ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 60, 63, 260, 261, 264, 265, 266, 270, and 271

[FRL–6413–3]

RIN 2050–AEO1

NESHAPS: Final Standards for Hazardous Air Pollutants for Hazardous Waste Combustors

ACTION: Final rule.

SUMMARY: We are promulgating revised standards for hazardous waste incinerators, hazardous waste burning cement kilns, and hazardous waste burning lightweight aggregate kilns. These standards are being promulgated under joint authority of the Clean Air Act (CAA) and Resource Conservation and Recovery Act (RCRA). The standards limit emissions of chlorinated dioxins and furans, other toxic organic compounds, toxic metals, hydrochloric acid, chlorine gas, and particulate matter. These standards reflect the performance of Maximum Achievable Control Technologies (MACT) as specified by the Clean Air Act. These MACT standards also will result in increased protection to human health and the environment over existing RCRA standards.

DATES: This final rule is in effect on September 30, 1999. You are required to be in compliance with these promulgated standards 3 years following the effective date of the final rule (i.e., September 30, 2002). You are provided with the possibility of a site-specific one year extension for the installation of controls to comply with the final standards or for waste minimization reductions. The incorporation by reference of certain publications listed in the rule was approved by the Director of the Federal Register as of September 30, 1999.

ADDRESSES: The official record (*i.e.*, public docket) for this rulemaking is identified as Docket Numbers: F–96–RCSP–FFFFF, F–97–CS2A–FFFFF, F–97–CS3A–FFFFF, F–97–CS4A–FFFFF, F–97–CS5A–FFFFF, F–97–CS6A–FFFFF, F–98–RCSF–FFFFF, and F–1999–RC2F–FFFFF. The official record is located in the RCRA Information Center (RIC), located at Crystal Gateway One, 1235 Jefferson Davis Highway, First Floor, Arlington, Virginia. The mailing address for the official record is RCRA Information Center, Office of Solid Waste (5305W), U.S. Environmental Protection Agency Headquarters, 401 M Street, SW, Washington, DC 20460.

Public comments and supporting materials are available for viewing in the RIC. The RIC is open from 9 a.m. to 4 p.m., Monday through Friday, excluding federal holidays. To review docket materials, you must make an appointment by calling 703–603–9230 or by sending a message via e-mail to: RCRA-Docket@epamail.epa.gov. You may copy a maximum of 100 pages from any regulatory docket at no charge. Additional copies cost 15 cent/page. The index for the official record and some supporting materials are available electronically. See the ''Supplementary Information'' section of this **Federal Register** notice for information on accessing the index and these supporting materials.

FOR FURTHER INFORMATION CONTACT: For general information, you can contact the RCRA Hotline at 1–800–424–9346 or TDD 1–800–553–7672 (hearing impaired). In the Washington metropolitan area, call 703–412–9810 or TDD 703–412–3323. For additional information on the Hazardous Waste Combustion MACT rulemaking and to access available electronic documents, please go to our Web page: www.epa.gov/hwcmact. Any questions or comments on this rule can also be sent to EPA via our Web page.

For more detailed information on technical requirements of this rulemaking, you can contact Mr. David Hockey, 703–308–8846, electronic mail: Hockey.David@epamail.epa.gov. For more detailed information on permitting associated with this rulemaking, you can contact Ms. Patricia Buzzell, 703–308–8632, electronic mail: Buzzell.Tricia@epamail.epa.gov. For more detailed information on compliance issues associated with this rulemaking, you can contact Mr. Larry Gonzalez, 703–308–8468, electronic mail: Gonzalez.Larry@epamail.epa.gov. For more detailed information on the assessment of potential costs, benefits and other impacts associated with this rulemaking, you can contact Mr. Lyn Luben, 703–308–0508, electronic mail: Luben.Lyn@epamail.epa.gov. For more detailed information on risk analyses associated with this rulemaking, you can contact Mr. David Layland, 703–308–0482, electronic mail: Layland.David@epamail.epa.gov.

SUPPLEMENTARY INFORMATION:

Official Record. The official record is the paper record maintained at the address in **ADDRESSES** above. All comments that were received electronically were converted into paper form and placed in the official record, which also includes all comments submitted directly in writing. Our responses to comments, whether the comments are written or electronic, are located in the response to comments document in the official record for this rulemaking.

Supporting Materials Availability on the Internet. The index for the official record and the following supporting materials are available on the Internet as:

—Technical Support Documents for HWC MACT Standards:
  —Volume I: Description of Source Categories
  —Volume II: HWC Emissions Database
  —Volume III: Selection of MACT Standards and Technologies
  —Volume IV: Compliance with the MACT Standards
  —Volume V: Emission Estimates and Engineering Costs
—Assessment of the Potential Costs, Benefits and Other Impacts of the Hazardous Waste Combustion MACT Standards—Final Rule
—Risk Assessment Support to the Development of Technical Standards for Emissions from Combustion Units Burning Hazardous Wastes: Background Information Document
—Response to Comments for the HWC MACT Standards Document

To access the information electronically from the World Wide Web (WWW), type: *www.epa.gov/hwcmact*

Outline

Acronyms Used in the Rule

acfm—Actual cubic feet per minute
BIF—Boilers and industrial furnaces
CAA—Clean Air Act
CEMS—Continuous emissions monitors/monitoring system
CFR—Code of Federal Regulations
DOC—Documentation of Compliance
DRE—Destruction and Removal Efficiency
dscf—Dry standard cubic foot
dscm—Dry standard cubic meter
EPA/USEPA—United States Environmental Protection Agency
gr—Grains
HSWA—Hazardous and Solid Waste Amendments
kg—Kilogram
MACT—Maximum Achievable Control Technology
mg—Milligrams
Mg—Megagrams (metric tons)
NOC—Notification of Compliance
NESHAP—National Emission Standards for HAPs
ng—Nanograms
NODA—Notice of Data Availability
NPRM—Notice of Proposed Rulemaking
POHC—Principal Organic Hazardous Constituent

ppmv—Parts per million by volume
ppmw—Parts per million by weight
RCRA—Resource Conservation and Recovery Act
R & D—Research and Development
SSRA—Site specific risk assessment
TEQ—Toxicity equivalence
μg—Micrograms

Outline

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Part One: Overview and Background for This Rule

I. What Is the Purpose of This Rule?

In this final rule, we adopt hallmark standards to more rigorously control toxic emissions from burning hazardous waste in incinerators, cement kilns, and lightweight aggregate kilns. These emission standards and continuation of our RCRA risk policy create a national cap for emissions that assures that combustion of hazardous waste in these devices is properly controlled.

The standards themselves implement section 112 of the Clean Air Act (CAA) and apply to the three major categories of hazardous waste burners—incinerators, cement kilns, and lightweight aggregate kilns. For purposes of today's rule, we refer to these three categories collectively as hazardous waste combustors. Hazardous waste combustors burn about 80% of the hazardous waste combusted annually within the United States. As a result, we project that today's standards will achieve highly significant reductions in the amount of hazardous air pollutants being emitted each year by hazardous waste combustors. For example, we estimate that 70 percent of the annual dioxin and furan emissions from hazardous waste combustors will be eliminated. Mercury emissions already controlled to some degree under existing regulations will be further reduced by about 55 percent.

Section 112 of the CAA requires emissions standards for hazardous air pollutants to be based on the performance of the Maximum Achievable Control Technology (MACT). The emission standards in this final rule are commonly referred to as MACT standards because we use the MACT concept to determine the levels of emission control under section 112(d) of the CAA.[1] At the same time, these emissions standards satisfy our obligation under the main statute regulating hazardous waste management, the Resource Conservation Recovery Act (RCRA), to ensure that hazardous waste combustion is conducted in a manner adequately protective of human health and the environment. Our use of both authorities as the legal basis for today's rule and details of the MACT standard-setting process are explained more fully in later sections of this preamble. Most significantly, by using both authorities in a harmonized fashion, we consolidate regulatory control of hazardous waste combustion into a single set of regulations, thereby eliminating the potential for conflicting or duplicative federal requirements.

Today's rule also has other important features in terms of our legal obligations and public commitments. First, promulgation of these standards fulfills our legal obligations under the CAA to control emissions of hazardous air pollutants from hazardous-waste burning incinerators and Portland cement kilns.[2] Second, today's rule fulfills our 1993 and 1994 public commitments to upgrade emission standards for hazardous waste combustors. These commitments are the centerpiece of our Hazardous Waste Minimization and Combustion Strategy.[3] Finally, today's rulemaking satisfies key terms of a litigation settlement agreement entered into in 1993 with a number of groups that had challenged our previous rule addressing emissions from hazardous waste boilers and industrial furnaces.[4]

II. In Brief, What Are the Major Features of Today's Rule?

The major features of today's final rule are summarized below.

A. Which Source Categories Are Affected by This Rule?

This rule establishes MACT standards for three source categories, namely: Hazardous waste burning incinerators, hazardous waste burning cement kilns, and hazardous waste burning lightweight aggregate kilns. As mentioned earlier, we refer to these three source categories collectively as hazardous waste combustors.

B. How Are Area Sources Affected by This Rule?

This rule establishes that MACT standards apply to both major sources—sources that emit or have the potential to emit 10 tons or greater per year of any single hazardous air pollutant or 25 tons per year or greater of hazardous air pollutants in the aggregate—and area sources, all others. Area sources may be regulated under MACT standards if we find that the category of area sources ''presents a threat of adverse effects to human health or the environment * * * warranting regulation (under the MACT standards).'' We choose to regulate area sources in today's rule and, as a result, all hazardous waste burning incinerators, cement kilns, and lightweight aggregate kilns will be regulated under standards reflecting MACT.

C. What Emission Standards Are Established in This Rule?

This rule establishes emission standards for: Chlorinated dioxins and furans; mercury; particulate matter (as a surrogate for antimony, cobalt, manganese, nickel, and selenium); semivolatile metals (lead and cadmium); low volatile metals (arsenic, beryllium, and chromium); hydrogen chloride and chlorine gas (combined). This rule also establishes standards for carbon monoxide, hydrocarbons, and destruction and removal efficiency as surrogates in lieu of individual standards for nondioxin/furan organic hazardous air pollutants.

D. What Are the Procedures for Complying With This Rule?

This rule establishes standards that apply at all times (including during startup, shutdown, or malfunction), except if hazardous waste is not being burned or is not in the combustion chamber. When not burning hazardous waste (and when hazardous waste does not remain in the combustion chamber), you may either follow the hazardous waste burning standards in this rule or emission standards we promulgate, if any, for other relevant nonhazardous waste source categories.

Initial compliance is documented by stack performance testing. To document continued compliance with the carbon monoxide or hydrocarbon standards, you must use continuous emissions monitoring systems. For the remaining standards, you must document continued compliance by monitoring limits on specified operating parameters. These operating parameter

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[1] The MACT standards reflect the ''maximum degree of reduction in emissions of * * * hazardous air pollutants'' that the Administrator determines is achievable, taking into account the cost of achieving such emission reduction and any nonair quality health and environmental impacts and energy requirements. Section 112(d)(2).

[2] In a 1992 **Federal Register** notice, we published the inital list of categories of major and area sources of hazardous air pollutants including hazardous waste incinerators and Portland cement plants. See 57 FR 31576 (July 16, 1992). Today's rule meets our obligation to issue MACT standards for hazardous waste incinerators. Today's rule also partially meets our obligation to issue MACT standards for Portland cement plants. To complete the obligation, we have finalized, in a separate rulemaking, MACT standards for the portland cement industry source category. Those standards apply to all cement kilns except those kilns that burn hazardous waste. See 64 FR 31898 (June 14, 1999). Those standards also apply to other HAP emitting sources at a cement plant (such as clinker coolers, raw mills, finish mills, and materials handling operations) regardless of whether the plant has hazardous waste burning cement kilns.

[3] EPA Document Number 530–R–94–044, Office of Solid Waste and Emergency Response, November 1994.

[4] ''Burning of Hazardous Waste in Boilers and Industrial Furnaces'' (56 FR 7134, February 21, 1991). These groups include the Natural Resources Defense Council, Sierra Club, Environmental Technology Council, National Solid Waste Management Association, and a number of local citizens' groups.

limits[5] are calculated based on performance test conditions using specified procedures intended to ensure that the operating conditions (and by correlation the actual emissions) do not exceed performance test levels at any time. You must also install an automatic waste feed cutoff system that immediately stops the flow of hazardous waste feed to the combustor if a continuous emissions monitoring system records a value exceeding the standard or if an operating parameter limit is exceeded (considering the averaging period for the standard or operating parameter). The standards and operating parameter limits apply when hazardous waste is being fed or remains in the combustion chamber irrespective of whether you institute the corrective measures prescribed in the startup, shutdown, and malfunction plan.

E. What Subsequent Performance Testing Must Be Performed?

You must conduct comprehensive performance testing every five years. This testing regime is referred to as ''subsequent performance testing.'' You must revise the operating parameter limits as necessary based on the levels achieved during the subsequent performance test. In addition, you must conduct confirmatory performance testing of dioxins/furans emissions under normal operating conditions midway between subsequent performance tests.

F. What Is the Time Line for Complying With This Rule?

The compliance date of the standards promulgated in today's rule is three years after the date of publication of the rule in the **Federal Register**, or September 30, 2002 (See CAA section 112(i)(3)(A) indicating that the Environmental Protection Agency (EPA) may establish a compliance date no later than three years from the date of promulgation.) A one-year extension of the compliance date may be requested if you cannot complete system retrofits by the compliance date despite a good faith effort to do so.[6] CAA section 112(i)(3)(B). Continuous emissions monitoring systems and other continuous monitoring systems for the specified operating parameters must be fully operational by the compliance date. You must demonstrate compliance by conducting a performance test no later than 6 months after the compliance date (i.e., three and one-half years from the date of publication of today's rule in the **Federal Register**).

To ensure timely compliance with the standards, by the compliance date you must place in the operating record a Documentation of Compliance identifying limits on the specified operating parameters you believe are necessary and sufficient to comply with the emission standards. These operating parameter limits (and the carbon monoxide or hydrocarbon standards monitored with continuous monitoring systems) are enforceable until you submit to the Administrator a Notification of Compliance within 90 days of completion of the performance test.

The Notification of Compliance must document: (1) Compliance with the emission standards during the performance test; (2) the revised operating parameter limits calculated from the performance test; and (3) conformance of the carbon monoxide or hydrocarbon continuous emissions monitoring systems and the other continuous monitoring systems with performance specifications. You must comply with the revised operating parameter limits upon submittal of the Notification of Compliance.

G. How Does This Rule Coordinate With the Existing RCRA Regulatory Program?

You must have a RCRA permit for stack air emissions (or RCRA interim status) until you demonstrate compliance with the MACT standards. You do so by conducting a comprehensive performance test and submitting a Notification of Compliance to the Administrator, as explained above.[7] Hazardous waste combustors with RCRA permits remain subject to RCRA stack air emission permit conditions until the RCRA permit is modified to delete those conditions. (As discussed later in more detail, we recommend requesting modification of the RCRA permit at the time you submit the Notification of Compliance.) Only those provisions of the RCRA permit that are less stringent than the MACT requirements specified in the Notification of Compliance will be approved for deletion.[8] Hazardous waste combustors still in interim status without a full RCRA permit are no longer subject to the RCRA stack air emissions standards for hazardous waste combustors in Subpart O of Part 265 and subpart H of part 266 once compliance with the MACT standards has been demonstrated and a Notification of Compliance has been submitted to the Administrator.

You must satisfy both sets of requirements during the relatively short period when both RCRA and MACT stack air emissions standards and associated requirements in the RCRA permit or in RCRA interim status regulations are effective.

You also may have existing site-specific permit conditions. On a case-by-case basis during RCRA permit issuance or renewal, we determine whether further regulatory control of emissions is needed to protect human health and the environment, notwithstanding compliance with existing regulatory standards. Additional conditions may be included in the permit in addition to those derived from the RCRA emission standards as necessary to ensure that facility operations are protective of human health and the environment. Any of these risk-based permit provisions more stringent than today's MACT standards (or that address other emission hazards) will remain in the RCRA permit.

After the MACT compliance date, hazardous waste combustors must continue to comply with the RCRA permit issuance process to address nonMACT provisions (*e.g.*, general facility standards) and potentially conduct a risk review under § 270.32(b)(2) to determine if additional requirements pertaining to stack or other emissions are warranted to ensure protection of human health and the environment.

III. What Is the Basis of Today's Rule?

As stated previously, this rule issues final National Emissions Standards for Hazardous Air Pollutants (NESHAPS) under authority of section 112 of the Clean Air Act for three source categories of combustors: Hazardous waste burning incinerators, hazardous waste burning cement kilns, and hazardous waste burning lightweight aggregate kilns. The main purposes of the CAA are to protect and enhance the quality of our Nation's

[5] The term ''operating parameter limit'' and ''operating limit'' have the same meaning and are used interchangeably in the preamble and rule language.

[6] In June 1998, we promulgated a rule to allow hazardous waste combustors also to request a one-year extension to the MACT compliance date in cases where additional time will be needed to install pollution prevention and waste minimization measures to significantly reduce the amount or toxicity of hazardous waste entering combustion feedstreams. See 63 FR at 43501 (June 19, 1998). This provision is recodified in today's rule as 40 CFR 63.1213.

[7] Hazardous waste combustors, of course, also continue to be subject to applicable RCRA requirements for all other aspects of their hazardous waste management activities that are separate from the requirements being deferred to the CAA by this rule.

[8] RCRA permit requirements that may be less stringent than applicable MACT standards are nonetheless enforceable until the RCRA permit is modified.

air resources, and to promote the public health and welfare and the productive capacity of the population. CAA section 101(b)(1). To this end, sections 112(a) and (d) of the CAA direct EPA to set standards for stationary sources emitting (or having the potential to emit) ten tons or greater of any one hazardous air pollutant or 25 tons or greater of total hazardous air pollutants annually. Such sources are referred to as ''major sources.''

Today's rule establishes MACT emission standards for the following hazardous air pollutants emitted by hazardous waste burning incinerators, hazardous waste burning cement kilns, and hazardous waste burning lightweight aggregate kilns: Chlorinated dioxins and furans, mercury, two semivolatile metals (lead and cadmium), three low volatility metals (arsenic, beryllium, and chromium), and hydrochloric acid/chlorine gas. This rule also establishes MACT control for the other hazardous air pollutants identified in CAA section 112(b)(1) through the adoption of standards using surrogates. For example, we adopt a standard for particulate matter as a surrogate to control five metals that do not have specific emission standards established in today's rule. These five metals are antimony, cobalt, manganese, nickel, and selenium. Also, we adopt standards for carbon monoxide, hydrocarbons, and destruction and removal efficiency to control the other organic hazardous air pollutants listed in section 112(b)(1) that do not have specific emission standards established in this rule.

Today's standards meet our commitment under the Hazardous Waste Minimization and Combustion Strategy, first announced in May 1993, to upgrade the emission standards for hazardous waste burning facilities. EPA's Strategy has eight goals: (1) Ensure public outreach and EPA-State coordination; (2) pursue aggressive use of waste minimization measures; (3) continue to ensure that combustion and alternative and innovative technologies are safe and effective; (4) develop and impose more rigorous controls on combustion facilities; (5) continue aggressive compliance and enforcement efforts; (6) enhance public involvement opportunities in the permitting process for combustion facilities; (7) give higher priority to permitting those facilities where a final permit decision would result in the greatest environmental benefit or the greatest reduction in risk; and (8) advance scientific understanding on combustion issues and risk assessment and ensure that permits are issued in a manner that provides proper protection of human health and the environment.

We have made significant progress in implementing the Strategy. Today's rule meets the Strategy goal of developing and implementing rigorous state-of-the-art safety controls on hazardous waste combustors by using the best available technologies and the most current science.[9] We also developed a software tool (*i.e.*, the Waste Minimization Prioritization Tool) that allows users to access relative persistent, bioaccumulative and toxic hazard scores for any of 2,900 chemicals that may be present in RCRA waste streams. We also committed to the reduction of the generation of the most persistent, bioaccumulative and toxic chemicals by 50 percent by 2005. To facilitate this reduction we are developing a list of the persistent, bioaccumulative and toxic chemicals of greatest concern and a plan for working with the regulated community to reduce these chemicals. In addition, we promulgated new requirements to enhance public involvement in the permitting process[10] and performed risk evaluations during the permitting process for high priority facilities. We also made allowances for one-year extensions to the MACT compliance period as incentives designed to promote the installation of cost-effective pollution prevention technologies to replace or supplement emission control technologies for meeting MACT standards.

Finally, with regard to the regulatory framework that will result from today's rule, we are eliminating the existing RCRA stack emissions national standards for hazardous waste incinerators, cement kilns, and lightweight aggregate kilns. That is, after submittal of the Notification of Compliance established by today's rule (and, where applicable, RCRA permit modifications at individual facilities), RCRA national stack emission standards will no longer apply to these hazardous waste combustors. We originally issued air emission standards under the authority of section 3004(a) of RCRA, which calls for EPA to promulgate standards ''as may be necessary to protect human health and the environment.'' In light of today's new MACT standards, we have determined that RCRA emissions standards for these sources would only be duplicative and so are no longer necessary to protect human health and the environment. Under the authority of section 3004(a), it is appropriate to eliminate such duplicative standards.

Emission standards for hazardous waste burning incinerators and other sources burning hazardous wastes as fuel must be protective of human health and the environment under RCRA. We conducted a multipathway risk assessment to assess the ecological and human health risks that are projected to occur under the MACT standards. We have concluded that the MACT standards are generally protective of human health and the environment and that separate RCRA emission standards are not needed. Please see a full discussion of the national assessment of exposures and risk in Part VIII of this preamble.

Additionally, RCRA section 1006(b) directs EPA to integrate the provisions of RCRA for purposes of administration and enforcement and to avoid duplication, to the maximum extent practicable, with the appropriate provisions of the Clean Air Act and other federal statutes. This integration must be done in a way that is consistent with the goals and policies of these statutes. Therefore, section 1006(b) provides further authority for EPA to eliminate the existing RCRA stack emissions standards to avoid duplication with the new MACT standards. Nevertheless, under the authority of RCRA's ''omnibus'' clause (section 3005(c)(3); see 40 CFR 270.32(b)(2)), RCRA permit writers may still impose additional terms and conditions on a site-specific basis as may be necessary to protect human health and the environment.

IV. What Was the Rulemaking Process for Development of This Rule?

We proposed MACT standards for hazardous waste burning incinerators, hazardous waste burning cement kilns, and hazardous waste burning lightweight aggregate kilns on April 19, 1996. (61 FR 17358) In addition, we published five notices of data availability (NODAs):

1. August 23, 1996 (61 FR 43501), inviting comment on information pertaining to a peer review of three aspects of the proposed rule and information pertaining to the since-promulgated ''Comparable Fuels'' rule (see 63 FR 43501 (June 19, 1998));

2. January 7, 1997 (62 FR 960), inviting comment on an updated hazardous waste combustor data base containing the emissions and ancillary

[9] The three source categories covered by today's final rule burn more than 80 percent of the total amount of hazardous waste being combusted each year. The remaining 15–20 percent is burned in industrial boilers and other types of industrial furnaces, which will be addressed in a future NESHAPS rulemaking for hazardous waste burning sources.

[10] See 60 FR 63417 (December 11, 1995).

data that the Agency used to develop the final rule;

3. March 21, 1997 (62 FR 13775), inviting comment on our approach to demonstrate the technical feasibility of monitoring particulate matter emissions from hazardous waste combustors using continuous emissions monitoring systems;

4. May 2, 1997 (62 FR 24212), inviting comment on several topics including the status of establishing MACT standards for hazardous waste combustors using a revised emissions data base and the status of various implementation issues, including compliance dates, compliance requirements, performance testing, and notification and reporting requirements; and

5. December 30, 1997 (62 FR 67788), inviting comment on several status reports pertaining to particulate matter continuous emissions monitoring systems.

Finally, we have had many formal and informal meetings with stakeholders, representing an on-going dialogue on various aspects of the rulemaking.

We carefully considered information and comments submitted by stakeholders on these rulemaking actions and during meetings. We address their comments in our Response to Comments documents, which can be found in the public docket supporting this rulemaking. In addition, we addressed certain significant comments at appropriate places in this preamble.

Part Two: Which Devices Are Subject to Regulation?

I. Hazardous Waste Incinerators

Hazardous waste incinerators are enclosed, controlled flame combustion devices, as defined in 40 CFR 260.10. These devices may be fixed or transportable. Major incinerator designs used in the United States are rotary kilns, fluidized beds, liquid injection and fixed hearth, while newer designs and technologies are also coming into operation. Detailed descriptions of the designs, types of facilities and typical air pollution control devices were presented in the April 1996 NPRM and in the technical background document prepared to support the NPRM. (See 61 FR 17361, April 19, 1996.) In 1997, there were 149 hazardous waste incinerator facilities operating 189 individual units in the U.S. Of these 149 facilities, 20 facilities (26 units) were commercial hazardous waste incinerators, while the remaining 129 facilities (163 units) were on-site hazardous waste incinerators.

II. Hazardous Waste Burning Cement Kilns

Cement kilns are horizontally inclined rotating cylinders, lined with refractory-brick, and internally fired. Cement kilns are designed to calcine, or drive carbon dioxide out of, a blend of raw materials such as limestone, shale, clay, or sand to produce Portland cement. When combined with sand, gravel, water, and other materials, Portland cement forms concrete, a material used widely in many building and construction applications.

Generally, there are two different processes used to produce Portland cement: a wet process and a dry process. In the wet process, raw materials are ground, wetted, and fed into the kiln as a slurry. In the dry process, raw materials are ground and fed dry into the kiln. Wet process kilns are typically longer in length than dry process kilns to facilitate water evaporation from the slurried raw material. Dry kilns use less energy (heat) and also can use preheaters or precalciners to begin the calcining process before the raw materials are fed into the kiln.

A number of cement kilns burn hazardous waste-derived fuels to replace some or all of normal fossil fuels such as coal. Most kilns burn liquid waste; however, cement kilns also may burn bulk solids and small containers containing viscous or solid hazardous waste fuels. Containers are introduced either at the upper, raw material end of the kiln or at the midpoint of the kiln.

All existing hazardous waste burning cement kilns use particulate matter control devices. These cement plants either use fabric filters (baghouses) or electrostatic precipitators to control particulate matter.

In 1997, there were 18 Portland cement plants operating 38 hazardous waste burning kilns. Of these 38 kilns, 27 kilns use the wet process to manufacture cement and 11 kilns use the dry process. Of the dry process kilns, one kiln uses a preheater and another kiln used a preheater and precalciner. Detailed descriptions of the design types of facilities and typical air pollution control devices are presented in the technical background document.[11]

In developing standards, the Agency considered the appropriateness of distinguishing among the different types of cement kilns burning hazardous waste. We determined that distinguishing subcategories of hazardous waste burning cement kilns was not needed to develop uniform, achievable MACT standards. (See Part Four, Section VII of the preamble for a discussion of subcategory considerations.)

III. Hazardous Waste Burning Lightweight Aggregate Kilns

The term ''lightweight aggregate'' refers to a wide variety of raw materials (such as clay, shale, or slate) that, after thermal processing, can be combined with cement to form concrete products. Lightweight aggregate concrete is produced either for structural purposes or for thermal insulation purposes. A lightweight aggregate plant is typically composed of a quarry, a raw material preparation area, a kiln, a cooler, and a product storage area. The material is taken from the quarry to the raw material preparation area and from there is fed into the rotary kiln.

A rotary kiln consists of a long steel cylinder, lined internally with refractory bricks, which is capable of rotating about its axis and is inclined horizontally. The prepared raw material is fed into the kiln at the higher end, while firing takes place at the lower end. As the raw material is heated, it melts into a semiplastic state and begins to generate gases that serve as the bloating or expanding agent. As temperatures reach their maximum, the semiplastic raw material becomes viscous and entraps the expanding gases. This bloating action produces small, unconnected gas cells, which remain in the material after it cools and solidifies. The product exits the kiln and enters a section of the process where it is cooled with cold air and then conveyed to the discharge. Kiln operating parameters such as flame temperature, excess air, feed size, material flow, and speed of rotation vary from plant to plant and are determined by the characteristics of the raw material.

In 1997, there were five lightweight aggregate kiln facilities in the United States operating 10 hazardous waste-fired kilns. Detailed descriptions of the lightweight aggregate process and air pollution control techniques are presented in the technical support document.[12]

[11] USEPA, ''Final Technical Support Document for HWC MACT Standards, Volume I: Description of Source Categories,'' July 1999.

[12] USEPA, ''Final Technical Support Document for HWC MACT Standards, Volume I: Description of Source Categories,'' July 1999.

Part Three: How Were the National Emission Standards for Hazardous Air Pollutants (NESHAP) in This Rule Determined?

I. What Authority Does EPA Have To Develop a NESHAP?

The 1990 Amendments to the Clean Air Act (CAA) significantly revised the requirements for controlling emissions of hazardous air pollutants. EPA is required to develop a list of categories of major and area sources of the hazardous air pollutants identified in section 112 and to develop, over specified time periods, technology-based performance standards for sources of these hazardous air pollutants. See CAA sections 112(c) and 112(d). These source categories and subcategories are to be listed pursuant to section 112(c)(1). We published an initial list of 174 categories of such major and area sources in the **Federal Register** on July 16, 1992 (57 FR 31576), which was later amended at 61 FR 28197 (June 4, 1996)[13] and 63 FR 7155 (February 12, 1998). That list includes the Hazardous Waste Incineration, Portland Cement Manufacturing, and Clay Products Manufacturing source categories.

Promulgation of technology-based standards for these listed source categories is not necessarily the final step in the process. CAA section 112(f) requires the Agency to report to Congress on the estimated risk remaining after imposition of technology-based standards and make recommendations as to additional legislation needed to address such risk. If Congress does not act on any recommendation presented in this report, we are required to impose additional controls if such controls are needed to protect public health with an ample margin of safety or (taking into account costs, energy, safety, and other relevant factors) to prevent adverse environmental effects. In addition, if the technology-based standards for carcinogens do not reduce the lifetime excess cancer risk for the most exposed individual to less than one in a million (1×10^{-6}), then we must promulgate additional standards.

We prepared the Draft Residual Risk Report to Congress and announced its release on April 22, 1998 (63 FR 19914–19916). In that report, we did not propose any legislative recommendation to Congress. In section 4.2.4 of the report, we state that: ‘‘The legislative strategy embodied in the 1990 CAA Amendments adequately maintains the goal of protecting the public health and the environment and provides a complete strategy for dealing with a variety of risk problems. The strategy recognizes that not all problems are national problems or have a single solution. National emission standards will be promulgated to decrease the emissions of as many hazardous air pollutants as possible from major sources.’’

II. What Are the Procedures and Criteria for Development of NESHAPs?

A. Why Are NESHAPs Needed?

NESHAPs are developed to control hazardous air pollutant emissions from both new and existing sources. The statute requires a NESHAP to reflect the maximum degree of reduction of hazardous air pollutant emissions that is achievable taking into consideration the cost of achieving the emission reduction, any nonair quality health and environmental impacts, and energy requirements. NESHAPs are often referred to as maximum achievable control technology (or MACT) standards.

We are required to develop MACT emission standards based on performance of the best control technologies for categories or sub-categories of major sources of hazardous air pollutants. We also can establish lower thresholds for determining which sources are major where appropriate. In addition, we may require sources emitting particularly dangerous hazardous air pollutants such as particular dioxins and furans to control those pollutants under the MACT standards for major sources.

In addition, we regulate area sources by technology-based standards if we find that these sources (individually or in the aggregate) present a threat of adverse effects to human health or the environment warranting regulation. After such a determination, we have a further choice whether to require technology-based standards based on MACT or on generally achievable control technology.

B. What Is a MACT Floor?

The CAA directs EPA to establish minimum emission standards, usually referred to as MACT floors. For existing sources in a category or subcategory with 30 or more sources, the MACT floor cannot be less stringent than the ‘‘average emission limitation achieved by the best performing 12 percent of the existing sources. * * *’’ For existing sources in a category or subcategory with less than 30 sources, the MACT floor cannot be less stringent than the ‘‘average emission limitation achieved by the best performing 5 sources. * * *’’ For new sources, the MACT floor cannot be ‘‘less stringent than the emission control that is achieved by the best controlled similar source. * * *’’

We must consider in a NESHAP rulemaking whether to develop standards that are more stringent than the floor, which are referred to as ‘‘beyond-the-floor’’ standards. To do so, we must consider statutory criteria, such as the cost of achieving emission reduction, cost effectiveness, energy requirements, and nonair environmental implications.

Section 112(d)(2) specifies that emission reductions may be accomplished through the application of measures, processes, methods, systems, or techniques, including, but not limited to: (1) Reducing the volume of, or eliminating emissions of, such pollutants through process changes, substitution of materials, or other modifications; (2) enclosing systems or processes to eliminate emissions; (3) collecting, capturing, or treating such pollutants when released from a process, stack, storage, or fugitive emissions point; (4) design, equipment, work practice, or operational standards (including requirements for operator training or certification); or (5) any combination of the above. See section 112(d)(2).

Application of techniques (1) and (2) are consistent with the definitions of pollution prevention under the Pollution Prevention Act and the definition of waste minimization under RCRA. In addition, these definitions are in harmony with our Hazardous Waste Minimization and Combustion Strategy. These terms have particular applicability in the discussion of pollution prevention/waste minimization incentives, which were finalized at 63 FR 33782 (June 19, 1998) and which are summarized in the permitting and compliance sections of this final rule.

C. How Are NESHAPs Developed?

To develop a NESHAP, we compile available information and in some cases collect additional information about the industry, including information on emission source quantities, types and characteristics of hazardous air pollutants, pollution control technologies, data from emissions tests (e.g., compliance tests, trial burn tests) at controlled and uncontrolled facilities, and information on the costs and other energy and environmental impacts of emission control techniques. We use this information in analyzing and developing possible regulatory

[13] A subsequent Notice was published on July 18, 1996 (61 FR 37542) which corrected typographical errors in the June 4, 1996 Notice.

approaches. Of course, we are not always able to assemble the same amount of information per industry and typically base the NESHAP on information practically available.

NESHAPs are normally structured in terms of numerical emission limits. However, alternative approaches are sometimes necessary and appropriate. Section 112(h) authorizes the Administrator to promulgate a design, equipment, work practice, or operational standard, or a standard that is a combination of these alternatives.

III. How Are Area Sources and Research, Development, and Demonstration Sources Treated in This Rule?

A. Positive Area Source Finding for Hazardous Waste Combustors

1. How Are Area Sources Treated in This Rule?

In today's final rule, we make a positive area source finding pursuant to CAA section 112(c)(3) for hazardous waste burning incinerators, hazardous waste burning cement kilns, and hazardous waste burning lightweight aggregate kilns. This rule subjects both major and area sources in these three source categories to the same standards—the section 112(d) MACT standards. We make this positive area source determination because emissions from area sources subject to today's rule present a threat of adverse effects to human health and the environment. These threats warrant regulation under the section 112 MACT standards.

2. What Is an Area Source?

Area sources are sources emitting (or having the potential to emit) less than 10 tons per year of an individual hazardous air pollutant, and less than 25 tons per year of hazardous air pollutants in the aggregate. These sources may be regulated under MACT standards if we find that the sources ''presen[t] a threat of adverse effects to human health or the environment (by such sources individually or in the aggregate) warranting regulation under this section.'' Section 112(c)(3).

As part of our analysis, we estimate that all hazardous waste burning lightweight aggregate kilns are major sources, principally due to their hydrochloric acid emissions. We also estimate that approximately 80 percent of hazardous waste burning cement kilns are major sources, again due to hydrochloric acid emissions. Only approximately 30 percent of hazardous waste burning incinerators appear to be major sources, considering only the stack emissions from the incinerator. However, major and area source status is determined by the entire facility's hazardous air pollutant emissions, so that many on-site hazardous waste incinerators are major sources because they are but one contributing source of emissions among others (sometimes many others at large manufacturing complexes) at the same facility.

3. What Is the Basis for Today's Positive Area Source Finding?

The consequences of us not making a positive area source finding in this rule would result in an undesirable bifurcated regulation. First, the CAA provides independent authority to regulate certain hazardous air pollutant emissions under MACT standards, even if the emissions are from area sources. These are the hazardous air pollutants enumerated in section 112(c)(6), and include 2,3,7,8 dichlorobenzo-p-dioxins and furans, mercury, and some specific polycyclic organic hazardous air pollutants—hazardous air pollutants regulated under this rule. See 62 FR at 24213–24214. Thus, all sources covered by today's rule would have to control these hazardous air pollutants to MACT levels, even if we were not to make a positive area source determination. Second, because all hazardous air pollutants are fully regulated under RCRA, area source hazardous waste combustors would have not only a full RCRA permit, but also (as just explained) a CAA title V permit for the section 112(c)(6) hazardous air pollutants. One purpose of this rule is to avoid the administrative burden to sources resulting from this type of dual permitting, and these burdensome consequences of not making a positive area source finding have influenced our decision that area source hazardous waste combustors ''warrant regulation'' under section 112(d)(2).

a. Health and Environmental Factors. Our positive area source finding is based on the threats presented by emissions of hazardous air pollutants from area sources. We find that these threats warrant regulation under the MACT standards given the evident Congressional intent for uniform regulation of hazardous waste combustion sources, as well as the common emission characteristics of these sources and amenability to the same emission control mechanisms.

As discussed in both the April 1996 proposal and May 1997 NODA, all hazardous waste combustion sources, including those that may be area sources, have the potential to pose a threat of adverse effects to human health or the environment, although some commenters disagree with this point. These sources emit some of the most toxic, bioaccumulative and persistent hazardous air pollutants—among them dioxins, furans, mercury, and organic hazardous air pollutants. As discussed in these **Federal Register** notices and elsewhere in today's final rule, potential hazardous waste combustor area sources can be significant contributors to national emissions of these hazardous air pollutants. (See 62 FR 17365 and 62 FR 24213.)

Our positive area source finding also is based on the threat posed by products of incomplete combustion. The risks posed by these hazardous air pollutants cannot be directly quantified on a national basis, because each unit emits different products of incomplete combustion in different concentrations. However, among the products of incomplete combustion emitted from these sources are potential carcinogens.[14] The potential threat posed by emissions of these hazardous air pollutants is manifest and, for several reasons, we do not believe that control of these products of incomplete combustion should be left to the RCRA omnibus permitting process. First, we are minimizing the administrative burden on sources from duplicative permitting in this rule by minimizing the extent of RCRA permitting and hence minimizing our reliance on the omnibus process. Second, we are dealing with hazardous air pollutant emissions from these sources on a national rather than a case-by-case basis. We conclude that the control of products of incomplete combustion from all hazardous waste combustors through state-of-the art organic pollution control is the best way to do so from an implementation standpoint. Finally, a basic premise of the CAA is that there are so many uncertainties and difficulties in developing effective risk-based regulation of hazardous air pollutants that the first step should be technology-based standards based on Maximum Available Control Technology. See generally S. Rep. No. 228, 101st Cong. 1st Sess. 128–32 (1990). The positive area source finding and consequent MACT controls is consistent with this primary legislative objective.

The quantitative risk assessment for the final rule did not find risk from

[14] *E.g.*, benzene, methylene chloride, hexachlorobenzene, carbon tetrachloride, vinal chloride, benzo(a)pyrene, and chlorinated dioxins and furans. Energy and Environmental Research Corp., surrogate Evaluation for Thermal Treatment Systems, Draft Report, October 1994. Also see: USEPA, ''Final technical Support Document for HWC MACT Standards, Volume III: Section of MACT Standards and Technologies,'' July 1999.

mercury emissions from hazardous waste burning area source cement kilns to be above levels we generally consider acceptable. However, the uncertainties underlying the analysis are such that only qualitative judgments can be made. We do not believe our analysis can be relied upon to make a definitive quantitative finding about the precise magnitude of the risk. See Part Five, Section XIII for a discussion of uncertainty. Background exposures, which can be quite variable, were not considered in the quantitative assessment and are likely to increase the risk from incremental exposures to mercury from area source cement kilns. Commenters, on the other hand, believed that cement kilns did not pose significant risk and questioned our risk estimates made in the April 1996 NPRM and May 1997 NODA. However, taking into account the uncertainty of our mercury analysis and the likelihood of background exposures, a potential for risk from mercury may exist. Furthermore, the information available concerning the adverse human health effects of mercury, along with the magnitude of the emissions of mercury from area source cement kilns, also indicate that a threat of adverse effects is presumptive and that a positive area source finding is warranted.

b. Other Reasons Warranting Regulation under Section 112. Other special factors indicate that MACT standards are warranted for these sources.

The first reason is Congress's, our, and the public's strong preference for similar, if not identical, regulation of all hazardous waste combustors. Area sources are currently regulated uniformly under RCRA, with no distinction being made between smaller and larger emitters. This same desire for uniformity is reflected in the CAA. CAA section 112(n)(7) directs the Agency, in its regulation of HWCs under RCRA, to ''take into account any regulations of such emissions which are promulgated under such subtitle (*i.e.*, RCRA) and shall, to the maximum extent practicable and consistent with the provisions of this section, ensure that the requirements of such subtitle and this section are consistent.'' Congress also dealt with these sources as a single class by excluding hazardous waste combustion units regulated by RCRA permits from regulation as municipal waste combustors under CAA section 129(g)(1). Thus, a strong framework in both statutes indicates that air emissions from all hazardous waste combustors should be regulated under a uniform approach. Failure to adopt such a uniform approach would therefore be inconsistent with Congressional intent as expressed in both the language and the structure of RCRA and the CAA. Although many disagree, several commenters support the approach to apply uniform regulations for all hazardous waste combustors and assert that it is therefore appropriate and necessary to make the positive area source finding.

Second, a significant number of hazardous waste combustors could plausibly qualify as area sources by the compliance date through emissions reductions of one or more less dangerous hazardous air pollutants, such as total chlorine. We conclude it would be inappropriate to exclude from CAA 112(d) regulation and title V permitting a significant portion of the sources contributing to hazardous air pollutant emissions, particularly nondioxin products of incomplete combustion should this occur.

Third, the MACT controls identified for major sources are reasonable and appropriate for potential area sources. The emissions control equipment (and where applicable, feedrate control) defined as floor or beyond-the-floor control for each source category is appropriate and can be installed and operated at potential area sources. There is nothing unique about the types and concentrations of emissions of hazardous air pollutants from any class of hazardous waste combustors that would make MACT controls inappropriate for that particular class of hazardous waste combustors, but not the others. Commenters also raised the issue of applying generally available control technologies (GACT), in lieu of MACT, to area sources. Consideration of GACT lead us to the conclusion that GACT would likely involve the same types and levels of control as we identified for MACT. We believe GACT would be the same as MACT because the standards of this rule, based on MACT, are readily achievable, and therefore would also be determined to be generally achievable, *i.e.*, GACT.

Finally, we note that the determination here is unique to these RCRA sources, and should not be viewed as precedential for other CAA sources. In the language of the statute, there are special reasons that these RCRA sources warrant regulation under section 112(d)(2)—and so warrant a positive area source finding—that are not present for usual CAA sources. These reasons are discussed above—the Congressional desire for uniform regulation and our desire (consistent with this Congressional objective) to avoid duplicative permitting of these sources wherever possible. We repeat, however, that the positive area source determination here is not meant as a precedent outside the dual RCRA/CAA context.

B. How Are Research, Development, and Demonstration (RD&D) Sources Treated in This Rule?

Today's rule excludes research, development, and demonstration sources from the hazardous waste burning incinerator, cement kiln, and lightweight aggregate kiln source categories. We discuss below the statutory mandate to give special consideration to research and development (R&D) sources, an Advanced Notice of Proposed Rulemaking to list R&D facilities that we published in 1997, and qualifications for exclusion of R&D sources from the hazardous waste combustor source categories.

1. Why Does the CAA Give Special Consideration to Research and Development (R&D) Sources?

Section 112(c)(7) of the Clean Air Act requires EPA to ''establish a separate category covering research or laboratory facilities, as necessary to assure the equitable treatment of such facilities.'' Congress included such language in the Act because it was concerned that research and laboratory facilities should not arbitrarily be included in regulations that cover manufacturing operations. The Act defines a research or laboratory facility as ''any stationary source whose primary purpose is to conduct research and development into new processes and products, where such source is operated under the close supervision of technically trained personnel and is not engaged in the manufacture of products for commercial sale in commerce, except in a *de minimis* manner.''

We interpret the Act as requiring the listing of R&D major sources as a separate category to ensure equitable treatment of such facilities. Language in the Act specifying special treatment of R&D facilities (section 112(c)(7)), along with language in the legislative history of the Act, suggests that Congress considered it inequitable to subject the R&D facilities of an industry to a standard designed for the commercial production processes of that industry. The application of such a standard may be inappropriate because the wide range of operations and sizes of R&D facilities. Further, the frequent changes in R&D operations may be significantly different from the typically large and continuous production processes.

We have no information indicating that there are R&D sources, major or area, that are required to be listed and regulated, other than those associated with sources already included in listed source categories listed today. Although we are not aware of other R&D sources that need to be added to the source category list, such sources may exist, and we requested information about them in an Advance Notice of Proposed Rulemaking, as discussed in the next section.

2. When Did EPA Notice Its Intent To List R&D Facilities?

In May 1997 (62 FR 25877), we provided advanced notice that we were considering whether to list R&D facilities. We requested public comments and information on the best way to list and regulate such sources. Comment letters were received from industry, academic representatives, and governmental entities. After we compile additional data, we will respond to these comments in that separate docket. As a result we are not deciding how to address the issue in today's rule. The summary of comments and responses will be one part of the basis for our future decision whether to list R&D facilities as a source category of hazardous air pollutants.

3. What Requirements Apply to Research, Development, and Demonstration Hazardous Waste Combustor Sources?

This rule excludes research, development, and demonstration sources from the hazardous waste incinerator, cement kiln, or lightweight aggregate kiln source categories and therefore from compliance with today's regulations. We are excluding research, development, and demonstration sources from those source categories because the emission standards and compliance assurance requirements for those source categories may not be appropriate. The operations and size of a research, development, and demonstration source may be significantly different from the typical hazardous waste incinerator that is providing ongoing waste treatment service or hazardous waste cement kiln or hazardous waste lightweight aggregate kiln that is producing a commercial product as well as providing ongoing waste treatment.

We also are applying the exclusion to demonstration sources because demonstration sources are operated more like research and development sources than production sources. Thus, the standards and requirements finalized today for production sources may not be appropriate for demonstration sources. Including demonstration sources in the exclusion is consistent with our current regulations for hazardous waste management facilities. See § 270.65 providing opportunity for special operating permits for research, development, and demonstration sources that use an innovative and experimental hazardous waste treatment technology or process.

To ensure that research, development, and demonstration sources are distinguished from production sources, we have drawn from the language in section 112(c)(7) to define a research, development, and demonstration source. Specifically, these are sources engaged in laboratory, pilot plant, or prototype demonstration operations: (1) Whose primary purpose is to conduct research, development, or short-term demonstration of an innovative and experimental hazardous waste treatment technology or process; and (2) where the operations are under the close supervision of technically-trained personnel.[15]

In addition, today's rule limits the exclusion to research, development, and demonstration sources that operate for not longer than one year after first processing hazardous waste, unless the Administrator grants a time extension based on documentation that additional time is needed to perform research development, and demonstration operations. We believe that this time restriction will help distinguish between research, development, and demonstration sources and production sources. This time restriction draws from the one-year time restriction (unless extended on a case-by-case basis) currently applicable to hazardous waste research, development, and demonstration sources under § 270.65.

The exclusion of research, development, and demonstration sources applies regardless of whether the sources are located at the same site as a production hazardous waste combustor that is subject to the MACT standards finalized today. A research, development, and demonstration source that is co-located at a site with a production source still qualifies for the exclusion. A research, development, and demonstration source co-located with a production source is nonetheless expected to experience the type and range of operations and be of the size typical for other research, development, and demonstration sources.

Finally, hazardous waste research, development, and demonstration sources remain subject to RCRA permit requirements under § 270.65, which direct the Administrator to establish permit terms and conditions that will assure protection of human health and the environment.

Although we did not propose this exclusion specifically for hazardous waste combustor research, development, and demonstration sources, the exclusion is an outgrowth of the May 1997 notice discussed above. In that notice we explain that we interpret the CAA as requiring the listing of research and development major sources as a separate category to ensure equitable treatment of such facilities. A commenter on the April 1996 hazardous waste combustor NPRM questioned whether we intended to apply the proposed regulations to research and development sources. We did not have that intent, and in response are finalizing today an exclusion of research, development, and demonstration sources from the hazardous waste incinerator, hazardous waste burning cement kiln, and hazardous waste burning lightweight aggregate kiln source categories.

IV. How Is RCRA's Site-Specific Risk Assessment Decision Process Impacted by This Rule?

RCRA Sections 3004(a) and (q) mandate that standards governing the operation of hazardous waste combustion facilities be protective of human health and the environment. To meet this mandate, we developed national combustion standards under RCRA, taking into account the potential risk posed by direct inhalation of the emissions from these sources.[16] With advancements in the assessment of risk since promulgation of the original national standards (*i.e.*, 1981 for incinerators and 1991 for boilers and industrial furnaces), we recognized in the 1993 Hazardous Waste Minimization and Combustion Strategy that additional risk analysis was appropriate. Specifically, we noted that the risk posed by indirect exposure (e.g., ingestion of contamination in the food chain) to long-term deposition of metals,

[15] The statute also qualifies that research and development sources do not engage in the manufacture of products for commercial sale except in a *de minimis* manner. Although this qualification is appropriate for research and development sources, engaged in short-term demonstration of an innovative or experimental treatment technology or process may produce products for use in commerce. For example, a cement kiln engaged in a short-term demonstration of an innovative process may nonetheless produce marketable clinker in other than *de minimis* quantities. Consequently, we are not including this qualification in the definition of a research, development, and demonstration source.

[16] See No CFR part 264, subpart O for incinerator standards and 40 CFR part 266, subpart H for BIF standards.

dioxin/furans and other organic compounds onto soils and surface waters should be assessed in addition to the risk posed by direct inhalation exposure to these contaminants. We also recognized that the national assessments performed in support of the original hazardous waste combustor standards did not take into account unique and site-specific considerations which might influence the risk posed by a particular source. Therefore, to ensure the RCRA mandate was met on a facility-specific level for all hazardous waste combustors, we strongly recommended in the Strategy that site-specific risk assessments (SSRAs), including evaluations of risk resulting from both direct and indirect exposure pathways, be conducted as part of the RCRA permitting process. In those situations where the results of a SSRA showed that a facility's operations could pose an unacceptable risk (even after compliance with the RCRA national regulatory standards), additional risk-based, site-specific permit conditions could be imposed pursuant to RCRA's omnibus authority (section 3005(c)(3)).

Today's MACT standards were developed pursuant to section 112(d) of the CAA, which does not require a concurrent risk evaluation of those standards. To determine if the MACT standards would satisfy the RCRA protectiveness mandate in addition to the requirements of the CAA, we conducted a national RCRA evaluation of both direct and indirect risk as part of this rulemaking. If we found the MACT standards to be sufficiently protective so as to meet the RCRA mandate as well, we could consider modifying our general recommendation that SSRAs be conducted for all hazardous waste combustors, thereby lessening the regulatory burden to both permitting authorities and facilities.

In this section, we discuss: The applicability of both the RCRA omnibus authority and the SSRA policy to hazardous waste combustors subject to today's rulemaking; the implementation of the SSRA policy; the relationship of the SSRA policy to the residual risk requirement of section 112(f) of the CAA; and public comments received on these topics. A discussion of the national risk characterization methodology and results is provided in Part Five, Section XIII of today's notice.

A. What Is the RCRA Omnibus Authority?

Section 3005(c)(3) of RCRA (codified at 40 CFR 270.32(b)(2)) requires that each hazardous waste facility permit contain the terms and conditions necessary to protect human health and the environment. This provision is commonly referred to as the "omnibus authority" or "omnibus provision." It is the means by which additional site-specific permit conditions may be incorporated into RCRA permits should such conditions be necessary to protect human health and the environment.[17] SSRAs have come to be used by permitting authorities as a quantitative basis for making omnibus determinations for hazardous waste combustors.

In the April 1996 NPRM and May 1997 NODA, we discussed the RCRA omnibus provision and its relation to the new MACT standards. Commenters question whether the MACT standards supersede the omnibus authority with respect to hazardous waste combustor air emissions. Other commenters agree in principle with the continued applicability of the omnibus authority after promulgation of the MACT standards. These commenters recognize that there may be unique conditions at a given site that may warrant additional controls to those specified in today's notice. For those sources, the commenters acknowledge that permit writers must retain the legal authority to place additional operating limitations in a source's permit.

As noted above, the omnibus provision is a RCRA statutory requirement and does not have a CAA counterpart. The CAA does not override RCRA. Each statute continues to apply to hazardous waste combustors unless we determine there is duplication and use the RCRA section 1006(b) deferral authority to create a specific regulatory exemption.[18] Promulgation of the MACT standards, therefore, does not duplicate, supersede, or otherwise modify the omnibus provision or its applicability to sources subject to today's rulemaking. As indicated in the April 1996 NPRM, a RCRA permitting authority (such as a state agency) has the responsibility to supplement the national MACT standards as necessary, on a site-specific basis, to ensure adequate protection under RCRA. We recognize that this could result in a situation in which a source may be subject to emission standards and operating conditions under two regulatory authorities (*i.e.*, CAA and RCRA). Although our intent, consistent with the integration provision of RCRA section 1006(b), is to avoid regulatory duplication to the maximum extent practicable, we may not eliminate RCRA requirements if a source's emissions are not protective of human health and the environment when complying with the MACT standards.[19]

B. How Will the SSPA Policy Be Applied and Implemented in Light of This Mandate?

1. Is There a Continuing Need for Site-Specific Risk Assessments?

As stated previously, EPA's Hazardous Waste Minimization and Combustion Strategy recommended that SSRAs be conducted as part of the RCRA permitting process for hazardous waste combustors where necessary to protect human health and the environment. We intended to reevaluate this policy once the national hazardous waste combustion standards had been updated. We view today's MACT standards as more stringent than those earlier standards for incinerators, cement kilns and lightweight aggregate kilns. To determine if the MACT standards as proposed in the April 1996 NPRM would satisfy the RCRA mandate to protect human health and the environment, we conducted a national evaluation of both human health and ecological risk. That evaluation, however, did not quantitatively assess the proposed standards with respect to mercury and nondioxin products of incomplete combustion. This was due to a lack of adequate information regarding the behavior of mercury in the environment and a lack of sufficient emissions data and parameter values (*e.g.*, bioaccumulation values) for nondioxin products of incomplete combustion. Since it was not possible to suitably evaluate the proposed standards for the potential risk posed by mercury and nondioxin products of incomplete combustion, we elected in the April 1996 NPRM to continue recommending that SSRAs be conducted as part of the permitting process until we could conduct a further assessment once final MACT standards are promulgated and implemented.

Although some commenters agree with this approach, a number of other commenters question the necessity of a quantitative nondioxin product of incomplete combustion assessment to demonstrate RCRA protectiveness of the MACT standards. These commenters

[17] The risk-based permit conditions are in addition to those conditions required by the RCRA national regulatory standards for hazardous waste combustors (*e.g.*, general facility requirements).

[18] The risk-based permit conditions are in addition to those conditions required by the RCRA national regulatory standards for hazardous waste combustors (*e.g.*, general facility requirements).

[19] RCRA section 1006(b) authorizes deferral of RCRA provisions to other EPA-implemented authorities provided, among other things, that key RCRA policies and protections are not sacrificed. See *Chemical Waste Management* v. *EPA*, 976 F. 2d 2, 23, 25 (D.C. Cir. 1992).

assert that existing site-specific assessments demonstrate that emissions of nondioxin products of incomplete combustion are unlikely to produce significant adverse human health effects. However, we do not agree that sufficient SSRA information exists to conclude that emissions from these compounds are unlikely to produce significant adverse effects on human health and the environment on a national basis. First, only a limited number of completed SSRAs are available from which broader conclusions can be drawn. Second, nondioxin products of incomplete combustion emissions can vary widely depending on the type of combustion unit, hazardous waste feed and air pollution control device used. Third, a significant amount of uncertainty exists with respect to identifying and quantifying these compounds. Many nondioxin products of incomplete combustion cannot be characterized by standard analytical methodologies and are unaccounted for by standard emissions testing.[20] (On a site-specific basis, uncharacterized nondioxin products of incomplete combustion are typically addressed by evaluating the total organic emissions.) Fourth, nondioxin products of incomplete combustion can significantly contribute to the overall risk posed by a particular facility. For example, in the Waste Technologies Industries incinerator's SSRA, nondioxin organics were estimated to contribute approximately 30% of the total cancer risk to the most sensitive receptor located in the nearest subarea to the facility.[21] Fifth, national risk management decisions concerning the protectiveness of the MACT standards must be based on data that are representative of the hazardous waste combustors subject to today's rulemaking. We do not believe that the information afforded by the limited number of SSRAs now available is sufficiently complete or representative to render a national decision.[22]

Some commenters recommend discontinuing conducting SSRAs altogether. Other commenters, however, advocate continuing to conduct SSRAs, where warranted, as a means of addressing uncertainties inherent in the national risk evaluation and of addressing unique, site-specific circumstances not considered in the assessment.

In developing the national risk assessment for the final MAC standards, we expanded our original analysis to include a quantitative assessment of mercury patterned after the recently published Mercury Study Report to Congress.[23] We were unable to perform a similar assessment of nondioxin products of incomplete combustion emissions because of continuing data limitations for these compounds, despite efforts to collect additional data since publication of the April 1996 NPRM . Thus, we conclude that sufficient data are not available to quantitatively assess the potential risk from these constituents on a national level as part of today's rulemaking.

Given the results of the final national risk assessment for other hazardous air pollutants, we generally anticipate that sources complying with the MACT standards will not pose an unacceptable risk to human health or the environment. However, we cannot make a definitive finding in this regard for all hazardous waste combustors subject to today's MACT standards for the reasons discussed.

First, as discussed above, the national risk evaluation did not include an assessment of the risk posed by nondioxin products of incomplete combustion. As reflected in the Waste Technologies Industries SSRA, these compounds can significantly contribute to the overall risk posed by a hazardous waste combustor. Without a quantitative evaluation of these compounds, we cannot reliably predict whether the additional risk contributed by nondioxin products of incomplete combustion would or would not result in an unacceptable increase in the overall risk posed by hazardous waste combustors nationally.

Second, the quantitative mercury risk analysis conducted for today's rulemaking contains significant uncertainties. These uncertainties limit the use of the analysis for drawing quantitative conclusions regarding the risks associated with the national mercury MACT standard. Among others, the uncertainties include an incomplete understanding of the fate and transport of mercury in the environment and the biological significance of exposures to mercury in fish. (See Part Five, Section XIII.) Given these uncertainties, we believe that conducting a SSRA, which will assist a permit writer to reduce uncertainty on a site-specific basis, may be still warranted in some cases.[24] As the science regarding mercury fate and transport in the environment and exposure improves, and greater certainty is achieved in the future, we may be in a better position from which to draw national risk management conclusions regarding mercury risk.

Third, we agree with commenters who indicated that, by its very nature, the national risk assessment, while comprehensive, cannot address unique, site-specific risk considerations [25] As a result of these considerations, a separate analysis or ''risk check'' may be necessary to verify that the MACT standards will be adequately protective under RCRA for a given hazardous waste combustor.

Thus, we are recommending that for hazardous waste combustors subject to the Phase I final MACT standards, permitting authorities should evaluate the need for a SSRA on a case-by-case basis.[26] SSRAs are not anticipated to be necessary for every facility, but should be conducted for facilities where there is some reason to believe that operation

[20] USEPA, ''Development of a Hazardous Waste Incinerator Target Analyte List of Products of Incomplete Combustion'' EPA–600/R–98–076. 1998.

[21] The total cancer risk for this receptor was 1 x 10E–6. The results derived for the Waste Technologies Industries incinerator's SSRA are a combination of measurements and conservative estimates of stack and fugitive emissions, which were developed in tandem with an independent external peer review. USEPA, ''Risk Assessment for the Waste Technologies Industries Hazardous Waste Incineration Facility (East Livepool, Ohio)'' EPA–905–R97–002.

[22] Since publication of the April 1996 NPRM, we have expanded our national risk evaluation of the other hazardous waste combustor emissions (*e.g.,* metals) from 11 facilities to 76 facilities assessed for today's final rulemaking. The 76 facilities were selected using a stratified random sampling approach that allowed for a 90 percent probability of including at least one ''high risk'' facility. However, this larger set of facility assessments does not include an evaluation nondioxin products of incomplete combustion. See Part Five, Section XIII for further discussion.

[23] USEPA, ''Mercury Study Report to Congress, Volume III: Fate and Transport of Mercury in the Environment,'' EPA 452/R–97–005, December 1997.

[24] An example of the possible reduction in uncertainty which may be derived through the performance of a SSRA includes the degree of conversion of mercury to methyl mercury in water bodies. Due to the wide range of chemical and physical properties associated with surface water bodies, there appears to be a great deal of variability concerning mercury methylation. In conducting a SSRA, a risk assessor may choose to use a default value to represent the percentage of mercury assumed to convert to methyl mercury. Conversely, the risk assessor may choose to reduce the uncertainty in the analysis by deriving a site-specific value using actual surface water data. Chemical and physical properties that may influence mercury methylation include, but are not limited to: dissolved oxygen content, pH, dissolved organic content, salinity, nutrient concentrations, and temperature. See USEPA, ''Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities,'' EPA–530–D–98–001A, External Peer Review Draft, 1998.

[25] Including for example, unusual terrain or dispersion features, particularly sensitive ecosystems, unusually high contaminant background concentrations, and mercury methylation rates in surface water.

[26] We continue to recommend that for those HWCs not subject to the Phase I final MACT standards, as SSRA should be conducted as part of the RCRA permitting process.

in accordance with the MACT standards alone may not be protective of human health and the environment. If a SSRA does demonstrate that operation in accordance with the MACT standards may not be protective of human health and the environment, permitting authorities may require additional conditions as necessary. We consider this an appropriate course of action to ensure protection of human health and the environment under RCRA, given current limits to our scientific knowledge and risk assessment tools.

2. How Will the SSRA Policy Be Implemented?

Some commenters suggest that EPA provide regulatory language specifically requiring SSRAs. Adequate authority and direction already exists to require SSRAs on a case-by-case basis through current regulations and guidance (none of which are being reconsidered, revised or otherwise reopened in today's rulemaking). The omnibus provision (codified in 40 CFR 270.32(b)(2)) directs the RCRA permitting authority to include terms and conditions in the RCRA permit as necessary to ensure protection of human health and the environment. Under 40 CFR 270.10(k), the permitting authority may require a permittee or permit applicant to submit information where the permitting authority has reason to believe that additional permit conditions may be warranted under § 270.32(b)(2). Performance of a SSRA is a primary, although not exclusive mechanism by which the permitting authority may develop the information necessary to make the determination regarding what, if any, additional permit conditions are needed for a particular hazardous waste combustor. Thus, for hazardous waste combustors, the information required to establish permit conditions could include a SSRA, or the necessary information required to conduct a SSRA.

In 1994, we provided guidance concerning the appropriate methodologies for conducting hazardous waste combustor SSRAs.[27] This guidance was updated in 1998 and released for publication as an external peer review draft.[28] We anticipate that use of the updated and more detailed guidance will result in a more standardized assessments for hazardous waste combustors.

To implement the RCRA SSRA policy, we expect permitting authorities to continue evaluating the need for an individual hazardous waste combustor risk assessment on a case-by-case basis. We provided a list of qualitative guiding factors in the April 1996 NPRM to assist in this determination. One commenter is concerned that the subjectivity inherent in the list of guiding factors might lead to inconsistencies when determining if a SSRA is necessary and suggested that we provide additional guidance on how the factors should be used. We continue to believe that the factors provided, although qualitative, generally are relevant to the risk potential of hazardous waste combustors and therefore should be considered when deciding whether or not a SSRA is necessary. However, as a practical matter, the complexity of the multipathway risk assessment methodology precludes conversion of these qualitative factors into more definitive criteria. We will continue to compile data from SSRAs to determine if there are any trends which would assist in developing more quantitative or objective criteria for deciding on the need for a SSRA at any given site. In the interim, SSRAs provide the most credible basis for comparisons between risk-based emission limits and the MACT standards.

The commenter further suggests that EPA emphasize that the factors should be considered collectively due to their complex interplay (*e.g.*, exposure is dependent on fate and transport which is dependent on facility characteristics, terrain, meteorological conditions, etc.). We agree with the commenter. The elements comprising multipathway risk assessments are highly integrated. Thus, the considerations used in determining if a SSRA is necessary are similarly interconnected and should be evaluated collectively.

The guiding factors as presented in the April 1996 NPRM contained several references to the proposed MACT standards. As a result, we modified and updated the list to reflect promulgation of the final standards and to re-focus the factors to specifically address the types of considerations inherent in determining if a SSRA is necessary. The revised guiding factors are: (1) Particular site-specific considerations such as proximity to receptors, unique dispersion patterns, *etc.;* (2) identities and quantities of nondioxin products of incomplete combustion most likely to be emitted and to pose significant risk based on known toxicities (confirmation of which should be made through emissions testing); (3) presence or absence of other off-site sources of pollutants in sufficient proximity so as to significantly influence interpretation of a facility-specific risk assessment; (4) presence or absence of significant ecological considerations, such as high background levels of a particular contaminant or proximity of a particularly sensitive ecological area; (5) volume and types of wastes being burned, for example wastes containing highly toxic constituents both from an acute and chronic perspective; (6) proximity of schools, hospitals, nursing homes, day care centers, parks, community activity centers that would indicate the presence of potentially sensitive receptors; (7) presence or absence of other on-site sources of hazardous air pollutants so as to significantly influence interpretation of the risk posed by the operation of the source in question; and (8) concerns raised by the public. The above list of qualitative guiding factors is not intended to be all-inclusive; we recognize that there may be other factors equally relevant to the decision of whether or not a SSRA is warranted in particular situations.

With respect to existing hazardous waste combustion sources, we do not anticipate a large number of SSRAs will need to be performed after the compliance date of the MACT standards. SSRAs already have been initiated for many of these sources. We strongly encourage facilities and permitting authorities to ensure that the majority of those risk assessments planned or currently in progress be completed prior to the compliance date of the MACT standards. The results of these assessments can be used to provide a numerical baseline for emission limits. This baseline then can be compared to the MACT limits to determine if site-specific risk-based limits are appropriate in addition to the MACT limits for a particular source.

Several commenters suggest that completed risk assessments should not have to be repeated. We do not anticipate repeating many risk assessments. It should be emphasized that changes to comply with the MACT standards should not cause an increase in risk for the vast majority of the facilities given that the changes, in all probability, will be the addition of pollution control equipment or a reduction in the hazardous waste being burned. For those few situations in which the MACT requirements might result in increased potential risk for a particular facility due to unique site-specific considerations, the RCRA permit writer, however, may determine

[27] USEPA. ''Guidance for Performing Screening Level Risk Analyses at Combustion Facilities Burning Hazardous Wastes'' Draft, April 1994; USEPA. ''Implementation of Exposure Assessment Guidance for RCRA Hazardous Waste Combustion Facilities'' Draft, 1994.

[28] USEPA. ''Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities'' EPA–520–D–98–001A, B&C. External Peer Review Draft, 1998.

that a risk check of the projected MACT emission rates is in order.[29] Should the results of the risk check demonstrate that compliance with the MACT requirements does not satisfy the RCRA protectiveness mandate, the permitting authority should invoke the omnibus provision to impose more stringent, site-specific, risk-based permit conditions as necessary to protect human health and the environment.

With respect to new hazardous waste combustors and existing combustors for which a SSRA has never been conducted, we recommend that the decision of whether or not a SSRA is necessary be made prior to the approval of the MACT comprehensive performance test protocol, thereby allowing for the collection of risk emission data at the same time as the MACT performance testing, if appropriate (see Part Five, Section V). In those instances where it has been determined a SSRA is appropriate, the assessment should take into account both the MACT standards and any relevant site-specific considerations.

We emphasize that the incorporation of site-specific, risk-based permit conditions into a permit is not anticipated to be necessary for the vast majority of hazardous waste combustors. Rather, such conditions would be necessary only if compliance with the MACT requirements is insufficient to protect human health and the environment pursuant to the RCRA mandate and if the resulting risk-based conditions are more stringent than those required under the CAA. Risk-based permit conditions could include, but are not limited to, more stringent emission limits, additional operating parameter limits, waste characterization and waste tracking requirements.

C. What Is the Difference Between the RCRA SSRA Policy and the CAA Residual Risk Requirement?

Section 112(f) of the CAA requires the Agency to conduct an evaluation of the risk remaining for a particular source category after compliance with the MACT standards. This evaluation of residual risk must occur within eight years of the promulgation of the MACT standards for each source category. If it is determined that the residual risk is unacceptable, we must impose additional controls on that source category to protect public health with an ample margin of safety and to prevent adverse environmental effects.

Our SSRA policy is intended to address the requirements of the RCRA protectiveness mandate, which are different from those provided in the CAA. For example, the omnibus provision of RCRA requires that the protectiveness determination be made on a permit-by-permit or site-specific basis. The CAA residual risk requirement, conversely, requires a determination be made on a source category basis. Further, the time frame under which the RCRA omnibus determination is made is more immediate; the SSRA is generally conducted prior to final permit issuance. The CAA residual risk determination, on the other hand, is made at any time within the eight-year time period after promulgation of the MACT standards for a source category. Thus, the possibility of a future section 112(f) residual risk determination does not relieve RCRA permit writers of the present obligation to determine whether the RCRA protectiveness requirement is satisfied. Finally, nothing in the RCRA national risk evaluation for this rule should be taken as establishing a precedent for the nature or scope of any residual risk procedure under the CAA.

Part Four: What Is the Rationale for Today's Final Standards?

I. Emissions Data and Information Data Base

A. How Did We Develop the Data Base for This Rule?

To support the emissions standards in today's rule, we use a ''fourth generation'' data base that considers and incorporates public comments on previous versions of the data base. This final data base[24] summarizes emissions data and ancillary information on hazardous waste combustors that was primarily extracted from incinerator trial burn reports and cement and lightweight aggregate kiln Certification of Compliance test reports prepared as part of the compliance process for the current regulatory standards. Ancillary information in the data base includes general facility information (*e.g.*, location) process operating data (*e.g.*, waste, fuel, raw material compositions, feed rates), and facility equipment design and operational information (*e.g.*, air pollution control device temperatures).

The data base supporting the April 1996 proposal was the initial data base released for public comment.[25] We received a substantial number of public comments on this data base including identification of data errors and submission of many new trial burn and compliance test reports not already in the data base. Subsequently, we developed a ''second generation'' data base addressing these comments and, on January 7, 1997, published a NODA soliciting public comment on the updated data base. Numerous industry stakeholders submitted comments on the second generation data base. The data base was revised again to accommodate these public comments resulting in a ''third generation'' data base. We also published for comment a document indicating how specific public comments submitted in response to the January NODA were addressed.[26] In the May 1997 NODA, we used this third generation data base to re-evaluate the MACT standards. Since the completion of the third generation data base, we have incorporated additional data base comments and new test reports resulting in the ''fourth generation'' data base. This final data base is used to support all MACT analyses discussed in today's rule. Compared to the changes made to develop the third generation data base, those changes made in the fourth generation are relatively minor. The majority of these changes (e.g., incorporating a few trial burn reports and incorporating suggested revisions to the third generation data base) were in response to public comments received to May 1997 NODA.

B. How Are Data Quality and Data Handling Issues Addressed?

We selected approaches to resolve several data quality and handling issues regarding: (1) Data from sources no longer burning hazardous waste; (2) assigning values to reported nondetect measurements; (3) data generated under normal conditions versus worst-case compliance conditions; and (4) use of imputation techniques to fill in missing or unavailable data. This section discusses our selected approaches to these four issues.

[29] For example, hazardous waste burning cement kilns that previously monitored hydrocarbons in the main stack may elect to install a mid-kiln sampling port for carbon monoxide or hydrocarbon monitoring to avoid restrictions on hydrocarbon levels in the main stack. Thus, their stack hydrocarbon emissions may increase.

[24] USEPA, ''Final Technical Support Document for HWC MACT Standards, Volume II: HWC Emissions Database,'' July 1999.

[25] USEPA, ''Draft Technical Support Document for HWC MACT Standards, Volume II: HWC Emissions Database,'' February 1996.

[26] See USEPA, ''Draft Report of Revisions to Hazardous Waste Combustor Database Based on Public Comments Submitted in Response to the January 7, 1997 Notice of Data Availability (NODA),'' May 1997.

1. How Are Data From Sources No Longer Burning Hazardous Waste Handled?

Data and information from sources no longer burning hazardous waste are not considered in the MACT standards evaluations promulgated today. We note that some facilities have recently announced plans to cease burning hazardous waste. Because we cannot continually adjust our data base and still finalize this rulemaking, we concluded revisions to the data base in early 1998. Announcements or actual facility changes after that date simply could not be incorporated.

Numerous commenters responded to our request for comment on the appropriate approach to handle emissions data from sources no longer burning hazardous waste. In the April 1996 proposal, we considered all available data, including data from sources that had since ceased waste burning operations. However, in response to comments to the April 1996 NPRM, in the May 1997 NODA we excluded data from sources no longer burning hazardous waste and reevaluated the MACT floors with the revised data base. Of the data included in the fourth generation data base, the number of sources that have ceased waste burning operations include 18 incineration facilities comprising 18 sources; eight cement kiln facilities comprising 12 sources; and one lightweight aggregate kiln facility comprising one source.

Several commenters support the inclusion in the MACT analyses of data from sources no longer burning hazardous waste. They believe the performance data from these sources are representative of emissions control achievable when burning hazardous waste because the data were generated under compliance testing conditions. Other commenters suggest that data from sources no longer burning hazardous waste should be excluded from consideration when conducting MACT floor analyses to ensure that the identified MACT floor levels are achievable.

The approach we adopt today is identical to the one we used for the May 1997 NODA. Rather than becoming embroiled in a controversy over continued achievability of the MACT standards, we exercise our discretion and use a data base consisting of only facilities now operating (at least as of the data base finalization date). Ample data exist to support setting the MACT standards without using data from facilities that no longer burn hazardous waste. To the extent that some previous data from facilities not now burning hazardous waste still remain in the data base, we ascribe to the view that these data are representative of achievable emissions control and can be used.

2. How Are Nondetect Data Handled?

In today's rule, as in the May 1997 NODA, we evaluated nondetect values, extracted from compliance test reports and typically associated with feedstream input measurements rather than emissions concentrations, as concentrations that are present at one-half the detection limit. In the proposal, we assumed that nondetect analyses were present at the value of the full detection limit.

Some commenters support our approach to assume that nondetect values are present at one-half the detection limit. The commenter states that this approach is consistent with the data analysis techniques used in other EPA environmental programs such as in the evaluation of groundwater monitoring data. Other commenters oppose treating nondetect values at one-half the detection limit, especially for dioxins/furans because Method 23 for quantitating stack emissions states that nondetect values for congeners be treated as zero when calculating total congeners and the toxicity equivalence quotient for dioxins/furans. As explained in the NODA, the assumption that nondetect measurements are present at one-half the reported detection limit is more technically and environmentally conservative and increases our confidence that standards and risk findings are appropriate. Further, we considered assuming that nondetect values were present at the full detection limit, but found that there were no significant differences in the MACT data analysis results.[27] Therefore, in today's rule, we assume nondetect measurements are present at one-half the detection limit.

3. How Are Normal Versus Worst-Case Emissions Data Handled?

The majority of the available emissions data for all of the hazardous air pollutants except mercury can be considered worst-case because they were generated during RCRA compliance testing. Because limits on operating parameters are established based on compliance test operations, sources generally operate during compliance testing under worst-case conditions to account for variability in operations and emissions. However, the data base also contains some normal data for these hazardous air pollutants. Normal data include those where hazardous waste was burned, but neither spiking of the hazardous waste with metals or chlorine nor operation of the combustion unit and emission control equipment under detuned conditions occurred.

In the MACT analyses supporting today's rule, normal data were not used to identify or define MACT floor control, with the exception of mercury, as discussed below. This approach is identical to the one used in the May 1997 NODA. 62 FR 24216.

Several commenters support the use of normal emissions data in defining MACT controls because the effect of ignoring the potentially lower emitters from these sources would skew the analysis to higher floor results. Other commenters oppose the use of normal data because they would not be representative of emissions under compliance test conditions—the conditions these same sources will need to operate under during MACT performance tests to establish limits on operating conditions.[28]

We conclude that it is inappropriate to perform the MACT floor analysis for a particular hazardous air pollutant using emissions data that are a mixture of normal and worst-case data. The few normal emissions data would tend to dominate the identification of best performing sources while not necessarily being representative of the range of normal emissions. Because the vast majority of our data is based on worst-case compliance testing, the definition of floor control is based on worst-case data.[29] Using worst-case emissions data to establish a MACT

[27] Using dioxins and furans as an example, for those sources using MACT control, this difference is no more than approximately 10 percent of the standard. USEPA, ''Final Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies,'' July 1999.

[28] These commenters are concerned that, if the standards were based on normal emissions data, sources would be inappropriately constrained to emissions that are well below what is currently normal. This is because of the double ratcheting effect of the compliance regime whereby a source must first operate below the standard during compliance testing, and then again operate below compliance testing levels (and associated operating parameters) to maintain day-to-day compliance.

[29] We considered adjusting the emissions data to account for spiking to develop a projected normal emissions data base. However, we conclude that this is problematic and have not done so. For example, it is difficult to project (lower) emissions from semivolatile metal-spiked emissions data given that system removal efficiency does not correlate linearly with semivolatile metal feedrate. In addition, we did not know for certain whether some data were spiked. Thus, we would have to use either a truncated data base of despiked data or a mixed data base of potentially spiked data and despiked data, neither of which would be fully satisfactory.

floor also helps account for emissions variability, as discussed in Section V.D. below.

Sources did not generally spike mercury emissions during RCRA compliance testing because they normally feed mercury at levels resulting in emissions well below current limits.[30] Consequently, sources are generally complying with generic, conservative feedrate limits established under RCRA rather than feedrate limits established during compliance testing. Because our data base is comprised essentially of normal emissions, we believe this is one instance where use of normal data to identify MACT floor is appropriate. See discussion in Section V.D. below of how emissions variability is addressed for the mercury floors.

4. What Approach Was Used To Fill In Missing or Unavailable Data?

With respect to today's rule, the term ''imputation'' refers to a data handling technique where a value is filled-in for a missing or unavailable data point. We only applied this technique to hazardous air pollutants that are comprised of more than one pollutant (*i.e.*, semivolatile metals, low volatile metals, total chlorine). We used imputation techniques in both the proposal and May 1997 NODA; however, we decided not to use imputation procedures in the development of today's promulgated standards. We used only complete data sets in our MACT determinations. Several commenters to the proposal and May 1997 NODA oppose the use of imputation techniques. Commenters express concern that the imputation approach used in the proposal did not preserve the statistical characteristics (average and standard deviation) of the entire data set. Thus, commenters suggest that subsequent MACT analyses were flawed. We reevaluated the data base and determined that a sufficient number of data sets are complete without the use of an imputation technique.[31] A complete discussion of various data handling conventions is presented in the technical support document.[32]

[30] Three of 23 incinerators used to define MACT floor (*i.e.*, sources for which mercury feedrate data are available) are known to have spiked mercury. No cement kilns used to define MACT floor (*e.g.*, excluding sources that have stopped burning hazardous waste) are known to have spiked mercury. Only one of ten lightweight aggregate kilns used to define MACT floor is known to have spiked mercury.

[31] This is especially true because antimony is no longer included in the low volatile metal standard.

[32] See USEPA, ''Final Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies,'' July 1999.

II. How Did We Select the Pollutants Regulated by This Rule?

Section 112(b) of the Clean Air Act, as amended, provides a list of 188[33] hazardous air pollutants for which the Administrator must promulgate emission standards for designated major and area sources. The list is comprised of metal, organic, and inorganic compounds.

Hazardous waste combustors emit many of the hazardous air pollutants. In particular, hazardous waste combustors can emit high levels of dioxins and furans, mercury, lead, chromium, antimony, and hydrogen chloride. In addition, hazardous waste combustors can emit a wide range of nondioxin/furan organic hazardous air pollutants, including benzene, chloroform, and methylene chloride.

In today's rule, we establish nine emission standards to control hazardous air pollutants emitted by hazardous waste combustors. Specifically, we establish emission standards for the following hazardous air pollutants: Chlorinated dioxins and furans, mercury, two semivolatile metals (*i.e.*, lead and cadmium), three low volatility metals (*i.e.*, arsenic, beryllium, chromium), and hydrochloric acid/chlorine gas. In addition, MACT control is provided for other hazardous air pollutants via standards for surrogates: (1) A standard for particulate matter will control five metal hazardous air pollutants—antimony, cobalt, manganese, nickel, and selenium; and (2) standards for carbon monoxide, hydrocarbons, and destruction and removal efficiency will control nondioxin/furan organic hazardous air pollutants.

A. Which Toxic Metals Are Regulated by This Rule?[34]

1. Semivolatile and Low Volatile Metals

The Section 112(b) list of hazardous air pollutants includes 11 metals: antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, and selenium. To establish an implementable approach for controlling these metal hazardous air pollutants, we proposed to group the metals by their relative volatility and established emission standards for each volatility group. We placed six of the eleven metals in volatility groups. The high-volatile group is comprised of mercury, the semivolatile group is comprised of lead and cadmium, and the low volatile group is comprised of arsenic, beryllium, and chromium.[35] We refer to these six metals for which we have established standards based on volatility group as ''enumerated metals.'' We have chosen to control the remaining five metals using particulate matter as a surrogate as discussed in the next section.

[33] The initial list consisted of 189 HAPs, but we have removed caprolactam (CAS number 105602) from the list of hazardous air pollutants. See § 63.60.

[34] RCRA standards currently control emissions of three toxic metals that have not been designated as Clean Air Act hazardous air pollutants: Barium, silver, and thallium. These RCRA metals are incidentally controlled by today's MACT controls for metal hazardous air pollutants in two ways. First, the RCRA metals are semivolatile or nonvolatile and will, in part, be controlled by the air pollution control systems used to meet the semivolatile metal and low volatile metal standards in today's rule. Second, these RCRA metals will be controlled by the measures used to meet today's MACT participate matter standard. See text that follows.

Grouping metals by volatility is reasonable given that emission control strategies are governed primarily by a metal's volatility. For example, while semivolatile metals and low volatile metals are in particulate form in the emission control train and can be removed as particulate matter, mercury species are generally emitted from hazardous waste combustors in the vapor phase and cannot be controlled by controlling particulate matter unless a sorbent, such as activated carbon, is injected into the combustion gas. In addition, low volatile metals are easier to control than semivolatile metals because semivolatile metals volatilize in the combustion chamber and condense on fine particulate matter, which is somewhat more difficult to control. Low volatile metals do not volatilize significantly in hazardous waste combustors and are emitted as larger, easier to remove, particles entrained in the combustion gas.[36]

Commenters agree with our proposal to group metals by their relative volatility. We adopt these groupings for the final rule.

We note that the final rule does not require a source to control its particulate matter below the particulate matter standard to control semivolatile and low

[35] Antimony was included in the low volatile group at proposal, but we subsequently determined that the MACT particulate matter standard serves as an adequate surrogate for this metal. See the May 1997 NODA (62 FR at 24216). In making this determination, we noted that antimony is an noncarcinogen with relatively low toxicity compared with the other five nonmercury metals that were placed in volatility groups. To be of particular concern, antimony would have to be present in hazardous waste at several orders of magnitude higher than shown in the available data.

[36] The dynamics associated with the fate of metals in a hazardous waste combustor are much more complex than presented here. For more information, see USEPA, ''Draft Technical Support Document for HWC MACT Standards, Volume VII: Miscellaneous Technical Issues,'' February 1996.

volatile metals. It is true that when we were determining the semivolatile and low volatile metal floor standards, we did examine the feedrates from only those facilities that were meeting the numerical particulate standard. See Part Four, Section V.B.2.c. This is because we believe that facilities, in practice, use both feedrate and particulate matter air pollution control devices in a complementary manner to address metals emissions (except mercury). However, our setting of the semivolatile and low volatile metal floor standards does not require MACT particulate matter control to be installed, either directly or indirectly, as a matter of CAA compliance. We do not think it is necessary to require compliance with a particulate matter standard as an additional express element of the semivolatile/low volatile metal emission standards because the particulate matter standard is already required to control the nonenumerated metals, as discussed below. However, we could have required compliance with a particulate matter standard as part of the semivolatile or low volatile metal emission standard because of the practice of using particulate matter control as at least part of a facility's strategy to control or minimize metal emissions (other than mercury).

2. How Are the Five Other Metal Hazardous Air Pollutants Regulated?

We did not include five metal hazardous air pollutants (*i.e.*, antimony, cobalt, manganese, nickel, selenium) in the volatility groups because of: (1) Inadequate emissions data for these metals [37]; (2) relatively low toxicity of antimony, cobalt, and manganese; and (3) the ability to achieve control, as explained below, by means of surrogates. Instead, we chose the particulate matter standard as a surrogate control for antimony, cobalt, manganese, nickel, and selenium. We refer to these five metals as ''nonenumerated metals'' because standards specific to each metal have not been established. We conclude that emissions of these metals is effectively controlled by the same air pollution control devices and systems used to control particulate matter.

Some commenters suggest that particulate matter is not a surrogate for the five nonenumerated metals. Commenters also note that our own study, as well as investigations by commenters, did not show a relationship between particulate matter and semivolatile metals and low volatile metals when emissions from multiple sources were considered. However, we conclude that such a relationship is not expected when multiple sources are considered because wide variations in source operations can affect: (1) Metals and particulate matter loadings at the inlet to the particulate matter control device; (2) metals and particulate matter collection efficiency; and (3) metals and particulate matter emissions. Factors that can contribute to variability in source operations include metal feed rates, ash levels, waste types and physical properties (*i.e.*, liquid vs. solid), combustion temperatures, and particulate matter device design, operation, and maintenance.

Conversely, emissions of semivolatile metals and low volatile metals are directly related to emissions of particulate matter at a given source when other operating conditions are held constant (*i.e.*, as particulate matter emissions increase, emissions of these metals also increase) because semivolatile metals and low volatile metals are present as particulate matter at the typical air pollution control device temperatures of 200 to 400°F that are required under today's rule.[38] A strong relationship between particulate matter and semivolatile/low volatile metal emissions is evident from our emissions data base of trial burn emissions at individual sources where particulate matter varies and metals feedrates and other conditions that may affect metals emissions were held fairly constant. Other work also has clearly demonstrated that improvement in particulate control leads to improved metals control.[39]

We also requested comment on whether particulate matter could be used as a surrogate for all semivolatile and low volatile metal hazardous air pollutants (*i.e.*, all metal hazardous air pollutants except mercury). See the May 1997 NODA. This approach is strongly recommended by the cement industry. In that Notice, we concluded that, because of varying and high levels of metals concentrations in hazardous waste, use of particulate matter control alone may not provide MACT control for metal hazardous air pollutants.[40] Our conclusion is the same today. Without metal-specific MACT emission standards or MACT feedrate standards, sources could feed high levels of one or more metal hazardous air pollutant metals. This practice could result in high metal emissions, even though the source's particulate matter is controlled to the emission standard (*i.e.*, a large fraction of emitted particulate matter could be comprised of metal hazardous air pollutants). Thus, the use of particulate matter control alone would not constitute MACT control of that metal and would be particularly troublesome for the enumerated semivolatile and low volatile metal because of their toxicity.[41]

Many commenters suggest that particulate matter is an adequate surrogate for all metal hazardous air pollutants. They suggest that, given current metal feedrates and emission rates, particularly in the cement industry, a particulate matter standard is sufficient to ensure that metal hazardous air pollutants (other than mercury) are controlled to levels that would not pose a risk to human health or the environment. While this may be true in some cases as a theoretical matter, it may not be in all cases. Data demonstrating this conclusively were not available for all cement kilns. Moreover, this approach may not ensure MACT control of the potentially problematic (*i.e.*, high potential risk) metals for reasons discussed above (*i.e.*, higher metal feedrates will result in higher metals emissions even though particulate matter capture efficiency remains constant). Consequently, we conclude that semi-volatile metals and low volatile metals standards are appropriate in addition to the particulate matter standard.

Finally, several commenters suggest that a particulate matter standard is not needed to control the five nonenumerated metals because the standards for the enumerated semivolatile and low volatile metals would serve as surrogates for those

[37] USEPA, ''Final Technical Support Document for HWC MACT Standards, Volume II: HWC Emissions Database,'' July 1999.

[38] The dioxin/furan emission standard requires that gas temperatures at the inlet to electrostatic precipitators and fabric filters not exceed 400°F. Wet particulate matter control devices reduce gas temperatures to below 400°F by virtue of their design and operation. The vapor phase contribution (*i.e.*, nonparticulate form that will not be controlled by a particulate matter control device) of semivolatile metal and low volatile metal at these temperatures is negligible.

[39] USEPA, ''Final Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies,'' July 1999.

[40] However, for sources not burning hazardous waste and without a significant potential for extreme variability in metals feedrates, particulate matter is an adequate surrogate for metal hazardous air pollutants (*e.g.*, for nonhazardous waste burning cement kilns).

[41] Using particulate matter as a surrogate for metals is, however, the approach we used in the final rule for five metals: Antimony, cobalt, manganese, nickel, selenium. Technical and practical reasons unique to these metals support this approach. First, these metals exhibit relatively low toxicity. Second, for some of these metals, we did not have emissions data adequate to establish specific standards. Therefore, the best strategy for these particular metals, at this time, is to rely on particulate matter as a surrogate.

metals. Their rationale is that because the nonenumerated metals can be classified as either semivolatile or nonvolatile [42], they would be controlled along with the enumerated semivolatile and low volatile metals. However, MACT control would not be assured for the five nonenumerated metals even though they would be controlled by the same emission control device as the enumerated semivolatile and low volatile metals. For example, a source with high particulate matter emissions could achieve the semivolatile and low volatile metal emission standards (*i.e.*, MACT control) by feeding low levels of enumerated semivolatile and low volatile metals. But, if that source also fed high levels of nonenumerated metals, MACT control for those metals would not be achieved unless the source was subject to a particulate matter MACT standard. Consequently, we do not agree that the semivolatile and low volatile metal standards alone can serve as surrogates for the nonenumerated metals.

We also proposed to use particulate matter as a supplemental control for nondioxin/furan organic hazardous air pollutants that are adsorbed onto the particulate matter. Commenters state, however, that the Agency had not presented data showing that particulate matter in fact contains significant levels of adsorbed nondioxin/furan organic hazardous air pollutants. We now concur with commenters that, for cement kiln and lightweight aggregate kiln particulate matter, particulate matter emissions have not been shown to contain significant levels of adsorbed organic compounds. This is likely because cement kiln and lightweight aggregate kiln particulate matter is primarily inert process dust (*i.e.*, entrained raw material). Although particulate matter emissions from incinerators could contain higher levels of carbon that may adsorb some organic compounds, this is not likely a significant means of control for those organic hazardous air pollutants.[43]

B. How Are Toxic Organic Compounds Regulated by This Rule?

1. Dioxins/Furans

We proposed that dioxin/furan emissions be controlled directly with a dioxin/furan emission standard based on toxicity equivalents. The final rule adopts a TEQ approach for dioxin/furans. In terms of a source determining compliance, we expect sources to use accepted TEQ references.[44]

2. Carbon Monoxide and Hydrocarbons

We proposed that emissions of nondioxin/furan organic hazardous air pollutants be controlled by compliance with continuously monitored emission standards for either of two surrogates: carbon monoxide or hydrocarbons. Carbon monoxide and hydrocarbons are widely accepted indicators of combustion conditions. The current RCRA regulations for hazardous waste combustors use emissions limits on carbon monoxide and hydrocarbons to control emissions of nondioxin/furan toxic organic emissions. See 56 FR 7150 (February 21, 1991) documenting the relationship between carbon monoxide, combustion efficiency, and emissions of organic compounds. In addition, Clean Air Act emission standards for municipal waste combustors and medical waste incinerators limit emissions of carbon monoxide to control nondioxin/furan organic hazardous air pollutants. Finally, hydrocarbon emissions are an indicator of organic hazardous air pollutants because hydrocarbons are a direct measure of organic compounds.

Nonetheless, many commenters state that EPA's own surrogate evaluation [45] did not demonstrate a relationship between carbon monoxide or hydrocarbons and nondioxin/furan organic hazardous air pollutants at the carbon monoxide and hydrocarbon levels evaluated. Several commenters note that this should not have been a surprise given that the carbon monoxide and hydrocarbon emissions data evaluated were generally from hazardous waste combustors operating under good combustion conditions (and thus, relatively low carbon monoxide and hydrocarbon levels). Under these conditions, emissions of nondioxin/furan organic hazardous air pollutants were generally low, which made the demonstration of a relationship more difficult. These commenters note that there may be a correlation between carbon monoxide and hydrocarbons and nondioxin/furan organic hazardous air pollutants, but it would be evident primarily when actual carbon monoxide and hydrocarbon levels are higher than the regulatory levels. We agree, and conclude that carbon monoxide and hydrocarbon levels higher than those we establish as emission standards are indicative of poor combustion conditions and the potential for increased emissions of nondioxin/furan organic hazardous air pollutants. Consequently, we have adopted our proposed approach for today's final rule.[46]

3. Destruction and Removal Efficiency

We have determined that a destruction and removal efficiency (DRE) standard is needed to ensure MACT control of nondioxin/furan organic hazardous air pollutants.[47] We adopt the implementation procedures from the current RCRA requirements for DRE (see §§ 264.342, 264.343, and 266.104) in today's final rule. The rationale for adopting destruction and removal efficiency as a MACT standard is discussed later in Section IV of the preamble.

C. How Are Hydrochloric Acid and Chlorine Gas Regulated by This Rule?

We proposed that hydrochloric acid and chlorine gas emissions be controlled by a combined total chlorine MACT standard because: (1) The test method used to determine hydrochloric acid and chlorine gas emissions may not be able to distinguish between the compounds in all situations; [48] and (2) both of these hazardous air pollutants can be controlled by limiting feedrate of chlorine in hazardous waste and wet scrubbing. We have adopted this approach in today's final rule.

One commenter questions whether it is appropriate to establish a combined standard for hydrochloric acid and chlorine gas because the removal efficiency of emission control equipment is substantially different for the two pollutants. Although we agree that the efficiency of emission control equipment is substantially different for the two pollutants, we conclude that the MACT control techniques will readily

[42] As a factual matter, selenium can be classified as a semivolatile metal and the remaining four nonenumerated metals can be classified as low volatile metals.

[43] We recognize that sorbent (*e.g.*, activated carbon) may be injected into the combustion system to control mercury or dioxin/furan. In these cases, particulate matter would be controlled as a site-specific compliance parameter for these organics. See the discussion in Part Five of this preamble.

[44] For example, USEPA, ''Interim Procedure for Estimating Risks Associated With Exposures to Mixtures of Chlorinated Dibenzo-p-Dioxin and -Dibenzofurans (CDDs and CDFs) and 1989 Update'', March 1989; Van den Berg, M., *et al.* ''Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife'' *Environmental Health Perspectives*, Volume 106, Number 12, December 1998.

[45] See Energy and Environmental Research Corporation, ''Surrogate Evaluation of Thermal Treatment Systems,'' Draft Report, October 17, 1994.

[46] As discussed at proposal, however, this relationship does not hold for certain types of cement kilns where carbon monoxide and hydrocarbons emissions evolve from raw materials. See discussion in Section VII of Part Four.

[47] Under this standard, several difficult to combust organic compounds would be identified and destroyed or removed by the combustor to at least a 99.99% (or 99.9999%, as applicable) efficiency.

[48] See the proposed rule, 61 FR at 17376.

enable sources to achieve the hydrochloric acid/chlorine gas emission standard. As discussed in Sections VI, VII, and VIII below, MACT control for all hazardous waste combustors is control of the hazardous waste chlorine feedrate. This control technique is equally effective for hydrochloric acid and chlorine gas and represents MACT control for cement kilns. MACT control for incinerators also includes wet scrubbing. Although wet scrubbing is more efficient for controlling hydrochloric acid, it also provides some control of chlorine gas. MACT control for lightweight aggregate kilns also includes wet or dry scrubbing. Although dry scrubbing does not control chlorine gas, chlorine feedrate control combined with dry scrubbing to remove hydrochloric acid will enable lightweight aggregate kilns to achieve the emission standard for hydrochloric acid/chlorine gas.

III. How Are the Standards Formatted in This Rule?

A. What Are the Units of the Standards?

With one exception, the final rule expresses the emission standards on a concentration basis as proposed, with all standards expressed as mass per dry standard cubic meter (*e.g.*, μg/dscm), with hydrochloric acid/chlorine gas, carbon monoxide, and hydrocarbon standards being expressed at parts per million by volume (ppmv). The exception is the particulate matter standard for hazardous waste burning cement kilns where the standard is expressed as kilograms of particulate matter per Mg of dry feed to the kiln.

Several commenters suggest that the standards should be expressed on a mass emission basis (*e.g.*, mg/hour) because of equity concerns across source categories and environmental loading concerns. They are concerned that expressing the standards on a concentration basis allows large gas flow rate sources such as cement kilns to emit a much greater mass of hazardous air pollutants per unit time than smaller sources such as some on-site incinerators. Concomitantly, small sources would incur a higher cost/lb of pollutant removed, they contend, than a large source.[49] Further, they reason that the larger sources would pose a much greater risk to human health and the environment because risk is a function of mass emissions of pollutants per unit of time.

[49] This result is not evident given that the cost of an emission control device is generally directly proportional to the gas flow rate, not the mass emission rate of pollutants per unit time.

Although we agree with commenters' point about differential environmental loadings attributable to small versus large sources with a concentration-based standard, we note that the mass-based standard urged here is inherently incompatible with technology-based MACT standards for several reasons.[50] A mass-based standard does not ensure MACT control at small sources. Small sources have lower flow rates and thus would be allowed to emit hazardous air pollutants at high concentrations. They could meet the standard with no or minimal control. In addition, this inequity between small and large sources would create an incentive to divert hazardous waste from large sources to small sources (existing and new), causing an increase in emissions nationally.

B. Why Are the Standards Corrected for Oxygen and Temperature?

As proposed, the final standards are corrected to 7 percent oxygen and 20°C because the data we use to establish the standards are corrected in this manner and because the current RCRA regulations for these sources require this correction. These corrections normalize the emissions data to a common base, recognizing the variation among the different combustors and modes of operation.

Several commenters note that the proposed oxygen correction equation does not appropriately address hazardous waste combustors that use oxygen enrichment systems. They recommend that the Agency promulgate the oxygen correction factor equation proposed in 1990 for RCRA hazardous waste incinerators. See 55 FR at 17918 (April 27, 1990). We concur, and adopt the revised oxygen correction factor equation.

C. How Does the Rule Treat Significant Figures and Rounding?

As proposed, the final rule establishes standards and limits based on two significant figures. One commenter notes that a minimum of three significant figures must be used for all intermediate calculations when rounding the results to two significant figures. We concur. Sources should use standard procedures, such as ASTM procedure E–29–90, to round final emission levels to two significant figures.

[50] Although the particulate matter standard for hazardous waste burning cement kilns in today's rule is the New Source Performance Standard expressed as on a mass basis (*i.e.*, kg of particulate matter per megagram of dry feed to the kiln), this standard is not based on a "mass of particulate matter emissions per unit of time" that commenters suggest. Rather, the cement kiln standard can be equated to a concentration basis given that cement kilns emit a given quantity of combustion gas per unit of dry feed to the kiln. In fact, we proposed the cement kiln particulate matter standard on a concentration basis, 0.03 gr/dscf, that was calculated from the New Source Performance Standard when applied to a typical wet process cement kiln.

IV. How Are Nondioxin/Furan Organic Hazardous Air Pollutants Controlled?

Nondioxin/furan organic hazardous air pollutants are controlled by a destruction and removal efficiency (DRE) standard and the carbon monoxide and hydrocarbon standards. Previous DRE tests demonstrating compliance with the 99.99% requirement under current RCRA regulations may be used to document compliance with the DRE standard provided that operations have not been changed in a way that could reasonably be expected to affect ability to meet the standard. However, if waste is fed at a point other than the flame zone, then compliance with the 99.99% DRE standard must be demonstrated during each comprehensive performance test, and new operating parameter limits must be established to ensure that DRE is maintained. A 99.9999% DRE is required for those hazardous waste combustors burning dioxin-listed wastes. These requirements are discussed in Section IV.A. below.

In addition, the rule establishes carbon monoxide and hydrocarbons emission standards as surrogates to ensure good combustion and control of nondioxin/furan organic hazardous air pollutants. Continuous monitoring and compliance with either the carbon monoxide or hydrocarbon emissions standard is required. If you choose to continuously monitor and comply with the carbon monoxide standard, you must also demonstrate during the comprehensive performance test compliance with the hydrocarbon emission standard. Additionally, you must also set operating limits on key parameters that affect combustion conditions to ensure continued compliance with the hydrocarbon emission standard. Alternatively, continuous monitoring and compliance with the hydrocarbon emissions standard eliminates the need to monitor carbon monoxide emissions because hydrocarbon emissions are a more direct surrogate of nondioxin/furan organic hazardous air pollutant emissions. These requirements are discussed in Section IV.B below.

A. What Is the Rationale for DRE as a MACT Standard?

All sources must demonstrate the ability to destroy or remove 99.99

percent of selected principal organic hazardous compounds in the waste feed as a MACT standard. This requirement, commonly referred to as four-nines DRE, is a current RCRA requirement. We are promulgating the DRE requirement as a MACT floor standard to control the emissions of nondioxin organic hazardous air pollutants. The rule also requires sources to establish limits on specified operating parameters to ensure compliance with the DRE standard. See Part Five Section VII(B).

In the April 1996 NPRM, we proposed that the four-nines DRE test requirement be retained under RCRA and be performed as part of a RCRA approved trial burn because we did not believe that the DRE test could be adequately implemented using the generally self-implementing MACT performance test and notification process.[51] See 61 FR 17447.

In response to the April proposal, however, we received comments that suggest the MACT comprehensive performance test and RCRA DRE trial burn could and should be combined, and that we should combine all stack air emission requirements for hazardous waste combustors into a single permit. Commenters are concerned that our proposed approach required sources to obtain two permits for air emissions and potentially be unnecessarily subject to dual enforcement.

We investigated approaches that would achieve the goals of a single air emission permit and inclusion of DRE in MACT. We determined that the 40 CFR part 63 general provisions, applicable to all MACT regulated sources unless superseded, includes a process similar to the process to develop a RCRA trial burn test plan and allows permitting authorities to review and approve MACT performance test plans. See 40 CFR 63.7. Additionally, we determined that, because all hazardous waste combustors are currently required to achieve four-nines DRE, the DRE requirement could be included as a MACT floor standard rather than a RCRA requirement. In the May 1997 NODA, we discussed an alternative approach that used a modified form of the general provision's performance test plan and approval process. The approach would allow combination of the DRE test with the comprehensive performance test and, therefore, facilitate implementation of DRE as a MACT standard. We also discussed modifying the general approach to extend the performance test plan review period to one year in advance of the date a source plans to perform the comprehensive performance test. This extended review period would provide sufficient time for negotiations between permitting authorities and sources to develop and approve comprehensive performance test plans. These test plans would identify operating parameter limits necessary to ensure compliance with all the proposed MACT standards, as well as, implement the four-nines DRE test as a MACT floor standard. See 62 FR at 24241. Commenters support the process to combine the applicable stack emission requirements into a single permit. As for making the DRE test a MACT standard, we received no negative comments. Many commenters, however, question the need for subsequent DRE testing once a unit demonstrates four-nines DRE. See discussion and our response in Subsection 2 below.

We believe that requiring the DRE test as a MACT standard is appropriate. As we previously noted, the four-nines DRE is firmly grounded statutory and regulatory requirement that has proven to be an effective method to determine appropriate process controls necessary for the combustion of hazardous waste. Specifically, RCRA requires that all hazardous waste incinerators must demonstrate the minimum technology requirement of four-nines DRE (RCRA section 3004(o)(1)(B)). Additionally, the current RCRA BIF regulations require that all boiler and industrial furnaces meet the four-nines DRE standard. Moreover, current RCRA regulations require all sources incinerating certain dioxin-listed contaminated wastes (F020–023 and F026–27) to achieve 99.9999% (six-nines) DRE. See §§ 264.343(a)(2) and 266.104(a)(3).

The statutory requirement for incinerators to meet four-nines DRE can be satisfied if the associated MACT requirements ensure that incinerators will continue to meet the four-nines DRE minimum technology requirement, *i.e.*, that MACT standards provide at least the ''minimum'' RCRA section 3004(o)(1) level of control. To determine if the RCRA statutory requirements could be satisfied, we investigated whether DRE could be replaced with universal standards for key operating parameters based on previous DRE demonstrations (*i.e.*, standards for carbon monoxide and hydrocarbon emissions). We found that, in the vast majority of DRE test conditions, if a unit operated with carbon monoxide levels of less than 100 ppmv and hydrocarbon emissions of less than 10 ppmv, the unit met or surpassed four-nines DRE. In a small number of test conditions, units emitted carbon monoxide and hydrocarbons at levels less than 100 and 10 ppmv respectively, but failed to meet four-nines DRE. Most failed test conditions were either due to questionable test results or faulty test design.[52] See U.S. EPA, ''Draft Technical Support Document for HWC MACT Standards (NODA), Volume II: Evaluation of CO/HC and DRE Database,'' April 1997. Even though we could potentially explain the reasons these units failed to achieve four-nines DRE, we determined that universal carbon monoxide and hydrocarbon emissions limits may not ensure that all units achieve four-nines DRE because carbon monoxide and hydrocarbon emissions may not be representative of good combustion for all operating conditions that facilities may desire to operate. In addition, we could not identify a better method than the DRE test to limit combustion failures modes.

Commenters state that the test conditions under which the DRE failures occurred involved feeding practices that were not common in the hazardous waste combustion industry. They further state that, if it could be ensured that hazardous waste ignited, hydrocarbon and carbon monoxide limits would be sufficient to ensure four-nines DRE is achieved continuously. Therefore, a DRE demonstration would not be warranted. Although we might agree in theory, the fact that tests were performed under these test conditions indicates that a source desired to operate in that fashion. Only the DRE test identified that the combustion failure occurred and was not susceptible to control via carbon monoxide and hydrocarbon emissions. This and other similar failures can lead to increased emissions of products of incomplete combustion and organic hazardous air pollutants. Also, as commenters acknowledge, carbon monoxide and hydrocarbon emissions were effective surrogates to ensure four-nines DRE only when

[51] Historically, under RCRA regulations, the permittiing authority and hazardous waste combustion source found it necessary to go through lengthy negotiations to develop a RCRA trial burn plan that adequately demonstrates the unit's ability to achieve four-nines DRE.

[52] In many of the failed test conditions that we investigated, the facility fed a low concentration of organic compound on which the DRE was being calculated. As has been observed many times, organic compounds can be reformed in the post combustion gas stream at concentrations sufficient to fail DRE. This is not indicative of a failure in the systems ability to destroy the compound, but is more likely the result of a poorly designed test. If the facility had fed a higher concentration of organic compound in the waste to the combustor, the unit would have been more likely to meet four-nines DRE with no change in the operating conditions used during the test. In other cases, poor test design (*i.e.*, firing aqueous organic waste into an unfired secondary combustion chamber) is considered to be the cause.

hazardous waste ignited. However, as we identified in the May 1997 NODA, there are a number of hazardous waste combustion sources that operate in a manner that does not ensure ignition of hazardous waste.

As a result of the DRE test investigation, we determined that a successful DRE demonstration is an effective, appropriate, and necessary method to identify operating parameter limits that ensure proper and achievable combustion of hazardous waste and to limit the emissions of organic hazardous air pollutants. Additionally, the DRE standard is a direct measure to ensure that the RCRA section 3004(o)(1) mandate and its protectiveness goals are being met, and also serves to maintain a consistent test protocol for sources combusting hazardous waste. The DRE demonstration requirement is also reasonable, provides a sound means to allow deferral of a RCRA mandate to the CAA, and simplifies implementation by having all stack emissions-related testing and compliance requirements promulgated under one statute, the CAA. Therefore, we retain the DRE demonstration as part of the MACT comprehensive performance test unless a DRE test has already been performed with no relevant changes.

1. MACT DRE Standard

In today's rule, all affected sources are required to meet 99.99% DRE of selected Principal Organic Hazardous Constituents (POCs) that are as or more difficult to destroy than any organic hazardous pollutant fed to the unit. With one exception discussed in subsection 3 below, this demonstration need be made only once during the operational life of a source, either before or during the initial comprehensive performance test, provided that the design, operation, and maintenance features do not change in a manner that could reasonably be expected to affect the ability to meet the DRE standard.

The DRE demonstration involves feeding a known mass of POHC(s) to a combustion unit, and then measuring for that POHC(s) in stack emissions. If the POHC(s) is emitted at a level that exceeds 0.01% of the mass of the individual POHC(s) fed to the unit, the unit fails to demonstrate sufficient DRE.

Operating limits for key combustion parameters are used to ensure four-nines DRE is maintained. The operating parameter limits are established based on operations during the DRE test. Examples of combustion parameters that are used to set operating limits include minimum combustion chamber temperature, minimum gas residence time, and maximum hazardous waste feedrate by mass. See § 63.1209(j).

Today's MACT DRE requirement is essentially the same as that currently required under RCRA. The main difference is that the vast majority of the MACT DRE demonstrations would not have to be repeated as often as currently required under RCRA, as discussed in section 3 below.

2. How Can Previous Successful Demonstrations of DRE Be Used To Demonstrate Compliance?

Except as discussed below, today's rule requires that, at least once during the operational life of a source during or before the initial comprehensive performance test, the source must demonstrate the ability to achieve 99.99% DRE and must set operating parameter limits to ensure that DRE is maintained. However, we recognize that many sources have already undergone approved DRE testing. Further, many facilities do not intend to modify their units design or operations in such a way that DRE performance or parameters would be adversely affected. Therefore, the Agency is allowing sources to use results from previous EPA or State-approved DRE demonstrations to fulfill the MACT four-nines DRE requirement, as well as to set the necessary operating limits on parameters that ensure continued compliance.

If a facility wishes to operate under new operating parameter limits that could reasonably be expected to affect the ability to meet the standard, a new DRE demonstration must be performed before or concurrent with the comprehensive performance test. If the DRE operating limits conflict with operating parameter limits that are set to ensure compliance with other MACT standards, the unit must comply with the more stringent limits. Additionally, if a source is modified in such a way that its DRE operating limits are no longer applicable or valid, the source must perform a new DRE test. Moreover, if a source is modified in any way such that DRE performance or parameters are affected adversely, the source must perform a new DRE test.

3. DRE for Sources That Feed Waste at Locations Other Than the Flame Zone

Today's rule requires sources that feed hazardous waste in locations other than the flame zone to perform periodic DRE tests to ensure that four-nines DRE continues to be achieved over the life of the unit. As indicated in the May 1997 NODA at 62 FR 25877, the Agency is concerned that these types of sources have a greater potential of varying DRE performance due to their waste firing practices. That is, due to the unique design and operation of the waste firing system, the DRE may vary over time, and those variations cannot be identified or limited through operating limits set during a single DRE test. For these units, we are requiring that DRE be verified during each comprehensive performance test and that new operating parameter limits be established to ensure continued compliance.

4. Sources That Feed Dioxin Wastes

In today's rule, we are requiring all sources that feed certain dioxin-listed wastes (*i.e.*, F020–F023, F026, F027) to demonstrate the ability to achieve 99.9999 percent (six-nines) DRE as a MACT standard. This requirement will serve to achieve a number of goals associated with today's regulations. First, under RCRA, six-nines DRE is required when burning certain dioxin-listed wastes. If we did not promulgate this requirement as a MACT standard, sources that feed dioxin-listed waste would be required to maintain two permits to manage their air emissions. Thus, by including this requirement as a MACT standard, we eliminate any unnecessary duplication. That outcome is contrary to our goal which is to limit, to the greatest extent possible, the need for sources to obtain two permits governing air emissions under different statutory authorities. Second, six-nines DRE helps to improve control of nondioxin organic hazardous air pollutants as well. Finally, this requirement properly reflects floor control for sources that feed dioxin-listed wastes. Currently, all sources that feed dioxin listed wastes must achieve six-nines DRE. Before making the decision to include six-nines DRE as a MACT standard, we considered whether the requirements could be eliminated given that we are issuing dioxin/furan emission standards with today's rule. We concluded, first, that we had not provided sufficient notice and comment to depart from the current regulations applicable to these sources. Second, we also decided that because we currently require other similar highly toxic bioaccumulative and persistent compounds (*e.g.*, PCB wastes) to be fed to units that demonstrate six-nines DRE, a departure from that policy for RCRA dioxin wastes would be inconsistent. Finally, we are in discussions that may cause us to reevaluate our overall approach to dioxin-listed wastes, with the potential to impact this rule and the land disposal restrictions program. Any changes to our approach will be included in a single rulemaking that would be proposed later.

B. What Is the Rationale for Carbon Monoxide or Hydrocarbon Standards as Surrogate Control of Organic Hazardous Air Pollutants?

Today's rule adopts limits on emissions of carbon monoxide and hydrocarbons as surrogates to ensure good combustion and control of nondioxin organic hazardous air pollutants. We require continuous emissions monitoring and compliance with either the carbon monoxide or hydrocarbon emissions standard. Sources can choose which of these two standards it wishes to continuously monitor for compliance. If a source chooses the carbon monoxide standard, it must also demonstrate during the comprehensive performance test compliance with the hydrocarbon emission standard. During this test the source also must set operating limits on key parameters that affect combustion conditions to ensure continued compliance with the hydrocarbon emission standard. These parameters relate to good combustion practices and are identical to those for which you must establish limits under the DRE standard. See § 63.109(a)(7) and 63.1209(j). However, this source need not install and use a continuous hydrocarbon monitor to ensure continued compliance with the hydrocarbon standard. As discussed previously, the limits established for DRE are identical. If a source elects to use the hydrocarbon limit for compliance, then it must continuously monitor and comply with the hydrocarbon emissions standard. However, this type of source need not monitor carbon monoxide emissions or carbon monoxide operating parameters because hydrocarbon emissions are a more direct surrogate of nondioxin organic hazardous air pollutant emissions.

The April 1996 NPRM proposed MACT emission standards for both carbon monoxide and hydrocarbon as surrogates to control emissions of nondioxin organic hazardous air pollutants. We also proposed that cement kilns comply with either a carbon monoxide or hydrocarbons standard due to raw material considerations.[53] See 61 FR at 17375–6. Our reliance on only carbon monoxide or only hydrocarbon has drawbacks, and therefore we proposed that incinerators and lightweight aggregate kilns comply with emissions standards for both. Nonetheless, we also acknowledged that requiring compliance with both carbon monoxide and hydrocarbon standards may be redundant, and requested comment on: (1) Giving sources the option of complying with either carbon monoxide or hydrocarbon emission standards; or (2) establishing a MACT standard for either carbon monoxide or hydrocarbon, but not both.

Comments to our proposed approach question the necessity of two related surrogates to control organic hazardous air pollutants. Many commenters assert they are capable of controlling hydrocarbon emissions effectively, but due to their system's unique design, they could not comply continuously with the carbon monoxide emission standard. In general, commenters prefer an approach that would afford them maximum flexibility in demonstrating compliance with organic control standards, *i.e.*, more like option (1) in the NPRM.

The May 1997 NODA included a refined version of the option that commenters prefer that allowed sources to monitor and comply with either a carbon monoxide or hydrocarbon emission standard. In response to the May 1997 NODA, commenters nearly unanimously support the option that allowed facilities to monitor and comply with either the carbon monoxide or hydrocarbon standard as surrogates to limit emissions of nondioxin organic hazardous air pollutants. However, a few commenters suggest that compliance with carbon monoxide or hydrocarbons in combination with DRE testing is redundant and unnecessary. However, in their comments, they do not address the issue of DRE failures associated with low carbon monoxide or hydrocarbon emissions, other than to state that if ignition failure was avoided, emissions of carbon monoxide or hydrocarbons would be good indicators of combustion efficiency and four-nines DRE. This does not address our concerns, which reflect cases in which ignition failures did not occur and in which destruction and removal efficiencies were not met.

In the May 1997 NODA, we discussed another option that required sources to comply with the hydrocarbon emission standard and establish a site-specific carbon monoxide limit higher than 100 ppmv. This option was developed because compliance with the hydrocarbon standard assures control of nondioxin organic hazardous air pollutants, and a site-specific carbon monoxide limit aids compliance by providing advanced information regarding combustion efficiency. However, we conclude that this option may be best applied as a site-specific remedy in situations where a source has trouble maintaining compliance with the hydrocarbon standard.

Today's final rule modifies the May 1997 NODA approach slightly. Complying with the carbon monoxide standard now requires documentation that hydrocarbon emissions during the performance test are lower than the standard, and requires operating limits on parameters that affect hydrocarbon emissions. We adopt this modification because some data show that high hydrocarbon emissions are possible while simultaneously low carbon monoxide emissions are found.[54]

In the BIF rule (56 FR at 7149–50), we found that both monitoring and compliance with either carbon monoxide or hydrocarbon limits and achieving four-nines DRE is needed to ensure control of products of incomplete combustion (including nondioxin organic hazardous air pollutants) that are a result of hazardous waste combustion. DRE, although sensitive to identifying combustion failure modes, cannot independently ensure that emissions of products of incomplete combustion or organic hazardous air pollutants are being controlled. DRE can only provide the assurance that, if a hazardous waste combustor is operating normally, the source has the capability to transform hazardous and toxic organic compounds into different compounds through oxidation. These other compounds can include carbon dioxide, water, and other organic hazardous air pollutants. Because carbon monoxide provides immediate information regarding combustion efficiency potentially leading to emissions of organic hazardous air pollutants and hydrocarbon provides a direct measure of organic emissions, these two parameters individually or in combination provide additional control that would not be realized with the DRE operating parameter limits alone.[55] Neither our data nor data supplied by commenters show that only monitoring

[53] See discussion regarding cement kilns compliance with the carbon monoxide and/or hydrocarbon standards in Part Four, Section VII.D.

[54] In a number of instances, RCRA compliance test records showed that sources emitting carbon monoxide at less than 100 ppmv emitted hydrocarbons in excess of 10 ppmv.

[55] We acknowledge that although hydrocarbon emissions are a direct measure of organic emissions, they are measured with a continuous emissions monitoring system known as a flame ionization detector. Some data suggest hydrocarbon flame ionization detectors do not respond with the same sensitivity to the full spectrum of organic compounds that may be present in the combustion gas. Additionally, combustion gas conditions also may affect the sensitivity and accuracy of the monitor. Nonetheless, monitoring hydrocarbons with these detectors appears to be the best method reasonably available to provide real-time monitoring of organic emissions from a hazardous waste combustor.

carbon monoxide, hydrocarbons, or DRE by itself can adequately ensure control of nondioxin organics. Therefore, the approach used in the BIF rule still provides the best regulatory model. We conclude in today's rule that hydrocarbons and carbon monoxide monitoring are not redundant with the DRE testing requirement to control emissions of organic hazardous air pollutants and require both standards. For an additional discussion regarding the use of hydrocarbons and carbon monoxide to control emissions of organic hazardous air pollutants, see USEPA, ''Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies,'' July 1999.

V. What Methodology Is Used To Identify MACT Floors?

This section discusses: (1) Methods used to identify MACT floor controls and emission levels for the final rule; (2) the rationale for using hazardous waste feedrate control as part of MACT floor control for the metals and total chlorine standards; (3) alternative methods for establishing floor levels considered at proposal and in the May 1997 NODA; and (4) our consideration of emissions variability in identifying MACT floor levels.

A. What Is the CAA Statutory Requirement To Identify MACT Floors?

We identify hazardous waste incinerators, hazardous waste burning cement kilns, and hazardous waste burning lightweight aggregate kilns as source categories to be regulated under section 112. We must, therefore, develop MACT standards for each category to control emissions of hazardous air pollutants. Under CAA section 112, we may distinguish among classes, types and sizes of sources within a category in establishing such standards.

Section 112 prescribes a minimum baseline or ''floor'' for standards. For new sources, the standards for a source category cannot be less stringent than the emission control that is achieved in practice by the best-controlled similar source. Section 112(d)(3). The standards for existing sources may be less stringent than standards for new sources, but cannot be less stringent than ''(A) * * * the average emissions limitation achieved by the best performing 12 percent of the existing sources (for which the Administrator has emissions information) * * *, in the category or subcategory for categories and subcategories with 30 or more sources, or (B) the average emissions limitation achieved by the best performing 5 sources (for which the Administrator has or could reasonably obtain emissions information) in the category or subcategory for categories and subcategories with fewer than 30 sources.'' *Id.*

We also must consider a more stringent standard than the floor, referred to in today's rule as a ''beyond-the-floor'' standard. For each beyond-the-floor analysis, we evaluate the maximum degree in reduction of hazardous air pollutants determined to be achievable, taking into account the cost of achieving those reductions, nonair quality health and environmental impacts, and energy costs. Section 112(d)(2). The object of a beyond-the-floor standard is to achieve the maximum degree of emission reduction without unreasonable economic, energy, or secondary environmental impacts.

B. What Is the Final Rule Floor Methodology?

Today's rule establishes MACT standards for the following hazardous air pollutants, hazardous air pollutant groups or hazardous air pollutant surrogates: dioxin/furans, mercury, two semivolatile metals (lead and cadmium), three low volatile metals (arsenic, beryllium, and chromium), particulate matter, total chlorine (hydrochloric acid and chlorine gas), carbon monoxide, hydrocarbons, and destruction and removal efficiency. This subsection discusses the overall engineering evaluation and data analysis methods we used to establish MACT floors for these standards. Additional detail on the specific application of these methods for each source category and standard is presented in Part Four, Sections VI–VIII, of the preamble and in the technical support document.[56]

1. What Is the General Approach Used in This Final Rule?

The starting point in developing standards is to determine a MACT floor emission level, the most lenient level at which a standard can be set. To identify the floor level, we first identified the control techniques used by the best performing sources. We designate these best performing sources the ''MACT pool'' and the emission control technologies they use we call ''MACT floor controls.''

After identifying the MACT pool and MACT floor controls, we determine the emission level that the MACT floor controls are routinely achieving—that is, an achievable emission level taking into account normal operating variability (*i.e.*, variability inherent in a properly designed and operated control system). This is called the floor emission level. To ensure that the floor emission level is being achieved by all sources using floor controls (*i.e.*, not just the MACT pool sources), we generally consider emissions data from all sources in a source category that use well-designed and properly operated MACT floor controls. (We call the data set of all sources using floor controls the ''expanded MACT pool.'') Floor levels in this rule are generally established as the level achieved by the source in the expanded MACT pool with the highest emissions average[57] using well-designed and properly operated MACT floor controls.

Several commenters oppose considering emissions data from all sources using MACT floor controls (*i.e.*, the expanded MACT pool) because they assert the expansion of the MACT pool results in inflated floors. If we adopt these commenters' recommendation, then many sources using MACT controls would not meet the standard, even though they were using MACT floor control. (Indeed, in some cases, other test conditions from the very system used to establish the MACT pool would not meet the standard, notwithstanding no significant change in the system's design and operation.) This result is inappropriate in that all sources using properly designed and operated MACT floor controls should achieve the floor emission level if the technology is well designed and operated. In the absence of data indicating a design or operation problem, we assume the floor emission level based on an expanded MACT pool reflects an emission level consistently achievable by MACT floor technology. Our resulting limits account for the fact that sources and emissions controls will experience normal operating variability even when properly designed and operated.

The MACT floor methodology in this rule does not use a single uniform data analysis approach consistently across all three source categories and standards. Our data analysis methods vary due to: (1) Limitations of our emissions data and ancillary information; (2) emissions of some hazardous air pollutants being related to the feedrate of the hazardous air pollutant (*e.g.*, semivolatile metal emissions are affected by semivolatile metal feedrates) while emissions of

[56] USEPA, ''Final Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies,'' July 1999.

[57] Each source's emissions usually are expressed as an average of three or more emission measurements at the same set of operating parameters. This is because compliance is based on the average of three or more runs.

other hazardous air pollutants are not (*e.g.*, dioxin/furan emissions are related to postcombustion dioxin/furan formation rather than dioxin/furan feedrates); (3) the various types of emissions controls currently in use which do not lend themselves to one type of MACT analysis; and (4) consideration of existing regulations as themselves establishing floor levels.

Finally, as discussed in Section D, the MACT floor levels established through our data analysis approaches account for emissions variability without the separate addition of a statistically-derived emissions variability factor.

2. What MACT Floor Approach Is Used for Each Standard?

a. Dioxins and Furans. For dioxins and furans, we adopt the MACT floor methodology discussed in the May 1997 NODA. Based on engineering information and principles, we identify temperature of combustion gas at the particulate matter control device of 400°F or less as MACT floor control of dioxin/furan. This technology and level of control has been selected because postcombustion formation of dioxin/furan is suppressed by lowering postcombustion gas temperatures, and formation is reasonably minimized at gas temperatures of 400°F or below. Sources controlling gas temperatures to 400°F or less at the particulate matter control device represent the level achieved by the median of the best performing 12 percent of sources where the source category has more than 30 sources (or the median of the best performing five sources where the source category has fewer than 30 sources).

The next step is to identify an emissions level that MACT floor control achieved on a routine basis. We analyzed the emissions data from all sources (within each source category) using MACT floor control and establish the floor level equal to the highest test condition average.

As discussed in greater detail in Part Four, Section VI, incinerators with waste heat recovery boilers present a unique situation for dioxin/furan control. Our data base shows that incinerators equipped with waste heat recovery boilers have significantly higher dioxin/furan emissions compared to other incinerators. In the waste heat recovery boiler, combustion gas is exposed to particles on boiler tubes within the temperature window of 450° F to 650° F, which promotes surface-catalyzed formation of dioxin/furan. Therefore, we establish separate dioxin/furan standards for incinerators with waste heat boilers and incinerators without waste heat boilers.[58] The specified floor control for both waste heat boilers and nonwaste heat boilers is combustion gas temperature control to 400°F or less at the particulate matter control device.[59] Floor levels for waste heat boiler incinerators are much higher, however, because of the dioxin/furan formation during the relatively slow temperature quench in the boiler. See the incinerator dioxin/furan discussion in Part Four, Section VI, of today's rule for more details.

b. What MACT Floor Methodology Is Used for Particulate Matter? We adopt a final MACT floor methodology for particulate matter based on the approaches discussed in the May 1997 NODA. For incinerators, the final MACT floor is determined through engineering principles and information, coupled with analysis of the emissions data base. For cement kilns, we base final MACT on the existing requirements of the New Source Performance Standard applicable to Portland cement kilns. Finally, for lightweight aggregate kilns, the final floor level is derived directly from the emissions data base (*i.e.*, the highest test condition average for sources using properly designed and operated floor control).

i. Incinerators. Today's rule identifies MACT floor control as either a well-designed, operated, and maintained fabric filter, ionizing wet scrubber, or electrostatic precipitator, based on engineering information and an evaluation of the particulate matter control equipment used by at least the median of the best performing 12 percent of sources and the emission levels achieved. These types of particulate matter control equipment routinely and consistently achieve superior particulate matter performance relative to other controls used by the incinerator source category and thus represent MACT. Using generally accepted engineering information and principles, we then identify an emission level that well-designed, operated and maintained fabric filters, ionizing wet scrubbers, and electrostatic precipitators routinely achieve.

The floor level is not directly identified from the emissions data base as the highest test condition average for sources using a fabric filter, ionizing wet scrubber, or electrostatic precipitator. The hazardous waste combustor incinerator data base, however, was used as a tool to determine if the identified floor level, established on generally accepted engineering information and principles, is in general agreement with available particulate matter data. This is because we do not have adequate data on the features of the control devices to accurately distinguish only those devices that are well-designed, operated, and maintained and thus representative of MACT. Several sources in the emissions data base that are equipped with fabric filters, ionizing wet scrubbers, or electrostatic precipitators have emission levels well above the emission levels of other sources equipped with those devices. This strongly suggests that the higher levels are not representative of those achieved by well-designed, operated, and maintained units, even when normal operating variability is considered. We accordingly did not use these data in establishing the standard. See *Kennecott* v. *EPA*, 780 F.2d 445, 458 (4th Cir. 1985) (EPA ''can reject data it reasonably believes to be unreliable including performance data that is higher than other plants operating the same control technology.'')

ii. Cement Kilns. As discussed in the May 1997 NODA and in more detail in the standards section for cement kilns in Part Four, Section VII, we base the MACT floor emission level on use of a fabric filter or electrostatic precipitator to achieve the New Source Performance Standard for Portland cement kilns. The MACT floor is equivalent to and expressed as the current New Source Performance Standard of 0.15 kg/Mg dry feed (0.30 lb/ton dry feed). In the NPRM and the May 1997 NODA, we proposed to express the particulate matter standard on a concentration basis. However, because we are not yet requiring sources to document compliance with the particulate matter standard by using a particulate matter continuous emissions monitoring system in this final rule, we establish and express the floor emission level equivalent to the New Source Performance Standard. Commenters' concerns about separate MACT pools for particulate matter, semivolatile metals, and low volatile metals are discussed in Part Four, Section VII.

iii. Lightweight Aggregate Kilns. All lightweight aggregate kilns burning

[58] We concluded that separate standards to control other hazardous air pollutants were not needed for waste heat boiler-equipped incinerators versus other incinerators. That is, whether or not the incinerator is equipped with a waste heat recovery boiler is only of concern for dioxin/furan emissions, not the other hazardous air pollutants.

[59] Wet particulate matter control devices (*e.g.*, venturi scrubbers) inherently preclude dioxin/furan formation because: (1) They do not suspend particulate matter in the combustion gas flow as do fabric filters and electrostatic precipitators, and (2) gas temperatures are below 400°F in the scrubber. Given this, floor control is use of a wet particulate matter control device or control of combustion gas temperature to 400°F or below at the inlet to a dry particulate matter control device.

hazardous waste are equipped with fabric filters. We could not distinguish only those sources with fabric filters better designed, operated, and maintained than others, and thus represent MACT control. Because we could not independently use engineering information and principles to otherwise distinguish which well-designed, operated, and maintained fabric filters are routinely achieving levels below the highest test condition average in the emissions data base (*i.e.*, considering the high inlet grain loadings for lightweight aggregate kilns), we establish the floor level as that highest test condition average emission level. Commenters concerns about a high floor level and separate MACT pools for particulate matter, semivolatile metals, and low volatile metals are discussed in Part Four, Section VIII.

c. Metals and Total Chlorine. This rule establishes MACT standards for mercury; semivolatile metals comprised of combined emissions of lead and cadmium; low volatility metals comprised of combined emissions of arsenic, beryllium, and chromium; and total chlorine comprised of combined emissions of hydrogen chloride and chlorine gas. As shown by the following analysis, these hazardous air pollutants are all controlled by the best performing sources, at least in part, by feedrate control of the metal or chlorine in the hazardous waste. In addition to hazardous waste feedrate control, some of the hazardous air pollutants also are controlled by air pollution control equipment. Both semivolatile metals and low volatile metals are controlled by a combination of hazardous waste metal feedrate control and by particulate matter control equipment. Total chlorine is controlled by a combination of feedrate control and, for hazardous waste incinerators, scrubbing equipment designed to remove acid gases.

i. How Are the Metals and Chlorine Floor Control(s) Identified? We follow the language of CAA section 112(d)(3) to identify the control techniques used by the best performing sources. The hazardous waste incinerator and hazardous waste cement kiln source categories are comprised of 186 and 33 sources, respectively. From the statutory language, we conclude that for this analysis the control techniques used by the best performing 6% of sources represents the average of the best performing 12% of the sources in those categories. It follows, therefore, that floor control for metals and chlorine is the technique(s) used by the best performing 12 incinerators and two cement kilns.

Because the hazardous waste lightweight aggregate kiln source category is comprised of only 10 sources, we follow the language of section 112(d)(3)(B) to identify the control technique(s) used by the three best performing sources, which represents the median of the best performing five sources.

Our floor control analysis indicates that the best performing 12 incinerators, two cement kilns, and three lightweight aggregate kilns all use hazardous waste feedrate control to limit emissions of mercury, semivolatile metal, low volatile metal, and total chlorine. For the semivolatile and low volatile metals, the best performing sources also use particulate matter control as part of the floor control technique. In addition, the best performing incinerator sources also control total chlorine and mercury with wet scrubbing. Accordingly, we identify floor control for semivolatile metal and low volatile metal as hazardous waste feedrate control plus particulate matter control, and floor control for incinerators for total chlorine and mercury as hazardous waste feedrate control plus wet scrubbing.

ii. What is the Rationale for Using Hazardous Waste Feedrate Control as MACT Floor Control Technique? As discussed above, MACT floor control for mercury, semivolatile metals, low volatile metals, and total chlorine is based on, or at least partially based on, feedrate control of metal and chlorine in the hazardous waste. The feedrate of metal hazardous air pollutants will affect emissions of those pollutants, and the feedrate of chlorine will affect emissions of total chlorine (*i.e.*, hydrochloric acid and chlorine gas) because metals and chlorine are elements and are not destroyed during combustion. Emissions controls, if any, control only a percentage of the metal or total chlorine fed. Therefore, as concentrations of metals and total chlorine in the inlet to the control device increase, emissions increase.

At proposal, we identified hazardous waste feedrates as part of the technology basis for the proposed floor emission standards.[60] MACT maximum theoretical emission concentrations[61] (MTECs) were established individually for mercury, semivolatile metals, low volatile metals, and total chlorine at a level equal to the highest MTEC of the average of the best performing 12% of sources. For some hazardous air pollutants, hazardous waste feedrate control of metals and chlorine was identified as the sole component of floor control (*i.e.*, where the best performing existing sources do not use pollution control equipment to remove the hazardous air pollutant). Examples include mercury and total chlorine from cement kilns. For other hazardous air pollutants, we identified hazardous waste feedrate control of metals and chlorine as a partial component of MACT floor control (*e.g.*, floor control for semivolatile metals include good particulate matter control in addition to feedrate control of semivolatile metals in hazardous waste).

In the May 1997 NODA, we continued to consider hazardous waste feedrate control of metals and chlorine as a valid floor control technology. However, rather than defining a specific MACT control feedrate level (expressed as a MTEC), we instead relied on another analysis tool, an emissions breakpoint analysis, to identify sources feeding metals and/or chlorine at high (and not MACT) levels. At the time, we believed that the breakpoint analysis was a less problematic approach to identify sources using MACT floor control than the approaches proposed initially.[62]

Given commenters' subsequent concerns with the emissions breakpoint analysis as well (see discussion in Section C below), we conclude that specifying MTECs as MACT control (partially or solely) is necessary to properly reflect the feedrate component of MACT control.

Notwithstanding how the MACT floor MTEC is defined, many commenters suggest that our consideration of hazardous waste feedrate as a floor control technique is inappropriate in a technology-based rulemaking and not permissible under the CAA. Commenters also state that hazardous waste feedrate control is not a control technique due to the wide variations in metals and chlorine in the hazardous waste generated at a single facility location. Further, they believe even greater variations occur in metals and chlorine levels in the hazardous waste generated at multiple production sites representing different industrial sectors. Thus, commenters suggest that basing a floor emission level on data from sources that feed hazardous waste with low levels of metals or chlorine is tantamount to declaring that wastes with higher levels of metals or chlorine are not to be generated. Other

[60] See 61 FR at 17366.

[61] We developed a term, Maximum Theoretical Emissions Concentration, to compare metals and chlorine feedrates across sources of different sizes. MTEC is defined as the metals or chlorine feedrate divided by the gas flow rate, and is expressed in μg/dscm.

[62] Comments had objected to our proposed approach of defining MTECs as too reliant on engineering inspection of the data.

commenters note, however, that hazardous waste feedrate control must be considered as a floor control technique because feedrate control is being used as a control means to comply with existing RCRA regulations for these combustors. Still other commenters recommend that we establish uniform hazardous waste feedrate limits (*i.e.*, base the standard on an emission concentration coupled with a hazardous waste feedrate limit on metals and chlorine) across all three hazardous waste combustor source categories. Please refer to Part Five, Section VII.D.3.c.iv of today's preamble and the Comment Response Document for detailed responses to these comments.

We do not accept the argument that control of hazardous waste metals and chlorine levels in hazardous waste cannot be part of the floor technology. First, control of hazardous air pollutants in hazardous waste feedstock(s) can be part of a MACT standard under section 112(d)(2)(A), which clearly indicates that material substitution can be part of MACT. Second, hazardous waste combustors are presently controlling the level of metal hazardous air pollutants and chlorine in the hazardous waste combusted because of RCRA regulatory requirements. (See § 266.103(c)(1) and (j) where metal and chlorine feedrate controls are required, and where monitoring of feedrates are required.) Simply because these existing controls are risk-based, rather than technology-based, does not mean that they are not means of controlling air emissions cognizable under the CAA. Floor standards are to be based on ''emission limitation[s]'' achieved by the best existing sources. An ''emission limitation'' includes ''a requirement established by the * * * Administrator which limits the quantity, rate, or concentration of emissions. * * * including any requirement relating to the operation * * * of a source. * * *'' CAA section 302(k). This is precisely what current regulations require to control metal and chlorine levels in hazardous waste feed.

Commenters also note that contemplated floor levels were lower than the feed limits specified in current regulations for boilers and industrial furnaces. This is true, but not an impediment to identifying achievable MACT floor levels. Actual performance levels can serve as a basis for a floor. An analogy would be where a group of facilities achieve better capture efficiency from air pollution control devices than required by existing rule. That level of performance (if generally achievable) can serve as the basis for a floor standard. Accordingly, we use hazardous waste feedrate, entirely or partially, to determine floor levels and beyond-the-floor levels for mercury, semivolatile metals, low volatile metals, and total chlorine.

iii. How Are Feedrate and Emissions Levels Representative of MACT Floor Control Identified? After identifying feedrate control as floor control, we use a data analysis method called the ''aggregate feedrate approach'' to establish floor control hazardous waste feedrate levels and emission levels for mercury, semivolatile metals, low volatile metals, and total chlorine. The first step in the aggregate feedrate approach is to identify an appropriate level of aggregated mercury, semivolatile metals, low volatile metals, and total chlorine feedrate control, expressed as a MTEC, being achieved in practice by the best performing incinerator, cement kiln and lightweight aggregate kiln sources. This aggregate MTEC level is derived only from the sources using MACT floor emission controls.

The aggregate feedrate approach involves four steps: (1) Identifying test conditions in the data base where data are available to calculate hazardous waste feedrate MTECs for all three metal hazardous air pollutant groups and total chlorine; (2) screening out test conditions where a source was not using the MACT floor emission control device for hazardous air pollutants that are cocontrolled by an air pollution control device[63]; (3) ranking the individual hazardous air pollutant MTECs, from the different source test conditions, from lowest to highest and assigning each a numerical rank, with a rank of one being the lowest MTEC; and (4) summing, for each test condition, the individual ranking for each of the hazardous air pollutants to determine a composite ranking. The total sum is used to provide an overall assessment of the aggregate level of hazardous air pollutants in the hazardous waste for each test condition. The hazardous waste feed streams with lower total sums (*i.e.*, hazardous air pollutant levels) are ''cleaner'' in aggregate than those with higher total sums.[64] (See the technical support document for more details on this procedure.[65])

The aggregate MTEC ranking process results in aggregate feedrate data from nine incinerators, 10 cement kilns, and 10 lightweight aggregate kilns from which to select an appropriate level of feedrate control representative of MACT floor control.[66] We considered selecting the source with either the highest or lowest aggregate MTEC in each source category to represent MACT floor control, but did not believe this was appropriate based on concerns about representativeness and achievability. We conclude that it is reasonable, however, to consider the best 50% of the sources for which we have data in each source category as the best performing sources. This is because, for incinerators and cement kilns, we have only a few sources with complete aggregate MTEC data relative to the size of the source category. The best 50% of the sources for these categories equates to five sources, given that we have aggregate MTEC data for nine incinerators and 10 cement kilns. For lightweight aggregate kilns, this equates also to five sources given that we have aggregate MTEC data for 10 lightweight aggregate kiln sources.

Additionally, we conclude it is appropriate to identify a feedrate MTEC representative of floor control based on the median of the best performing five sources. In selecting a representative sample and identifying the appropriate MTEC floor control level, we draw guidance from section 112(d)(3)(B), in which Congress requires the Agency to use the average of the best performing five sources when faced with small source categories (*i.e.*, less than 30 sources), and therefore limited data, to establish a MACT floor. In addition, this methodology is reasonable and appropriate because it allows consideration of a number of best performing sources (*i.e.*, five), which is within the range of reasonable values we could have selected.

We considered an approach that selected both the control technique and level of control as the average of the best performing 12% of incinerator and

[63] For example, to potentially be considered a MACT-controlled incinerator with respect to both the emissions control device and hazardous waste metals and chlorine feedrate, the incinerator must use a wet scrubber for hydrochloric acid and mercury control and must use either a fabric filter, ionizing wet scrubber, or electrostatic precipitator *and* achieve the floor particulate matter level of 0.015 gr/dscf. Similarly, cement kilns must achieve the particulate matter MACT floor (for this analysis only, the New Source Performance Standard was converted to an estimated equivalent stack gas concentration of 0.03 gr/dscf) and lightweight aggregate kilns must meet the particulate matter MACT floor of 0.025 gr/dscf. There is no MACT floor hydrochloric acid emissions control device for cement kilns and lightweight aggregate kilns.

[64] This aggregate hazardous waste MTEC ranking is done separately for each of the three combustor source categories.

[65] USEPA, ''Final Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies,'' July 1999.

[66] Only nine incinerators were ultimately used because (1) We have complete metal emissions data on relatively few sources, and (2) many sources do not use particulate matter floor control, a major means of controlling semivolatile metals and low volatile metals.

cement kiln sources for which we have aggregate MTEC data. This approach resulted in using only the best single source as representative of MACT floor control for all existing sources because there are only nine incinerators and 10 cement kilns for which we have adequate aggregate data. However, the level of feedrate control achieved by the single best performing existing source is likely not representative of the range of higher feedrate levels achieved by the best performing existing sources and, indeed, would inappropriately establish as a floor what amounts to a new source standard.

The final step of the aggregate feedrate approach is to determine an emission level that is routinely achieved by sources using MACT floor control(s). Similar to the April 1996 NPRM and May 1997 NODA, we evaluated all available data for each test condition to determine if a hazardous air pollutant is fed at levels at or below the MACT floor control MTEC. If so, the test condition is added to the expanded MACT pool for that hazardous air pollutant.[67] We then define the floor emission level for the hazardous air pollutant/hazardous air pollutant group as the level achieved by the source with the highest emissions average in the MACT expanded pool.

The aggregate feedrate approach is a logical and reasonable outgrowth of the aggregate hazardous air pollutant approach to establish floor emission levels that we discussed in the April 1996 NPRM. The initial proposal determined MACT floors separately for each hazardous air pollutant controlled by a different control technology, but we also proposed an alternative whereby floors would be set on the basis of a source's performance for all hazardous air pollutants.

Many commenters prefer the total aggregate hazardous air pollutant approach over the individual hazardous air pollutant approach because it better ensures that floor levels would be simultaneously achievable. However, we reject the total aggregate approach because it tends to result in floors that are likely to be artificially high, reflective of limited emissions data for all hazardous air pollutants at each facility. These floor levels, therefore, would not reflect performances of the best performing sources for particular hazardous air pollutants. We are assured of simultaneous achievability in our final methodology by: (1) Establishing the MACT floor feedrate control levels on an aggregate basis for metals and chlorine, as discussed above, rather than for each individual hazardous air pollutant; (2) using the particulate matter MACT pool to establish floor levels for particulate matter, semivolatile metals, and low volatile metals; and (3) ensuring that floor controls are not technically incompatible. In fact, our resulting floor emission levels are already achieved in practice by 9 to 40 percent of sources in each of the three source categories, clearly indicating simultaneously achievable standards.[68]

C. What Other Floor Methodologies Were Considered?

This is a brief overview of the major features of the MACT floor methodologies that we proposed in the April 1996 NPRM or discussed in the May 1997 NODA, accompanied by our rationale for not pursuing those methodologies in this final rule.

1. April 19, 1996 Proposal

We proposed the same general approach to identify floor control and floor emission levels as used in today's final rule. The proposal contained an approach to identify the controls used by the best performing sources (*i.e.*, the MACT pool) and then identify an emission level that those controls are achieving. To identify the floor emission level, we considered emissions from all sources using properly designed and operated controls (*i.e.*, the expanded MACT pool) and established a preliminary floor level as the highest test condition average for those sources.

There are three major differences between the proposed approach and today's final approach, however:

a. Emissions Variability. At proposal, we added a statistically-derived emissions variability factor to the highest test condition average in the expanded MACT pool. Today we conclude that emissions variability is considered inherently in the floor methodology. (See discussion in section D below for our rationale for not using a statistically-derived variability factor.)

b. MACT Pool for Particulate Matter, Semivolatile Metals, and Low Volatile Metals. At proposal, we identified separate and different MACT pools (and associated MACT controls) for particulate matter, semivolatile metals, and low volatile metals, even though all three are controlled by a particulate matter control device. Commenters said this is inappropriate and we concur. Specifying the MACT floor particulate matter emission control device individually for these pollutants is likely to result in three different definitions of floor control. Thus, the same particulate matter control device would need to meet three different design specifications. As a practical matter, the more stringent specification would prevail. But, this highlights the impracticability of evaluating floor emission control for these standards individually rather than in the aggregate.

As discussed in the May 1997 NODA, today's approach uses the same initial MACT pool to establish the floor levels for particulate matter, semivolatile metals, and low volatile metals. The initial MACT pool is comprised of those sources meeting the emission control component of MACT control. To establish the semivolatile metal and low volatile metal floor levels, the particulate matter MACT pool is then analyzed to consider MACT hazardous waste feedrate control first for semivolatile metals and then for low volatile metals, using the aggregate feedrate approach discussed above.

c. Definition of MACT Control. At proposal, we defined MACT emissions control by specifying the design of the emissions control device. Commenters suggested that this was problematic because: (1) Our data base had limited data on design of the control device; (2) some of our available data were incorrect; and (3) the parameters the Agency was using to characterize MACT control did not adequately correlate with control efficiency. Given these concerns, our May 1997 NODA contained an emissions breakpoint approach to identify those sources that appeared to have anomalously higher emissions than other sources in the potential MACT pool. Our rationale was that given the anomalously high emissions, those sources were not, in fact, using MACT control.

Commenters express serious concerns about the validity of the nonstatistical approach used to identify the breakpoint. After considering various statistical approaches to identify an emissions breakpoint, we conclude that the emissions breakpoint approach is problematic.[69] For these reasons, we are

[67] The expanded MACT pool for each hazardous air pollutant is comprised of test conditions from sources equipped with the prescribed MACT floor emission control device, if any, and feeding hazardous waste at an MTEC not exceeding the MACT floor MTEC for that hazardous air pollutant.

[68] Our analysis shows that approximately nine percent of incinerators, 27 percent of cement kilns, and 40 percent of lightweight aggregate kilns currently operating can meet all of the floor levels simultaneously. See USEPA, ''Final Technical Support Document For HWC MACT Standards, Volume V: Emissions Estimates and Engineering Costs,'' July 1999.

[69] To improve the rigor of our breakpoint approach, we investigated a modified Rosner ''outlier'' test that: (1) Uses a single tailed test to consider only high ''outliers'' (*i.e.*, test conditions

not defining MACT emissions control by design parameters or using an emissions breakpoint approach to identify MACT emissions or feedrate control. Rather, the MACT floor emission control equipment, where applicable, is defined generically (*e.g.,* electrostatic precipitator, fabric filter), and the aggregate feedrate approach is used to define MACT floor feedrates. We believe the aggregate feedrate approach addresses the concerns that commenters raise on the proposed approach because it more clearly defines MACT control and relies less on engineering judgment.

2. May 1997 NODA

We have incorporated into the final rule several of the procedures discussed in the May 1997 NODA. The NODA explained why it is inappropriate to add a statistically-derived emissions variability factor to the highest test condition average of the expanded MACT pool. Despite comments to the contrary, we conclude that emissions variability is inherently considered in the floor methodology. See discussion in section D below.

In addition, the NODA discussed using the same initial MACT pool to establish the floor levels for particulate matter, semivolatile metals, and low volatile metals. We use this same approach in this final rule. Commenters generally concurred with that approach.

As discussed above, we considered using an emissions breakpoint technique, but conclude that this approach is problematic and did not use the approach for this rule.

D. How Is Emissions Variability Accounted for in Development of Standards?

The methodology we use to establish the final MACT emission standards intrinsically accounts for emissions variability without adding statistically-derived emissions variability factors. Many commenters strongly suggest that statistically-derived emissions variability factors must be added to the emission levels we identify from the data base as floor emission levels to ensure that the standards are routinely achievable.[70] Other commenters suggest that our floor methodology inherently accounts for emissions variability. We discuss below the types of emissions variability and why we conclude that emissions variability is inherently accounted for by our methodology.

We account for three types of emissions variability in establishing MACT standards: (1) Within test condition variability among test runs (a test condition is comprised of at least three runs that are averaged); (2) imprecision in the stack test method; and (3) source-to-source emissions variability attributable to source-specific factors affecting the performance of the same MACT control device. (See, *e.g. FMC Corp.* v. *Train,* 539 F.2d 973, 985–86 (4th Cir. 1976), holding that variability in performance must be considered when ascertaining whether a technology-based standard is achievable.) The following sections discuss the way in which we account for these types of variability in the final rule.

1. How Is Within-Test Condition Emissions Variability Addressed?

Inherent process variability will cause emissions to vary from run-to-run within a test condition, even if the stack method is 100 percent precise and even though the source is attempting to maintain constant operating conditions. This is caused by many factors including: Minor changes in the feedrate of feedstreams; combustion perturbations (*e.g.,* uncontrollable, minor fluctuations in combustion temperature or fan velocity); changes in the collection efficiency of the emission control device caused by fluctuations in key parameters (*e.g.,* power input to an electrostatic precipitator); and changes in emissions of materials (*e.g.,* sulfur dioxide) that may cause test method interferences.

At proposal, we used a statistical approach to account for emissions variability. See 61 FR at 17366. The statistical approach identified an emissions variability factor, which was added to the log-mean of the emission level being achieved based on the available ''short-term'' compliance test data. We called this emission level the ''design level.'' The variability factor was calculated to ensure that the design level could be achieved 99 percent of the time, assuming average within-test condition emissions variability for the source using MACT control.

In the May 1997 NODA, we discussed alternative emission standards developed without using a statistically-derived variability factor. Adding such a variability factor was determined inappropriate because it sometimes resulted in nonsensical results. For example, the particulate matter MACT floor level for incinerators under one floor methodology would have been higher than the current RCRA standard allows, simply due to the impact of an added variability factor. In other cases, the floor levels would have been much higher than our experience would indicate are routinely being achieved using MACT control. We reasoned that these inappropriate and illogical results may flow from either the data base used to derive the variability factor (*e.g.,* we did not have adequate information to screen out potentially outlier runs on a technical basis) or selecting an inappropriate floor-setting test condition as the design level (*e.g.,* we did not have adequate information on design, operation, and maintenance of emissions control equipment used by sources in the emissions data base to definitively specify MACT control).

Consequently, we reasoned that adequately accounting for within test condition emissions variability is achieved where relatively large data sets are available to evaluate for identifying the floor level. Large sets of emissions data from MACT sources, which have emissions below the floor level, are likely to represent the range of emissions variability. For small data sets (*e.g.,* dioxin/furan emissions for waste heat recovery boiler equipped incinerators; dioxin/furan emissions data for lightweight aggregate kilns), we acknowledged that the same logic would not apply. For these small data sets, the floor level was set at the highest run for the MACT source with the highest test condition average emissions. Many commenters suggest that our logic was flawed. Commenters say that, if we desire the floor level to be achievable 99 percent of the time (*i.e.,* the basis for the statistically-derived variability factor at proposal), the emissions data base is far too small to identify the floor level as the highest test condition average for sources using MACT control.

We conclude, however, that the final floor levels identified, using the procedures discussed above (*i.e.,* without adding a statistically-derived emissions variability factor), are levels that can be consistently achieved by well designed, operated, and maintained MACT sources. We

that anomalously high emissions, not necessarily true outliers in the statistical sense); (2) presumes that any potential ''outliers'' are at the 80th percentile value or higher; and (3) has a confidence level of 90 percent. We abandoned this statistical approach because: (1) Although modifications to the standard Rosner test were supportable, the modified test has not been peer-reviewed; (2) although the target confidence level was 90 percent, the true significance level of the test, as revised, is inappropriately low—approximately 80 percent; and (3) the ''outlier'' test does not identify MACT-like test conditions because it only identifies anomalously high test conditions rather than the best performing test conditions.

[70] One commenter recommends specific statistical approaches to calculate variability factors and provides examples of how the statistical methods should be applied to our emissions data base. See comment number CS4A–00041.

conclude this because our emissions data base is comprised of compliance test data generated when sources have an incentive to operate under worst case conditions (*e.g.*, spiking metals and chlorine in the waste feed; detuning the emissions control equipment). Sources choose to operate under worst case conditions during compliance testing because the current RCRA regulations require that limits on key operating parameters not exceed the values occurring during the trial burn. Therefore, these sources conduct tests in a manner that will establish a wide envelope for their operating parameter limits in order to accommodate the expected variability (*e.g.*, variability in types of wastes, combustion system parameters, and emission control parameters). See 56 FR at 7146 where EPA likewise noted that certain RCRA operating permit test conditions are to be ''representative of worst-case operating conditions'' to achieve needed operating flexibility. One company that operates several hazardous waste incinerators at three locations comments that, because of the current RCRA compliance regime, which is virtually identical to the compliance procedures of today's MACT rule, ''the result is that units must be tested at rates which are at least three standard deviations harsher than normal operations and normal variability in order to simulate most of the statistical likelihood of allowable emission rates.'' [71] The commenter also states that because of the consequences of exceeding an operating parameter limit under MACT, ''* * * clearly a source will test under the worst possible operating conditions in order to minimize future (exceedances of the limits).'' Finally, the commenter says that ''Because of variability and the stiff consequences of exceeding these limits, operators do not in fact operate their units anywhere near the limits for sustained periods of time, but instead tend to operate several standard deviations below them, or at about 33 to 50% of the limits.'' [72]

We conclude from these comments, which are consistent with engineering principles and with many discussions with experts from the regulated community, that MACT sources with compliance test emissions at or below the selected floor level are achieving those levels routinely because these test conditions are worst-case and are defined by the source itself to ensure 100 percent compliance with the relevant standard.

We acknowledge, however, that mercury is a special case because our mercury emission data may not be representative of worst-case conditions. As discussed in Section I.B.3 above, sources did not generally spike mercury emissions during RCRA compliance testing because they normally feed mercury at levels resulting in emissions well below current limits.[73] Although our data base for mercury is comprised essentially of normal emissions, emissions variability is adequately accounted for in setting floor levels. First, mercury emissions variability is minimal because the source can readily control emissions by controlling the feedrate of mercury.[74] For cement and lightweight aggregate kilns, mercury is controlled solely by controlling feedrate. Given that there is no emission control device that could have perturbations affecting emission rates, emissions variability at a given level of mercury feedrate control is relatively minor. Any variability is attributable to variability in feedrate levels due to feedstream sampling and analysis imprecision, and stack method imprecision (see discussion below).

Second, our emissions data indicate that the mercury floor levels are being achieved by a wide margin, which is a strong indication that a variability factor is not needed. Only one of the 15 incinerators using MACT floor control exceeds the design level for the floor emission level.[75] In addition, only seven of 45 incinerators for which we have mercury emissions data exceed the design level, and two of those eight are know to have spiked mercury in the hazardous waste feed during compliance testing. Only six of the 45 incinerators exceed the floor emission level.

The situation is similar for cement kilns and lightweight aggregate kilns. Only two of 22 cement kilns using floor control exceed the design level, only five of the 33 kilns in the source category exceed the design level, and only one of the 33 kilns exceeds the floor emission level. Only one of nine lightweight aggregate kilns using floor control exceeds the design level, and only two of the 10 kilns in the source category exceed the design level (and one of those kilns is known to have spiked mercury in the hazardous waste feed during compliance testing). Only one of the 10 kilns exceeds the floor emission level, and that kiln spiked mercury.

We conclude from this analysis that the mercury floor emission levels in this rule are readily achieved in practice even though our mercury emissions data were not spiked (*i.e.*, they may not represent worst-case emissions), and therefore a separate variability factor is not needed.

2. How Is Waste Imprecision in the Stack Test Method Addressed?

Method precision is a measure of how closely emissions data are grouped together when measuring the same level of stack emissions (*e.g.*, using a paired or quad test train). Method imprecision is largely a function of the ability of the sampling crew and analytical laboratory to routinely follow best practices. Precision can be affected by: (1) Measurement of ancillary parameters including gas flow rate, pressure, and temperature; (2) recovery of materials from the sampling train; and (3) cleaning, concentrating, and quantitating the analyte.

Several commenters state that we must add a factor to the selected floor level to account for method imprecision in addition to a factor to account for within-test condition emissions variability. We investigated the imprecision for the stack methods used to document compliance with today's rule and determined that method imprecision may be significant for some hazardous air pollutant/method combinations.[76] Our results indicate, however, that method precision is much better than commenters claim, and that as additional data sets become available,

[71] See Comment No. CS4A–00029.A, dated August 16, 1996.

[72] To estimate the compliance cost of today's rule, we assumed that sources would design their systems to meet an emission level that is 70% of the standard, herein after called the ''design level.''

[73] Three of 23 incenerators used to define MACT floor (*i.e.*, sources for which mercury feedrate data are available) are known to have spiked mercury. No cement kilns used to define MACT floor (*e.g.*, excluding sources that have stopped burning hazardous waste) are known to have spiked mercury. Only one of ten lightweight aggregate kilns used to define MACT floor is known to have spiked mercury.

[74] Although incenerators are generally equipped with wet scrubbers that can have a mercury removal efficiency of 15 to 60 percent, feedrate control is nonetheless the primary means of mercury emissions control because of the relatively low removal efficiency provided by wet scrubbers.

[75] Commenters note that the mercury levels fed during RCRA compliance testing may not represent the normal range of feedrates, and thus the compliance test emission levels may not be representative of emission levels achieved in practice. Given that only one of 15 incinerators using floor control exceeds the design level, it appears that the floor emission level is, in fact, being achieved in practice. Some of these 15 sources were likely feeding mercury at the high end of their normal range, even though others may have been feeding mercury at normal or below normal levels. This is also the situation of cement kilns where only two of 2 kilns using floor control exceed the design level, and for lightweight aggregate kilns where only one of nine kilns using floor exceeds the design level.

[76] USEPA, ''Final Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies,'' July 1999.

the statistically-derived precision bars for certain pollutants are reasonably expected to be reduced significantly. This is mainly because data should become available over a wider range of emission levels thus reducing the uncertainty that currently results in large precision bar projections for some hazardous air pollutants at emission levels that are not close to the currently available paired and quad-train emissions data.

We conclude that method imprecision, in selecting the floor levels for hazardous waste combustors, is adequately addressed for the same reasons that we accounted for within-test condition emissions variability. Method precision is simply a factor that contributes to within-test condition variability. As discussed above, sources consider emissions variability when defining their compliance test operating conditions to balance emissions standards compliance demonstrations with the need to obtain a wide operating envelope of operating parameter limits.

3. How Is Source-to-Source Emissions Variability Addressed?

If the same MACT control device (*i.e.*, same design, operating, and maintenance features) were used at several sources within a source category, emissions of hazardous air pollutants from the sources could vary. This is because factors that affect the performance of the control device could vary from source to source. Even though a device has the same nominal design, operating, and maintenance features, those features could never be duplicated exactly. Thus, emissions could vary from source to source.

We agree that this type of emissions variability must be accounted for in the standards to ensure the standards are achieved in practice. Source-to-source emissions variability is addressed by identifying the floor emission level as the highest test condition average for sources in the expanded MACT pool, as discussed above.[77]

The test condition average emissions for sources in the expanded MACT pool for most standards often vary over several orders of magnitude. That variability is attributable partially to the type of source-to-source emissions variability addressed here as well as the inclusion of sources with varying levels of MACT control in the pool. Sources are included in the expanded MACT pool if they have controls equivalent to or better than MACT floor controls. We are unable to identify true source-to-source emissions variability for sources that actually have the same MACT controls because we are unable to specify in sufficient detail the design, operating, and maintenance characteristics of MACT control. Such information is not readily available. Therefore, we define MACT control only in general terms. This problem (and others) are addressed in today's rule by selecting the MACT floor level based on the highest test condition average in the expanded MACT pool, which accounts for source-to-source variability.

We also conclude that the characteristics of the emissions data base coupled with the methodology used to identify the floor emission level adequately accounts for emissions variability so that the floor level is routinely achieved in practice by sources using floor control. As further evidence, we note that a large fraction—50 to 100 percent—of sources in the data base currently meet the floor levels regardless of whether they currently use floor control.[78]

VI. What Are the Standards for Existing and New Incinerators?

A. To Which Incinerators Do Today's Standards Apply?

The standards promulgated today apply to each existing, reconstructed, and newly constructed incinerator (as defined in 40 CFR 260.10) burning hazardous waste. These standards apply to all major source and area source incinerator units and to all units whether they are transportable or fixed sources. These standards also apply to incinerators now exempt from RCRA stack emission standards under §§ 264.340(b) and (c).[79] Additionally, these standards apply to thermal desorbers that meet the definition of a RCRA incinerator, and therefore, are not regulated under subpart X of part 264.

B. What Subcategorization Options Did We Evaluate?

We considered whether it would be appropriate to subcategorize incinerators based on several factors discussed below and conclude that subcategorization is not necessary. However, for waste heat recovery boiler-equipped incinerators, we establish a separate emission standard solely for dioxin/furan. We explained our rationale for separate dioxin/furan standards for waste heat recovery boilers in the May 1997 NODA (62 FR 24220). We said that waste heat recovery boilers emit significantly higher dioxin/furan emissions than other incinerators, probably because the heat recovery boiler precludes rapid temperature quench of the combustion gases to below 400°F, therefore warranting separate standards for dioxin/furan only (*i.e.*, the waste heat boiler does not affect achievability of the other emission standards).

We considered several options for subcategorizing the hazardous waste incinerator source category based on: (1) Size of the unit (*e.g.*, small and large incinerators); (2) method of use of the hazardous waste incinerator (*e.g.*, commercial hazardous waste incinerator, captive (on-site) unit); (3) facility design (*e.g.*, rotary kiln, liquid injection, fluidized bed, waste heat boiler), and (4) type of waste fed (*e.g.*, hazardous waste mixed with radioactive waste, munitions, liquid, solid or aqueous wastes). Subcategorization would be appropriate if one or more of these factors affected achievability of emission standards that were established without subcategorization. In the May 1997 NODA (62 FR 24219), we stated that subdividing the hazardous waste incinerator source category by size or method of use (such as commercial or on-site) would be inappropriate because it would not result in standards that are more achievable. Many of the standards would be the same for the subcategories while the remainder would be more stringent. That conclusion is not altered by any of the changes in today's final rule. Therefore, subcategorization would add complexity without any tangible achievability benefits.

In the same notice, we also requested comment on subcategorization and/or a deferral of standards for mixed waste incinerators based on a comment from the Department of Energy that this type of incinerator has several unique features that warrant subcategorization.

[77] Because of the need to account for this type of variability, we disagree with those commenters recommending that: (1) The floor emission level be identified as the average emission level achieved by the 12 percent of source with the lowest emissions; and (2) it is inappropriate to base the floor emission level on sources using floor control but that are not within the 12 percent of sources with the lowest emissions (*i.e.*, the expanded MACT pool should not be used to identify floor emission levels). The floor emission level must be achieved in practice by sources using the appropriately designed and operated floor control. Thus, emission levels being achieved by all sources using the appropriately designed and operated floor control (*i.e.*, including sources using floor control but having emission levels greater than the average of the emissions achieved by the 12 percent of sources with the lowest emissions) must be considered when identifying the floor emission level.

[78] USEPA, ''Final Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies,'' July 1999.

[79] Sections 264.340(b) and (c) exempt from stack emission standards incinerators (a) burning solely ignitable, corrosive or reactive wastes under certain conditions, and (b) if the waste contains no or insignificant levels of hazardous constituents.

There are three Department of Energy mixed waste incinerators. Each mixed waste incinerator has a different type of operation and different air pollution control devices, and two of the sources have high dioxin/furan and mercury emissions (several times the dioxin/furan standards adopted in today's rule). We received several comments on the mixed waste incinerator issue. These commenters contend that, because of the radioactive component of the wastes, mixed waste incinerators pose greater than average risk, and regulating these facilities should not be deferred. These commenters also note that the MACT controls are not incompatible with mixed waste incinerators and thus these incinerators can readily achieve the emission standards. We agree that MACT controls are compatible with mixed waste incinerators, with one exception discussed below, and do not establish a mixed waste incinerator subcategory.

The standards promulgated today are generally achievable by all types and sizes of incinerators when using MACT controls. We recognize, however, that each of the possible subcategories considered has some unique features. At the same time, upon consideration of each individual issue, we conclude that unique features of a particular hazardous waste incinerator can be better dealt with on an individual basis (through the permit process or through petitions) instead of through extensive subcategorization. As an example, we agree with the Department of Energy's contentions that feedstream testing for metals is problematic for mixed waste incinerators due to radioactivity of the waste and because risk from metal emissions is minimal in mixed waste incinerators that use HEPA filters to prevent radioactive emissions. Section 63.1209(g)(1) of today's rule provides a mechanism for petitioning the Administrator for use of an alternative monitoring method.[80] This petition process appears to be an appropriate vehicle for addressing the concerns expressed by the Department of Energy about feedstream testing for metals and use of HEPA filters at its mixed waste incinerators.

In summary, our decision not to subcategorize hazardous waste incinerators is based on four reasons:

(1) Size differences among hazardous waste incinerators do not necessarily reflect process, equipment or emissions differences among the incinerators. Many small size hazardous waste incinerators have emissions lower than those promulgated today even though they are not regulated to those low levels.

(2) Types and concentrations of uncontrolled hazardous air pollutants are similar for all suggested subcategories of hazardous waste incinerators.

(3) The same type of control devices, such as electrostatic precipitators, fabric filters, and scrubbers, are used by all hazardous waste incinerators to control emissions of particular hazardous air pollutants.

(4) The standards are achievable by all types and sizes of well designed and operated incinerators using MACT controls.

C. What Are the Standards for New and Existing Incinerators?

1. What Are the Standards for Incinerators?

We discuss in this section the basis for the emissions standards for incinerators. The emissions standards are summarized below:

STANDARDS FOR EXISTING AND NEW INCINERATORS

Hazardous air pollutant or hazardous air pollutant surrogate	Emissions standard[1]	
	Existing sources	New sources
Dioxin /Furan	0.20 ng TEQ[2]/dscm; or 0.40 ng TEQ/dscm and temperature at inlet to the initial particulate matter control device ≤ 400°F.	0.20 ng TEQ/dscm.
Mercury	130 µg/dscm	45 µg/dscm.
Particulate Matter	34mg/dscm (0.015gr/dscf)	34mg/dscm (0.015gr/dscf).
Semivolatile Metals	240 µg/dscm	24 µg/dscm.
Low Volatile Metals	97 µg/dscm	97 µg/dscm.
Hydrochloric Acid/Chlorine Gas	77 ppmv	21 ppmv.
Hydrocarbons[3,4]	10 ppmv (or 100 ppmv carbon monoxide)	10 ppmv (or 100 ppmv carbon monoxide).
Destruction and Removal Efficiency	99.99% for each specific principal organic hazardous constituent, except 99.9999% for specified dioxin-listed wastes.	Same as for existing incinerators.

[1] All emission levels are corrected to 7 percent oxygen.
[2] Toxicity equivalent quotient, the international method of relating the toxicity of various dioxin/furan congeners to the toxicity of 2,3,7,8–TCDD.
[3] Hourly rolling average. Hydrocarbons reported as propane.
[4] Incinerators that elect to continuously comply with the carbon monoxide standard must demonstrate compliance with the hydrocarbon standard of 10ppmv during the comprehensive performance test.

2. What Are the Standards for Dioxins and Furans?

We establish a dioxin/furan standard for existing incinerators of either 0.20 ng TEQ/dscm, or a combination of dioxin/furan emissions up to 0.40 ng TEQ/dscm and temperature at the inlet to the initial dry particulate matter control device not to exceed 400°F.[81] Expressing the standard as a temperature limit as well as a dioxin/furan concentration limit provides better control of dioxin/furan, because sources operating at temperatures below 400°F generally have lower emissions and is consistent with the current practice of many sources. Further, without the lower alternative TEQ limit of 0.20 ng/dscm, sources that may be operating dry particulate matter control devices at temperatures higher than 400°F while achieving dioxin/furan emissions below 0.20 ng TEQ/dscm would nonetheless be required to incur costs to lower gas temperatures. This would not be appropriate because lowering gas temperatures in this case would likely

[80] The petition for an alternative monitoring method should be included in the comprehensive performances test plan submitted for review and approval.

[81] Incinerators that use wet scrubbers as the initial particulate matter control device are presumed to meet the 400°F temperature requirement. Consequently, as a practical matter, the standard for such incinerators is simply 0.4 ng TEQ/dscm.

achieve limited reductions in dioxin/furan emissions (*i.e.*, because emissions are already below 0.20 ng TEQ).

For new incinerators, the dioxin/furan standard is 0.20 ng TEQ/dscm. We discuss below the rationale for these standards.

a. What is the MACT Floor for Existing Sources? We establish the same MACT floor control, as was evaluated in the May 1997 NODA, based on the revised data base and the refinements to the analytical approaches. This floor control is based on quenching of combustion gases to 400°F or below at the dry particulate matter control device.[82] We selected a temperature of 400°F because that temperature is below the temperature range for optimum surface-catalyzed dioxin/furan formation reactions—450°F to 650°F—and most sources operate their particulate matter control device below that temperature. In addition, temperature is an important control parameter because dioxin/furan emissions increase exponentially as combustion gas temperatures at the dry particulate matter control device increase above 400°F.

We identify a MACT floor level of 0.40 ng TEQ/dscm for incinerators other than those equipped with waste heat recovery boilers. As discussed in the May 1997 NODA, the floor level of 0.40 ng TEQ/dscm is based on the highest nonoutlier test condition for sources equipped with dry particulate matter control devices operated at temperatures of 400°F or below or wet particulate matter control devices. We screened out four test conditions from three facilities because they have anomalously high dioxin/furan emissions and are not representative of MACT control practices.[83] Three of these test conditions are from sources that had other test conditions with emission averages well below 0.40 ng TEQ/dscm, indicating that the same facilities can achieve lower emission levels in different operating modes.

We identify a MACT floor level for waste heat boiler-equipped hazardous waste incinerators of 12 ng TEQ/dscm based on the highest emitting individual run for sources equipped with dry particulate matter control devices operated at temperatures of 400°F or below or wet particulate matter control devices. We use the highest run to set the floor level rather than the average of the runs for the test condition to address emissions variability concerns given that we have a very small data set for waste heat boilers. All waste heat boiler-equipped hazardous waste incinerators meet this floor level, except for a new test conducted after the publication of the May 1997 NODA at high temperature conditions that resulted in dioxin/furan emission levels of 47 ng TEQ/dscm. This source is not using MACT control, however, because the temperature at the particulate matter control device exceeded 400°F. Thus, we do not consider emissions from this source in identifying the floor level.

We received numerous and diverse comments on the April 1996 proposal and the May 1997 NODA. While some commenters consider the dioxin/furan standards too high, a large number comment that the standards are too stringent. Many comment that the methodology used for calculating the dioxin/furan MACT floor level is inappropriate and that the cost-effectiveness of the standards is not reasonable. In particular, some commenters suggest separating ''fast quench'' and ''slow quench'' units. We have fully addressed this latter concern because we now establish separate dioxin/furan standards for waste heat boilers given that they are a fundamentally different type of process and that they have higher dioxin/furan emissions because of the slow quench across the boiler. We address the other comments elsewhere in the preamble and in the comment response document.

Approximately 65% of all test conditions at all incinerator sources are achieving the 0.40 ng TEQ/dscm level, and over 50% of all test conditions achieve the 0.20 ng TEQ/dscm level. We estimate that approximately 60 percent of incinerators currently meet the TEQ limit as well as the temperature limit. Under the statute, compliance costs are not to be considered in MACT floor determinations. For purposes of compliance with Executive Order 12866 and the Regulatory Flexibility Act, we calculated the annualized cost for hazardous waste incinerators to achieve the dioxin/furan MACT floor levels. Assuming that no hazardous waste incinerator exits the market due to MACT standards, the annual cost is estimated to be $3 million, and the standards will reduce dioxin/furan emissions nationally by 3.4 g TEQ per year from the baseline emissions level of 24.8 g TEQ per year.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? We investigated the use of activated carbon injection, along with limiting temperatures at the inlet to the initial dry particulate matter control device to 400°F,[84] to achieve two alternative beyond-the-floor emission levels: (1) 0.40 ng TEQ/dscm for waste heat boiler-equipped incinerators (*i.e.*, slow quench) to reduce their emissions to the floor level for other incinerators; and (2) 0.20 ng TEQ/dscm for all incinerators. Activated carbon injection technology is feasible and proven to reduce dioxin/furan emissions by 99 percent or greater.[85] It is currently used by one waste heat boiler-equipped hazardous waste incinerator (Waste Technologies Industries in East Liverpool, Ohio) and many municipal waste combustors.[86] The removal efficiency of an activated carbon injection system is affected by several factors including carbon injection rate and adsorption quality of the carbon. Thus, activated carbon injection systems can be used by waste heat boiler-equipped incinerators to achieve alternative beyond-the-floor emissions of either 0.40 ng TEQ/dscm or 0.20 ng TEQ/dscm.

We conclude that a beyond-the-floor emission level of 0.40 ng TEQ/dscm for waste heat boiler-equipped incinerators is cost-effective but a 0.20 ng TEQ/dscm emission level for all incinerators is not cost-effective. We estimate that 23 waste heat boiler-equipped incinerators will need to install activated carbon injection systems at an annualized cost of approximately $6.6 million. This will result in a sizable reduction of 17.9 g TEQ dioxin/furan emissions per year and will provide an 84 percent reduction in emissions from the floor emission level (21.4 g TEQ per year) for all hazardous waste incinerators. This represents a cost-effectiveness of $370,000 per gram TEQ removed.

When we evaluated the alternative beyond-the-floor emission level of 0.20 ng TEQ/dscm for all incinerators, we determined that 80 hazardous waste incinerators would incur costs to reduce dioxin/furan emissions by 19.5 g TEQ from the floor level (21.4 g TEQ) at an annualized cost of $16.1 million. The cost-effectiveness would be $827,000 per gram of TEQ removed. In addition,

[82] The temperature limit applies at the inlet to a dry particulate matter control device that suspends particulate matter in the combustion gas stream (*e.g.*, electrostatic precipitator, fabric filter) such that surface-catalyzed formation of dioxin/furan is enhanced. The temperature limit does not apply to a cyclone control device, for example.

[83] USEPA, ''Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies,'' July 1999, Section 3.1.1.

[84] Limiting the temperature at the dry particulate matter control device reduces surface-catalyzed formation of dioxin/furan and enhances the adsorption of dioxin/furan on the activated carbon.

[85] USEPA, ''Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies,'' July 1999.

[86] We have established in a separate rulemaking that activated carbon injection is MACT floor control for municipal waste combustors.

we determined that the vast majority of these emissions reductions would be provided by waste heat boiler-equipped incinerators, and would be provided by the beyond-the-floor emission level of 0.40 ng TEQ/dscm discussed above. The incremental annualized cost of the 0.20 ng TEQ/dscm option for incinerators other than waste heat boiler-equipped incinerators would be $9.5 million, and would result in an incremental reduction of only 1.6 g TEQ per year. This represents a high cost for a very small additional emission reduction from the floor, or a cost-effectiveness of $6.0 million per additional gram of TEQ dioxin/furan removed. Accordingly, we conclude that the 0.20 ng TEQ/dscm beyond-the-floor option is not cost-effective.

We note that dioxin/furan are some of the most toxic compounds known due to their bioaccumulative potential and wide range of adverse health effects, including carcinogenesis, at exceedingly low doses. We consider beyond-the-floor reduction of dioxin/furan emissions a prime environmental and human health consideration. As discussed above, our data base indicates that a small subset of incinerators—those equipped with waste heat recovery boilers—can emit high levels of dioxin/furan, up to 12 ng TEQ/dscm, even when operating the dry particulate matter control device at ≤400°F. We are concerned that such high dioxin/furan emission levels are not protective of human health and the environment, as mandated by RCRA. If dioxin/furan emissions from waste heat boiler-equipped incinerators are not reduced by a beyond-the-floor emission standard, omnibus RCRA permit conditions would likely be needed in many cases. This would defeat our objective of having only one permitting framework for stack air emissions at hazardous waste incinerators (except in unusual cases). Thus, the beyond-the-floor standard promulgated today for waste heat boiler-equipped incinerators is not only cost-effective, but also an efficient approach to meed the Agency's RCRA mandate.

Some commenters suggest that the standard for waste heat boiler-equipped hazardous waste incinerators, which is based on activated carbon injection, be set at levels achieved by activated carbon injection at the Waste Technologies Industries facility—an average of 0.07 ng TEQ/dscm. We determined that this would not be appropriate because of concerns that such a low emission level may not be routinely achievable. An emission level of 0.07 ng TEQ/dscm represents a 99.4 percent reduction in emissions from the floor level of 12 ng TEQ/dscm. Although activated carbon injection can achieve dioxin/furan emissions reductions of 99 percent and higher, we are concerned that removal efficiency may decrease at low dioxin/furan emission levels. We noted our uncertainty about how much activated carbon injection control efficiency may be reduced at low dioxin/furan concentrations in the May 1997 NODA (62 FR at 24220). Several commenters agree with our concern, including Waste Technologies Industries.[87] No commenters provide data or information to the contrary. Because we have data from only one hazardous waste incinerator documenting that an emission level of 0.07 ng TEQ can be achieved, we are concerned that an emission level that low may not be routinely achievable by all sources.

c. What Is the MACT Floor for New Sources? For new sources, the CAA requires that the MACT floor be the level of control used by the best controlled single source. As discussed above, one source, the Waste Technologies Industries (WTI) incinerator in Liverpool, Ohio, uses activated carbon injection. Therefore, we identify activated carbon injection as MACT floor control for new sources. To establish the MACT floor emission level that is being achieved in practice for sources using activated carbon injection, data are available from only WTI. WTI is achieving an emission level of 0.07 ng TEQ/dscm. As discussed above, we are concerned that emission level may not be routinely achievable because the removal efficiency of activated carbon injection may be reduced at such low emission levels. An emission level of 0.20 ng TEQ/dscm is routinely achievable, however. We note that activated carbon injection is MACT floor control for dioxin/furan at new large municipal waste combustors. We established a standard of 13 ng/dscm total mass "equal to about 0.1 to 0.3 ng/dscm TEQ" for these sources (60 FR 65396 (December 19, 1995)), equivalent to approximately 0.20 ng TEQ/dscm. We conclude, therefore, that a floor level of 0.20 ng TEQ/dscm is achievable for new sources using activated carbon injection and accordingly set this as the standard.

d. What Are Our Beyond-the-Floor Considerations for New Sources? As discussed in the May 1997 NODA, a beyond-the-floor standard below 0.20 ng TEQ/dscm would not be appropriate. Although installation of carbon beds would enable new hazardous waste incinerators to achieve lower dioxin/furan levels, we do not consider the technology to be cost-effective. The reduction in dioxin/furan emissions would be very small, while the costs of carbon beds would be prohibitively high. In addition, due to the very small dioxin/furan reduction, the benefit in terms of cancer risks reduced also will be very small. Therefore, we conclude that a beyond-the-floor standard for dioxin/furan is not appropriate.

3. What Are the Standards for Mercury?

We establish a mercury standard for existing and new incinerators of 130 and 45 μg/dscm respectively. We discuss below the rationale for these standards.

a. What Is the MACT Floor for Existing Sources? We are establishing the same MACT floor level as proposed, 130 μg/dscm although, as discussed below, the methodology underlying this standard has changed from proposal. At proposal, the floor standard was based on the performance of either: (1) Feedrate control of mercury at a maximum theoretical emission concentration not exceeding 19 μg/dscm; or (2) wet scrubbing in combination with feedrate control of mercury at a level equivalent to a maximum theoretical emission concentration not exceeding 51 μg/dscm. In the May 1997 NODA, we reevaluated the revised data base and defined MACT control as based on performance of wet scrubbing in combination with feedrate control of mercury at a level equivalent to a maximum theoretical emission concentration of 50 μg/dscm and discussed a floor level of 40 μg/dscm.

Several commenters object to our revised methodology and are concerned that we use low mercury feedrates to define floor control. These commenters state that standards should not be based on sources feeding very small amounts of a particular metal, but rather on their ability to minimize the emissions by removing the hazardous air pollutant. As discussed previously, we maintain that hazardous waste feedrate is an appropriate MACT control technique. We agree with commenters' concerns, however, that previous methodologies to define floor feedrate control may have identified sources feeding anomalously low levels of a metal (or chlorine). To address this concern, we have revised the floor determination methodology for mercury, semivolatile metals, low volatile metals and total chlorine. A

[87] Waste Technologies Industries suggested, however, that after experience with activated carbon injection systems has been attained by several hazardous waste incinerators, the Agency could then determine whether an emission level of 0.07 ng TEQ/dscm is routinely achievable. See comment number 064 in Docket F–97–CS4A–FFFFF.

detailed description of this methodology—the aggregate feedrate approach—is presented in Part Four, Section V of this preamble. Adopting this aggregate feedrate approach, we identify a mercury feedrate level that is approximately five times higher than the May 1997 NODA level and higher than approximately 70% of the test conditions in our data base.

Wet scrubbers also provide control of mercury (particularly mercury chlorides). Given that virtually all incinerators are equipped with wet scrubbers (for control of particulate matter or acid gases), we continue to define floor control as both hazardous waste feedrate control of mercury and wet scrubbing. The MACT floor based on the use of wet scrubbing and feedrate control of mercury is 130 µg/dscm.[88]

The floor level is being achieved by 80% of the test conditions in our data base of 30 hazardous waste incinerators. As already discussed above, consideration of costs to achieve MACT floor standards play no part in our MACT floor determinations, but we nevertheless estimate costs to the hazardous waste incinerator universe for administrative purposes. We estimate that 35 hazardous waste incinerators, assuming no market exit by any facility, will need to adopt measures to reduce mercury emissions at their facilities by 3.46 Mg from the current baseline of 4.4 Mg at an estimated annualized cost $12.2 million, yielding a cost-effectiveness of $3.6 million per Mg of mercury reduced.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? As required by statute, we evaluated more stringent beyond-the-floor controls for further reduction of mercury emissions from the floor level. Activated carbon injection systems can achieve mercury emission reductions of over 85 percent and we proposed them as beyond-the-floor control in the April 1996 NPRM. In the May 1997 NODA, we reevaluated the use of activated carbon injection [89] as beyond-the-floor control, but cited significant cost-effectiveness concerns. We reiterate these concerns here. Our technical support document [90] provides details of annualized costs and reductions that can be achieved.

In addition, we considered a beyond-the-floor level of 50 µg/dscm based on limiting the feedrate of mercury in the hazardous waste (*i.e.*, additional feedrate control beyond floor control), and conducted an evaluation of the cost of achieving this reduction to determine if this beyond-the-floor level would be appropriate. The national incremental annualized compliance cost to meet this beyond-the-floor level, rather than comply with the floor controls, would be approximately $4.2 million for the entire hazardous waste incinerator industry and would provide an incremental reduction in mercury emissions nationally beyond the MACT floor controls of 0.7 Mg/yr, yielding a cost-effectiveness of $10 million per additional Mg of mercury reduced. Thus, potential benefits in relation to costs are disproportionately low, and we conclude that beyond-the-floor mercury controls for hazardous waste incinerators are not warranted. Therefore, we are not adopting a mercury beyond-the-floor standard.

Many commenters object to our beyond-the-floor standards as proposed, citing high costs for achieving relatively small mercury emission reductions, and compare the cost-effectiveness numbers with regulations of other sources (electric utilities, municipal and medical waste incinerators). Although comparison between rules for different sources is not directly relevant (see, *e.g.*, *Portland Cement Association* v. *Ruckelshaus* 486 F.2d 375, 389 (D.C. Cir. 1973)), we nevertheless agree that the cost of a mercury beyond-the-floor standard in relation to benefits is substantial. Some commenters, as well as the peer review panel, state that beyond-the-floor levels are not supported by a need based on risk. Although the issue of residual risk can be deferred under the CAA, an immediate question must be addressed if RCRA regulation of air emissions is to be deferred. Our analysis [91] indicates that mercury emissions at the floor level do not pose a serious threat to the human health and environment and that these standards are adequately protective to satisfy RCRA requirements as a matter of national policy, subject, of course, to the possibility of omnibus permit conditions for individual facilities in appropriate cases.

Some commenters state that the technical performance of activated carbon injection for mercury control is not adequately proven. Activated carbon injection performance has been adequately demonstrated at several hazardous waste incinerators, municipal waste combustors, and other devices.[92] Our peer review panel also states that activated carbon injection can achieve 85% reduction of mercury emissions.[93] Some commenters also state that we underestimate the cost and complexities of retrofitting incinerators to install activated carbon injection systems (*e.g.*, air reheaters would be required in many cases). We reevaluated the modifications needed for retrofits of activated carbon injection systems and have revised the costs of installation.

c. What Is the MACT Floor for New Sources? Floor control must be based on the level of control used by the best controlled single source. The best controlled source in our data base uses wet scrubbing and hazardous waste feedrate control of mercury at a feedrate corresponding to a maximum theoretical emission concentration of 0.072 µg/dscm. We conclude that this feedrate is atypically low, however, given that the next lowest mercury feedrates in our data base are 63, 79, 110, and 130 µg/dscm, expressed as maximum theoretical emission concentrations. Accordingly, we select the mercury feedrate for the second best controlled source under the aggregate feedrate approach to represent the floor control mercury feedrate for new sources. That feedrate is 110 µg/dscm [94] expressed as a maximum theoretical emission concentration, and corresponds to an emission level of 45 µg/dscm after considering the expanded MACT pool (*i.e.*, the highest emission level from all sources using floor control). Therefore, we establish a MACT floor level for mercury for new sources of 45 µg/dscm.[95] We note that, at proposal and in

[88] This is coincidentally the same floor level as proposed, notwithstanding the use of a different methodology.

[89] Flue gas temperatures would be limited to 400°F at the point of carbon injection to enhance mercury removal.

[90] USEPA, ''Technical Support Document for HWC MACT Standards, Volume V: Emission Estimates and Engineering Costs,'' July 1999.

[91] USEPA, ''Risk Assessment Support to the Development of Technical Standards for Emissions from Combustion Units Burning Hazardous Wastes: Background Information Document,'' July 1999.

[92] USEPA, ''Technical Support Document for HWC MACT Standards, Volume III: Selection of Proposed MACT Standards and Technologies,'' July 1999.

[93] Memo from Mr. Shiva Garg, EPA to Docket No. F–96–RCSP–FFFFF entitled ''Peer Review Panel Report in support of proposed rule for revised standards for hazardous waste combustors'', dated August 5, 1996.

[94] The test conditions with mercury feedrates of 63 and 79 µg/dscm do not have complete data sets for all metals and chlorine. Thus, these conditions cannot be used under the aggregate feedrate approach to define the floor level of feedrate control. Mercury emissions from those test conditions are used, however, to identify a floor emission level that is being achieved.

[95] In addition, this floor emission level may be readily achievable for new sources using activated carbon injection as floor control for dioxin/furan without the need for feedrate control of mercury. Activated carbon injection can achieve mercury emissions reductions of 85 percent. Given that the upper bound mercury feedrate for ''normal'' wastes (*i.e.*, without mercury spiking) in our data base corresponds to a maximum theoretical emission concentration of 300 µg/dscm, such sources could

Continued

the May 1997 NODA, mercury standards of 50 and 40 μg/dscm respectively were proposed for new sources. Today's final rule is in the same range as those proposed emission levels.

d. What Are Our Beyond-the-Floor Considerations for New Sources? We evaluated the use of activated carbon injection as beyond-the-floor control for new sources to achieve emission levels lower than floor levels. In the April 1996 NPRM and May 1997 NODA, we stated that new sources could achieve a beyond-the-floor level of 4 μg/dscm based on use of activated carbon injection. We cited significant cost-effectiveness concerns at that level, however. We reiterate those concerns today.

Many commenters object to our beyond-the-floor standards as proposed, citing high costs for achieving relatively small mercury emission reductions. They compare the proposed standards unfavorably with other sources' regulations (*e.g.*, electric utilities, municipal and medical waste incinerators), where the cost-effectiveness values are much lower. As stated earlier, comparison between rules for different sources is not directly relevant. Nonetheless, we conclude that use of activated carbon injection as a beyond-the-floor control for mercury for new sources would not be cost-effective. We also note that the floor levels are adequately protective to satisfy RCRA requirements.

We also considered additional feedrate control of mercury as beyond-the-floor control. We conclude, however, that significant emission reductions using feedrate control may be problematic because the detection limit of routine feedstream analysis procedures for mercury is such that a beyond-the-floor mercury emission limit could be exceeded even though mercury is not present in feedstreams at detectable levels. Although sources could potentially perform more sophisticated mercury analyses, cost-effectiveness considerations would likely come into play and suggest that a beyond-the-floor standard is not warranted.

4. What Are the Standards for Particulate Matter?

We establish standards for existing and new incinerators which limit particulate matter emissions to 0.015 grains/dry standard cubic foot (gr/dscf) or 34 milligrams per dry standard cubic meter (mg/dscm).[96] We chose the particulate matter standard as a surrogate control for the metals antimony, cobalt, manganese, nickel, and selenium. We refer to these five metals as ''nonenumerated metals'' because standards specific to each metal have not been established. We discuss below the rationale for adopting these standards.

a. What Is the MACT Floor for Existing Sources? Our data base consists of particulate matter emissions from 75 hazardous waste incinerators that range from 0.0002 gr/dscf to 1.9 gr/dscf. Particle size distribution greatly affects the uncontrolled particulate matter emissions from hazardous waste incinerators, which, in turn, is affected by incinerator type and design, particulate matter entrainment rates, waste ash content, waste sooting potential and waste chlorine content. Final emissions from the stacks of hazardous waste incinerators are affected by the degree of control provided to uncontrolled particulate matter emissions by the air pollution control devices. Dry collection devices include fabric filters or electrostatic precipitators, while wet collection devices include conventional wet scrubbers (venturi type) or the newer patented scrubbers like hydrosonic, free jet, or the collision type. Newer hazardous waste incinerators now commonly use ionizing wet scrubbers or wet electrostatic precipitators or a combination of both dry and wet devices.

The MACT floor setting procedure involves defining MACT level of control based on air pollution control devices used by the best performing sources. Control devices used by these best performing sources can be expected to routinely and consistently achieve superior performance. Then, we identify an emissions level that well designed, well-operated and well-maintained MACT controls can achieve based on demonstrated performance, and engineering information and principles.

The average of the best performing 12 percent of hazardous waste incinerators use either fabric filters, electrostatic precipitators (dry or wet), or ionizing wet scrubbers (sometimes in combination with venturi, packed bed, or spray tower scrubbers). As explained in Part Four, Section V, we define floor control for particulate matter for incinerators as the use of a well-designed, operated, and maintained fabric filter, electrostatic precipitator, or ionizing wet scrubber. Sources using certain wet scrubbing techniques such as high energy venturi scrubbers, and novel condensation, free-jet, and collision scrubbers can also have very low particulate matter emission levels. We do not consider these devices to be MACT control, however, because, in general, a fabric filter, electrostatic precipitator, or ionizing wet scrubber will provide superior particulate matter control. In some cases, sources using medium or low energy wet scrubbers are achieving very low particulate matter emissions, but only for liquid waste incinerators, which typically have low ash content waste. Thus, this control technology demonstrates high effectiveness only under atypical conditions, and we do not consider it to be MACT floor control for particulate matter.

We conclude that fabric filters, electrostatic precipitators, and ionizing wet scrubbers are routinely achieving an emission level of 0.015 gr/dscf based upon the following considerations:

i. Sources in our data base are achieving this emission level. Over 75 percent of the sources in the expanded MACT pool are achieving an emission level of 0.015 gr/dscf. We investigated several sources in our data base using floor control but failing to achieve this level, and we found that the control devices do not appear to be well-designed, operated, and maintained. Some of these sources are not using superior fabric filter bags (*e.g.*, Gore-tex®, Nomex felt, or tri-lift fabrics), some exhibit salt carry-over and entrainment from a poorly operated wet scrubber located downstream of the fabric filter, and some are poorly maintained in critical aspects (such as fabric cleaning cycle or bag replacements).[97]

ii. Well-designed, operated, and maintained fabric filters and electrostatic precipitators can routinely achieve particulate matter levels lower than the floor level of 0.015 gr/dscf. Levels less than 0.005 gr/dscf were demonstrated on hazardous waste incinerators and municipal waste combustors in many cases. Well-designed fabric filters have a surface collection area of over 0.5 ft^2/acfm and high performance filter fabrics such as Nomex and Gore-tex. Well-designed electrostatic precipitators have advanced power system controls (with intermittent or pulse energization), internal plate and electrode geometry to

achieve the mercury floor emission level of 45 μg/dscm using activated carbon injection alone.

[96] Particulate matter is a surrogate for the metal hazardous air pollutants for which we are not establishing metal emission standards: Antimony, cobalt, manganese, nickel, and selenium.

[97] USEPA, ''Technical Support Document for HWC, MACT Standards, Volume III: Selection of MACT Standards and Technologies,'' July 1999.

allow for high voltage potential, flue gas conditioning by addition of water or reagents such as sulfur trioxide or ammonia to condition particulate matter for lower resistivity, and optimized gas distribution within the electrostatic precipitator. The technical support document identifies many hazardous waste incinerators using such well designed control equipment.

iii. The 0.015 gr/dscf level is well within the accepted capabilities of today's particulate matter control devices in the market place. Vendors typically guarantee emission levels for the particulate matter floor control devices at less than 0.015 gr/dscf and in some cases, as low as 0.005 gr/dscf.

iv. The 0.015 gr/dscf level is consistent with standards promulgated for other incinerator source categories burning municipal solid waste and medical waste, both of which are based on performance of fabric filters or electrostatic precipitators as MACT. Comparison of hazardous waste incinerator floor level to these standards is appropriate because particulate matter characteristics such as particle size distribution, loading and particulate matter type are comparable within the above three types of waste burning source categories.

v. Hazardous waste incinerators that meet the 0.015 gr/dscf particulate matter level also generally achieve semivolatile metal system removal efficiencies of over 99% and low volatile metal system removal efficiencies over 99.9%. This indicates superior particulate matter collection efficiency because these metals are controlled by controlling fine and medium-sized particulate matter.

vi. Over 50 percent of all test conditions in the data base, regardless of the type of air pollution control device used, design of the hazardous waste incinerator, or the type of waste burned, currently meet the 0.015 gr/dscf level. This includes hazardous waste incinerators with high particulate matter entrainment rates (such as fluidized bed and rotary kilns) as well as those with wastes that generate difficult to capture fine particulate matter, such as certain liquid injection facilities.

vii. Many incinerators conducted several tests to develop the most flexible operating envelope for day-to-day operations, keeping in view the existing RCRA particulate matter standard of 0.08 gr/dscf. In many test conditions, they elected to meet (and be limited to) the 0.015 gr/dscf level, although they were only required to meet a 0.08 gr/dscf standard.

Many commenters object to the use of engineering information and principles in the selection of the MACT floor level. Some consider engineering information and principles highly subjective and dependent on reviewers' interpretation of the data, while others suggest the use of accepted statistical methods for handling the data. We performed analyses based on available statistical tools for outlier analysis and variability, as discussed previously, but conclude that those approaches are not appropriate. We continue to believe that the use of engineering information and principles is a valid approach to establish the MACT floor (*i.e.*, to determine the level of performance consistently achievable by properly designed and operated floor control technology).

Some commenters object to the use of ''well-designed, operated and maintained'' MACT controls. They consider the term too vague and want specific parameters and features (*e.g.*, air to cloth ratio for fabric filters and power input for electrostatic precipitators) identified. We understand commenters' concerns but such information is simply not readily available. Further, many parameters work in relation with several others making it problematic to quantify optimum values separate from the other values. The system as a whole needs to be optimized for best control efficiency on a case-by-case basis.

Some commenters object to our justification of particulate matter achievability on the basis of vendors' claims. They contend that: (1) Vendors' claims lack quality control and are driven by an incentive for sales; (2) vendors' claims are based on normal operating conditions, not on trial burn type conditions; and (3) MACT floor should not be based on theoretical performance of state-of-the-art technology. We would agree with the comments if the vendor information were from advertising literature, but instead, our analysis was based on warranties. The financial consequences of vendors' warranties require those warranties to be conservative and based on proven performance records, both during normal operations and during trial burn conditions. In any case, we are using vendor information as corroboration, not to establish a level of performance.

In the May 1997 NODA (62 FR at 24222), we requested comments on the alternative MACT evaluation method based on defining medium and low energy venturi-scrubbers burning low ash wastes as an additional MACT control, but screening out facilities from the expanded MACT floor universe that have poor semivolatile metal system removal efficiency. The resulting MACT floor emission level under this approach would be 0.029 gr/dscf. Many commenters agree with the Agency that this technique is unacceptable because it ignores a majority (over 75 percent) of the available particulate matter data in identifying the MACT standard. This result is driven by the fact that corresponding semivolatile metal data are not available from those sources. Other commenters, however, suggest that venturi scrubbers should be designated as MACT particulate matter control. These commenters suggest that sources using venturi scrubbers are within the average of the best performing 12 percent of sources, and there is no technical basis for their exclusion. As stated above, we agree that well-designed and operated venturi scrubbers can achieve the MACT floor level of 0.015gr/dscf under some conditions (as when burning low ash wastes), but their performance is generally not comparable to that of a fabric filter, electrostatic precipitator, or ionizing wet scrubber. Thus, we conclude that sources equipped with venturi scrubbers may not be able to achieve the floor emission level in all cases, and the floor level would have to be inappropriately increased to accommodate unrestricted use of those units.

Some commenters state that we must demonstrate health or environmental benefits if the rule were to require sources to replace existing, less efficient air pollution control devices (*e.g.*, venturi scrubbers incapable of meeting the standard) with a better performing device, particularly because particulate matter is not a hazardous air pollutant under the CAA. These comments are not persuasive and are misplaced as a matter of law. The MACT floor process was established precisely to obviate such issues and to establish a minimum level of control based on performance of superior air pollution control technologies. Indeed, the chief motivation for adopting the technology-based standards to control emissions of hazardous air pollutants in the first instance was the evident failure of the very type of risk-based approach to controlling air toxics as is suggested by the commenters. (See, *e.g.*, H. Rep. No. 490, 101st Cong. 2d Sess., at 318–19.) Inherent in technology-based standard setting, of course, is the possibility that some technologies will have to be replaced if they cannot achieve the same level of performance as the best performing technologies. Finally, with regard to the commenters' points regarding particulate matter not being a hazardous air pollutant, we explain above why particulate matter is a valid surrogate for certain hazardous air pollutants, and can be used as a means of controlling hazardous air pollutant emissions. In addition, the legislative history appears to contemplate regulation of particulate matter as part of the MACT process. (See S. Rep. No. 228, 101st Cong. 1st Sess., at 170.[98])

We do not consider cost in selecting MACT floor levels. Nevertheless, for purposes of administrative compliance with the Regulatory Flexibility Act and various Executive Orders, we estimate the cost burden on the hazardous waste incinerator universe to achieve compliance. Approximately 38 percent of hazardous waste incinerators currently meet the floor level of 0.015 gr/dscf. The annualized cost for the remaining 115 incinerators to meet the floor level, assuming no market exits, is estimated to be $17.4 million. Nonenumerated metals and particulate matter emissions will be reduced nationally by 5.1 Mg/yr and 1345 Mg/yr, respectively, or over 50 percent from current baseline emissions.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? In the NPRM, we proposed a beyond-the-floor emission level of 69 mg/dscm (0.030 gr/dscf) and solicited comment on an alternative beyond-the-floor emission level of 34 mg/dscm (0.015 gr/dscf) based on improved particulate matter control. (61 FR at 17383.) In the May 1997 NODA, we concluded that a beyond-the-floor standard may not be warranted due to significant cost-effectiveness considerations. (62 FR at 24222.)

In the final rule, we considered more stringent beyond-the-floor controls that would provide additional reductions of particulate matter emissions using fabric filters, electrostatic precipitators, and wet ionizing scrubbers that are designed, operated, and maintained to have improved collection efficiency. We considered a beyond-the-floor level of 16 mg/dscm (0.007 gr/dscf), approximately one-half the floor emission level, for existing incinerators based on improved particulate matter control. We then determined the cost of achieving this reduction in particulate matter, with corresponding reductions in the nonenumerated metals for which particulate matter is a surrogate, to determine if this beyond-the-floor level would be appropriate. The national incremental annualized compliance cost for incinerators to meet this beyond-the-floor level, rather than comply with the floor controls, would be approximately $6.8 million for the entire hazardous waste incinerator industry and would provide an incremental reduction in nonenumerated metals emissions nationally beyond the MACT floor controls of 1.7 Mg/yr. Based on these costs of approximately $4.1 million per additional Mg of nonenumerated metals emissions removed, we conclude that this beyond-the-floor option for incinerators is not acceptably cost-effective nor otherwise justified. Therefore, we do not adopt this beyond-the-floor standard. Poor cost-effectiveness would be particularly unacceptable here considering that these metals also have relatively low toxicity. Thus, the particulate matter standard for new incinerators is 34 mg/dscm. Therefore, the cost-effectiveness threshold we would select would be less than for more toxic pollutants such as dioxin, mercury or other metals.

c. What Is the MACT Floor for New Sources? We proposed a floor level of 0.030 gr/dscf for new sources based on the best performing source in the data base, which used a fabric filter with an air-to-cloth ratio of 3.8 acfm/ft². In the May 1997 NODA, we reevaluated the particulate matter floor level and indicated that floor control for existing sources would also appear to be appropriate for new sources. We are finalizing the approach discussed in the May 1997 NODA whereby floor control is a well-designed, operated, and maintained fabric filter, electrostatic precipitator, or ionizing wet scrubber, and the floor emission level is 0.015 gr/dscf.

d. What Are Our Beyond-the-Floor Considerations for New Sources? We considered more stringent beyond-the-floor controls that would provide additional reductions of particulate matter emissions using fabric filters, electrostatic precipitators, and wet ionizing scrubbers that are designed, operated, and maintained to have improved collection efficiency. We considered a beyond-the-floor level of 16 mg/dscm (0.007 gr/dscf), approximately one-half the emissions level for existing sources, for new incinerators based on improved particulate matter control. For analysis purposes, improved particulate matter control assumes the use of higher quality fabric filter bag material. We then determined the cost of achieving this reduction in particulate matter, with corresponding reductions in the nonenumerated metals for which particulate matter is a surrogate, to determine if this beyond-the-floor level would be appropriate. The incremental annualized compliance cost for one new large incinerator to meet this beyond-the-floor level, rather than comply with floor controls, would be approximately $39,000 and would provide an incremental reduction in nonenumerated metals emissions of approximately 0.05 Mg/yr.[99] For a new small incinerator, the incremental annualized compliance cost would be approximately $7,500 and would provide an incremental reduction in nonenumerated metals emissions of approximately 0.008 Mg/yr. Based on these costs of approximately $0.8–1.0 million per additional Mg of nonenumerated metals removed, we conclude that a beyond-the-floor standard of 16 mg/dscm is not warranted due to the high cost of compliance and relatively small nonenumerated metals emission reductions. Poor cost-effectiveness would be particularly unacceptable here considering that these metals also have relatively low toxicity. Thus, the particulate matter standard for new incinerators is 34 mg/dscm.

5. What Are the Standards for Semivolatile Metals?

Semivolatile metals are comprised of lead and cadmium. We establish standards which limit semivolatile metal emissions to 240 µg/dscm for existing sources and 24 µg/dscm for new sources. We discuss below the rationale for adopting these standards.

a. What Is the MACT Floor for Existing Sources? As discussed in Part Four, Section V of the preamble, floor control for semivolatile metals is hazardous waste feedrate control of semivolatile metals plus MACT floor particulate matter control. We use the aggregate feedrate approach to define the level of semivolatile metal feedrate control. We have aggregate feedrate data for 20 test conditions from nine hazardous waste incinerators that are using MACT floor control for particulate matter. The semivolatile metal feedrate levels, expressed as maximum theoretical emission concentrations, for these sources range from 100 µg/dscm to 1.5 g/dscm while the semivolatile emissions range from 1 to 6,000 µg/dscm. The MACT-defining maximum theoretical emission concentration is

[98] Control of particulate matter also helps assure that the standards are sufficiently protective to make RCRA regulation of these sources' air emissions unnecessary (except potentially on a site-specific basis through the omnibus permitting process). See Technical Support Document on Risk Assessment.

[99] Based on the data available, the average emissions in sum of the five nonenumerated metals from incinerators using MACT particulate matter control is approximately 229 µg/dscm. To estimate emission reductions of the nonenumerated metals for specific test conditions, we assume a linear relationship between a reduction in particulate matter and these metals.

5,300 μg/dscm. Upon expanding the MACT pool, only the highest emissions test condition of 6,000 μg/dscm was screened out because the semivolatile metal maximum theoretical emission concentration for this test condition was higher than the MACT-defining maximum theoretical emission concentration. The highest emission test condition in the remaining expanded MACT pool identifies a MACT floor emission level of 240 μg/dscm.

We originally proposed a semivolatile metal floor standard of 270 μg/dscm based on semivolatile metal feedrate control. We subsequently refined the emissions data base and reevaluated the floor methodology, and discussed in the May 1997 NODA a semivolatile metal floor level of 100 μg/dscm. Commenters express serious concerns with the May 1997 NODA approach in two areas. First, they note that the MACT-defining best performing sources have very low emissions, not entirely due to the performance of MACT control, but also due to atypically low semivolatile metal feedrates. Second, they object to our use of a ''breakpoint'' analysis to screen out the outliers from the expanded MACT pool (which was already small due to the screening process to define the feedrate level representative of MACT control). Our final methodology makes adjustments to address these concerns. Under the aggregate feedrate approach, sources with atypically low feedrates of semivolatile metals would not necessarily drive the floor control feedrate level. This is because the aggregate feedrate approach identifies as the best performing sources (relative to feedrate control) those with low feedrates in the aggregate for all metals and chlorine. In addition, the floor methodology no longer uses the breakpoint approach to identify sources not using floor control. These issues are discussed above in detail in Part Four, Section V, of the preamble.

Although cost-effectiveness of floor emission levels is not a factor in defining floor control or emission levels, we have estimated compliance costs and emissions reductions at the floor for administrative purposes. Approximately 66 percent of sources currently meet the semivolatile metal floor level of 240 μg/dscm. The annualized cost for the remaining 64 incinerators to meet the floor level, assuming no market exits, is estimated to be $1.8 million. Semivolatile metal emissions will be reduced nationally by 55.9 Mg per year from the baseline emissions level of 58.5 Mg per year, a reduction of 95.5%.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? We considered more stringent semivolatile metal feedrate control as a beyond-the-floor control to provide additional reductions in emissions. Cost effectiveness considerations would likely come into play, however, and suggest that a beyond-the-floor standard is not warranted. Therefore, we conclude that a beyond-the-floor standard for semivolatile metals for existing sources is not appropriate. We note that a beyond-the-floor standard is not needed to meet our RCRA protectiveness mandate.

c. What Is the MACT Floor for New Sources? Floor control for new sources is: (1) The level of semivolatile metal feedrate control used by the source with the lowest aggregate feedrate for all metals and chlorine;[100] and (2) use of MACT floor particulate matter control for new sources (*i.e.*, a fabric filter, electrostatic precipitator, or wet ionizing scrubber achieving a particulate matter emission level of 0.015 gr/dscf). Three sources in our data base are currently using the floor control selected for all new sources and are achieving semivolatile emissions ranging from 2 μg/dscm to 24 μg/dscm. To ensure that the floor level is achievable by all sources using floor control, we are establishing the floor level for semivolatile metals for new sources at 24 μg/dscm.

d. What Are Our Beyond-the-Floor Considerations for New Sources? We considered more stringent beyond-the-floor controls (*i.e.*, a more restrictive semivolatile metal feedrate) to provide additional reduction in emissions. We determined that cost-effectiveness considerations would likely be unacceptable due to the relatively low concentrations achieved at the floor. This suggests that a beyond-the-floor standard is not warranted. We note that a beyond-the-floor standard is not needed to meet our RCRA protectiveness mandate.

6. What Are the Standards for Low Volatile Metals?

Low volatile metals are comprised of arsenic, beryllium, and total chromium. We establish standards that limit emissions of these metals to 97 μg/dscm for both existing and new incinerators. We discuss below the rationale for adopting these standards.

a. What Is the MACT Floor for Existing Sources? We are using the same approach for low volatile metals as we did for semivolatile metals to define floor control. Floor control for low volatile metals is use of particulate matter floor control and control of the feedrate of low volatile metals to a level identified by the aggregate feedrate approach.

The low volatile metal feedrates for sources using particulate matter floor control range from 300 μg/dscm to 1.4 g/dscm when expressed as maximum theoretical emission concentrations. Emission levels for these sources range from 1 to 803 μg/dscm. Approximately 60 percent of sources using particulate matter floor control have low volatile metal feedrates below the MACT floor feedrate—24,000 μg/dscm, expressed as a maximum theoretical emission concentration.

Upon expanding the MACT pool, the source using floor control with the highest emissions is achieving an emission level of 97 μg/dscm. Accordingly, we are establishing the floor level for low volatile metals for existing sources at 97 μg/dscm to ensure that the floor level is achievable by all sources using floor control.

We identified a low volatile metal floor level of 210 μg/dscm in the April 1996 proposal. The refined data analysis in the May 1997 NODA, based on the revised data base, reduced the low volatile metal floor level to 55 μg/dscm. As with semivolatile metals, commenters express serious concerns with the May 1997 NODA approach, including selection of the breakpoint ''outlier'' screening approach and use of hazardous waste incinerator data with atypically low feedrates for low volatile metals. We acknowledge those concerns and adjusted our methodology accordingly. See discussions above in Part Four, Section V.

We estimated compliance costs to the hazardous waste incinerator universe for administrative purposes. Approximately 63 percent of incinerators currently meet the 97 μg/dscm floor level. The annualized cost for the remaining 69 incinerators to meet the floor level, assuming no market exits, is estimated to be $1.9 million, and would reduce low volatile metal emissions nationally by 6.9 Mg per year from the baseline emissions level of 8 Mg per year.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? We considered more stringent beyond-the-floor controls (*i.e.*, a more restrictive low volatile metal feedrate) to provide additional reduction in emissions. Due to the relatively low concentrations achieved at the floor, we determined that cost-effectiveness considerations would likely be unacceptable. Therefore, we conclude that a beyond-the-floor standard for low volatile metals for existing sources is not

[100] *I.e.*, a semivolatile metal feedrate equivalent to a maximum theoretical emission concentration of 3,500 μg/dscm.

appropriate. We note that a beyond-the-floor standard is not needed to meet our RCRA protectiveness mandate.

c. What Is the MACT Floor for New Sources? We identified a floor level of 260 µg/dscm for new sources at proposal based on the best performing source in the data base. That source uses a venturi scrubber with a low volatile metal feedrate equivalent to a maximum theoretical emission concentration of 1,000 µg/dscm. Our reevaluation of the data base in the May 1997 NODA identified a floor level of 55 µg/dscm based on use of floor control for particulate matter and feedrate control of low volatile metals. Other than the comments on the two issues of low feedrate and the inappropriate use of a breakpoint analysis discussed above, no other significant comments challenged this floor level.

Floor control for new sources is the same as discussed in the May 1997 NODA (*i.e.*, use of particulate matter floor control and feedrate control of low volatile metals), except the floor feedrate level under the aggregate feedrate approach used for today's final rule is 13,000 µg/dscm. Upon expanding the MACT pool, the source using floor control with the highest emissions is achieving an emission level of 97 µg/dscm.[101] Accordingly, we are establishing the floor level for low volatile metals for new sources at 97 µg/dscm to ensure that the floor level is achievable by all sources using floor control.

d. What Are Our Beyond-the-Floor Considerations for New Sources? We considered more stringent beyond-the-floor controls (*i.e.*, a more restrictive low volatile metal feedrate) to provide additional reduction in emissions. Because of the relatively low concentrations achieved, we determined that cost-effectiveness considerations would likely be unacceptable. Therefore, we conclude that a beyond-the-floor standard for low volatile metals for new sources is not appropriate. We note that a beyond-the-floor standard is not needed to meet our RCRA protectiveness mandate.

[101] The emission level for new sources achieving a feedrate control of 13,000 µg/dscm (expressed as a maximum theoretical emission concentration) is the same as the emission level for existing sources achieving a feedrate control of 24,000 µg/dscm because sources feeding low volatile metals in the range of 13,000 to 24,000 µg/dscm have emission levels at or below 97 µg/dscm. Although these sources feel low volatile metals at higher levels than the single best feedrate-controlled source, their emission control devices apparently are more efficient. Thus, they achieved lower emissions than the single best feedrate-controlled source.

7. What Are the Standards for Hydrochloric Acid and Chlorine Gas?

We establish standards for hydrochloric acid and chlorine gas, combined, for existing and new incinerators of 77 and 21 ppmv respectively. We discuss below the rationale for adopting these standards.

a. What Is the MACT Floor for Existing Sources? Almost all hazardous waste incinerators currently use some type of add-on stack gas wet scrubbing system, in combination with control of the feedrate of chlorine, to control emissions of hydrochloric acid and chlorine gas. A few sources use dry or semi-dry scrubbing, alone or in combination with wet scrubbing, while a few rely upon feedrate control only. Wet scrubbing consistently provides a system removal efficiency of over 99 percent for various scrubber types and configurations. Current RCRA regulations require 99% removal efficiency and most sources are achieving greater than 99.9 percent removal efficiency. Accordingly, floor control is defined as wet scrubbing achieving a system removal efficiency of 99 percent or greater combined with feedrate control of chlorine.

The floor feedrate control level for chlorine is 22 µg/dscm, expressed as a maximum theoretical emission concentration, based on the aggregate feedrate approach. The source in the expanded MACT pool (*i.e.*, all sources using floor control) with the highest emission levels of hydrogen chloride and chlorine gas is achieving an emission level of 77 ppmv. Thus, MACT floor for existing sources is 77 ppmv.

At proposal, we also defined floor control as wet scrubbing combined with feedrate control of chlorine. We proposed a floor emission level of 280 ppmv based on a chlorine feedrate control level of 21 µg/dscm, expressed as a maximum theoretical emission concentration. The best performing sources relative to emission levels all use wet scrubbing and feed chlorine at that feedrate or lower. We identified a floor level of 280 ppmv based on all sources in our data base using floor control and after applying a statistically-derived emissions variability factor. In the May 1997 NODA, we again defined floor control as wet (or dry) scrubbing with feedrate control of chlorine. We discussed a floor emission level of 75 ppmv based on the revised data base and break-point floor methodology. Rather than using a break-point analysis in the final rule, we use a floor methodology that identifies floor control as an aggregate chlorine feedrate combined with scrubbing that achieves a removal efficiency of at least 99 percent.

We estimated compliance costs to the hazardous waste incinerator universe for administrative purposes. Approximately 70 percent of incinerators currently meet the hydrochloric acid and chlorine gas floor level of 77 ppmv. The annualized cost for the remaining 57 incinerators to meet that level, assuming no market exits, is estimated to be $4.75 million and would reduce emissions of hydrochloric acid and chlorine gas nationally by 2,670 Mg per year from the baseline emissions level of 3410 Mg per year, a reduction of 78%.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? We considered more stringent beyond-the-floor controls to provide additional reduction in emissions. Due to the relatively low concentrations achieved at the floor, we determined that cost-effectiveness considerations would likely be unacceptable. Therefore, we conclude that a beyond-the-floor standard for hydrochloric acid and chlorine gas for existing sources is not appropriate. We note that a beyond-the-floor standard is not needed to meet our RCRA protectiveness mandate.

c. What Is the MACT Floor for New Sources? We identified a floor level of 280 ppmv at proposal based on the best performing source in the data base. That source uses wet scrubbing and a chlorine feedrate of 17 µg/dscm, expressed as a maximum theoretical emission concentration. Our reevaluation of the revised data base in the May 1997 NODA defined a floor level of 75 ppmv. Based on the aggregate feedrate approach used for today's final rule, we are establishing a floor level of 21 ppmv, based on a chlorine feedrate of 4.7 µg/dscm expressed as a maximum theoretical emission concentration.

d. What Are Our Beyond-the-Floor Considerations for New Sources? We considered more stringent beyond-the-floor controls to provide additional reduction in emissions. Due to the relatively low concentrations achieved at the floor, we determined that cost-effectiveness considerations would likely be unacceptable. Therefore, we conclude that a beyond-the-floor standard for hydrochloric acid and chlorine gas for new sources is not appropriate. We note that a beyond-the-floor standard is not needed to meet our RCRA protectiveness mandate.

8. What Are the Standards for Carbon Monoxide?

We use carbon monoxide as a surrogate for organic hazardous air pollutants. Low carbon monoxide concentrations in stack gas are an indicator of good control of organic hazardous air pollutants and are achieved by operating under good combustion practices.

We establish carbon monoxide standards of 100 ppmv for both existing and new sources based on the rationale discussed below. Sources have the option to comply with either the carbon monoxide or the hydrocarbon emission standard. Sources that elect to comply with the carbon monoxide standard must also document compliance with the hydrocarbon standard during the performance test to ensure control of organic hazardous air pollutants. See discussion in Part Four, Section IV.B.

a. What Is the MACT Floor for Existing Sources? As proposed, floor control for existing sources is operating under good combustion practices (*e.g.*, providing adequate excess oxygen; providing adequate fuel (waste) and air mixing; maintaining high temperatures and adequate combustion gas residence time at those temperatures).[102] Given that there are many interdependent parameters that affect combustion efficiency and thus carbon monoxide emissions, we were not able to quantify ''good combustion practices.''

We are identifying a floor level of 100 ppmv on an hourly rolling average, as proposed, because it is being achieved by sources using good combustion practices. More than 80 percent of test conditions in our data base have carbon monoxide levels below 100 ppmv, and more than 60 percent have levels below 20 ppmv. Of approximately 20 test conditions with carbon monoxide levels exceeding 100 ppmv, we know the characteristics of many of these sources are not representative of good combustion practices (*e.g.*, use of rotary kilns without afterburners; liquid injection incinerators with rapid combustion gas quenching). In addition, we currently limit carbon monoxide concentrations for hazardous waste burning boilers and industrial furnaces to 100 ppmv to ensure good combustion conditions and control of organic toxic compounds. Finally, we have established carbon monoxide limits in the range of 50 to 150 ppmv on other waste incineration sources (*i.e.*, municipal waste combustors, medical waste incinerators) to ensure good combustion conditions. We are not aware of reasons why it may be more difficult for a hazardous waste incinerator to achieve carbon monoxide levels of 100 ppmv.

We estimated compliance costs to the hazardous waste incinerator universe for administrative purposes. Because carbon monoxide emissions from these sources are already regulated under RCRA, approximately 97 percent of incinerators currently meet the floor level of 100 ppmv. The annualized cost for the remaining six incinerators to meet the floor level, assuming no market exits, is estimated to be $0.9 million and would reduce carbon monoxide emissions nationally by 45 Mg per year from the baseline emissions level of 9170 Mg per year.[103] Although we cannot quantify a corresponding reduction of organic hazardous air pollutant emissions, we estimate these reductions would be significant based on the carbon monoxide reductions.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? We considered more stringent beyond-the-floor controls (*i.e.*, better combustion practices resulting in lower carbon monoxide levels) to provide additional reduction in emissions. Although it is difficult to quantify the reduction in emissions of organic hazardous air pollutants that would be associated with a lower carbon monoxide limit, we concluded that cost-effectiveness considerations would likely come into play, and suggest that a beyond-the-floor standard is not warranted. Therefore, we conclude that a beyond-the-floor standard for carbon monoxide for existing sources is not appropriate. We note that, although control of carbon monoxide (or hydrocarbon) is not an absolute guarantee that nondioxin/furan products of incomplete combustion will not be emitted at levels of concern, this problem (where it may exist) can be addressed through the RCRA omnibus permitting process.

c. What Is the MACT Floor for New Sources? At proposal and in the May 1997 NODA, we stated that operating under good combustion practices defines MACT floor control for new (and existing) sources,[104] and the preponderance of data indicate that a floor level of 100 ppmv over an hourly rolling average is readily achievable. For reasons set forth in the proposal, and absent data to the contrary, we conclude that this floor level is appropriate.

d. What Are Our Beyond-the-Floor Considerations for New Sources? We considered more stringent beyond-the-floor controls (*i.e.*, better combustion practices resulting in lower carbon monoxide levels) to provide additional reduction in emissions. For the reasons discussed above in the context of beyond-the-floor controls for existing sources, however, we conclude that a beyond-the-floor standard for carbon monoxide for new sources is not appropriate.

9. What Are the Standards for Hydrocarbon?

Hydrocarbon concentrations in stack gas are a direct surrogate for emissions of organic hazardous pollutants. We establish hydrocarbon standards of 10 ppmv for both existing and new sources based on the rationale discussed below. Sources have the option to comply with either the carbon monoxide or the hydrocarbon emission standard. Sources that elect to comply with the carbon monoxide standard, however, must nonetheless document compliance with the hydrocarbon standard during the comprehensive performance test.

a. What Is the MACT Floor for Existing Sources? We proposed a hydrocarbon emission standard of 12 ppmv[105] based on good combustion practices, but revised it in the May 1997 NODA to 10 ppmv based on refinements of analysis and the corrected data base.

As proposed, floor control for existing sources is operating under good combustion practices (*e.g.*, providing adequate excess oxygen; providing adequate fuel (waste) and air mixing; maintaining high temperatures and adequate combustion gas residence time at those temperatures). Given that there are many interdependent parameters that affect combustion efficiency and thus hydrocarbon emissions, we are not able to quantify good combustion practices.

We are identifying a floor level for the final rule of 10 ppmv on an hourly rolling average because it is being achieved using good combustion practices. More than 85 percent of test conditions in our data base have hydrocarbon levels below 10 ppmv, and nearly 75 percent have levels below 5 ppmv. Although 13 test conditions in our data base representing 7 sources have hydrocarbon levels higher than 10 ppmv, we conclude that these sources

[102] USEPA, ''Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies,'' July 1999.

[103] As discussed previously in the text, you have the option of complying with the hydrocarbon emission standard rather than the carbon monoxide standard. This is because carbon monoxide is a conservative indicator of the potential for emissions of organic compounds while hydrocarbon concentrations in stack gas are a direct measure of emissions of organic compounds.

[104] Because we cannot quantify good combustion practices, floor control for the single best controlled source is the same as for existing sources (*i.e.*, that combination of design, operation, and maintenance that achieves good combustion as evidenced by carbon monoxide levels of 100 ppmv or less on an hourly rolling average).

[105] Based on an hourly rolling average, reported as propane, corrected to 7 percent oxygen, dry basis.

are not operating under good combustion practices. For example, one source is a rotary kiln without an afterburner. Another source is a fluidized bed type incinerator that operates at lower than typical combustion temperatures without an afterburner while another source is operating at high carbon monoxide levels, indicative of poor combustion efficiency.[106]

Some commenters on the May 1997 NODA object to the 10 ppmv level and suggest adopting a level of 20 ppmv based on the BIF rule (§ 266.104(c)), and an earlier hazardous waste incinerator proposal (55 FR 17862 (April 27, 1990)). These commenters cite sufficient protectiveness at the 20 ppmv level. We conclude that this comment is not on point because the MACT standards are technology rather than risk-based. The MACT standards must reflect the level of control that is not less stringent than the level of control achieved by the best performing sources. Because hazardous waste incinerators are readily achieving a hydrocarbon level of 10 ppmv using good combustion practices, that floor level is appropriate.

Some commenters also object to the requirement to use heated flame ionization hydrocarbon detectors[107] in hazardous waste incinerators that use wet scrubbers. The commenters state that these sources have a very high moisture content in the flue gas that hinders proper functioning of the specified hydrocarbon detectors. We agree that hydrocarbon monitors may be hindered in these situations. For this and other reasons (*e.g.*, some sources can have high carbon monoxide but low hydrocarbon levels), the final rule gives sources the option of: (1) Continuous hydrocarbon monitoring; or (2) continuous carbon monoxide monitoring and demonstration of compliance with the hydrocarbon standard only during the performance test.

We estimated compliance costs to the hazardous waste incinerator universe for administrative purposes. Approximately 97 percent of incinerators currently meet the hydrocarbon floor level of 10 ppmv. The annualized cost for the remaining six incinerators to meet the floor level, assuming no market exits, is estimated to be $0.35 million, and would reduce hydrocarbon emissions nationally by 28 Mg per year from the baseline emissions level of 292 Mg per year. Although the corresponding reduction of organic hazardous air pollutant emissions cannot be quantified, these reductions are qualitatively assessed as significant.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? We considered more stringent beyond-the-floor controls (*i.e.*, better combustion practices resulting in lower hydrocarbon levels) to provide additional reduction in emissions. Although it is difficult to quantify the reduction in emissions of organic hazardous air pollutants that would be associated with a lower hydrocarbon limit, cost-effectiveness considerations would likely come into play, however, and suggest that a beyond-the-floor standard is not warranted. Therefore, we conclude that a beyond-the-floor standard for hydrocarbon emissions for existing sources is not appropriate. We note further that, although control of hydrocarbon emissions is not an absolute guarantee that nondioxin products of incomplete combustion will not be emitted at levels of concern, this problem (where it may exist) can be addressed through the RCRA omnibus permitting process.

c. What Is the MACT Floor for New Sources? At proposal and in the May 1997 NODA, we stated that operation under good combustion practices at new (and existing) hazardous waste incinerators defines the MACT control.[108] As discussed above, sources using good combustion practices are achieving hydrocarbon levels of 10 ppmv or below. Comments on this subject were minor and did not identify any problems in achieving the 10 ppmv level by new sources. Thus, we conclude that a floor level of 10 ppmv on hourly rolling average is appropriate for new sources.

d. What Are Beyond-the-Floor Considerations for New Sources? We considered more stringent beyond-the-floor controls (*i.e.*, better combustion practices) to provide additional reduction in emissions. For the reasons discussed above in the context of beyond-the-floor controls for existing sources, however, we conclude that a beyond-the-floor standard for hydrocarbons for new sources is not appropriate.

10. What Are the Standards for Destruction and Removal Efficiency?

We establish a destruction and removal efficiency (DRE) standard for existing and new incinerators to control emissions of organic hazardous air pollutants other than dioxins and furans. Dioxins and furans are controlled by separate emission standards. See discussion in Part Four, Section IV.A. The DRE standard is necessary, as previously discussed, to complement the carbon monoxide and hydrocarbon emission standards, which also control these hazardous air pollutants.

The standard requires 99.99 percent DRE for each principal organic hazardous constituent (POHC), except that 99.9999 percent DRE is required if specified dioxin-listed hazardous wastes are burned. These wastes are listed as—F020, F021, F022, F023, F026, and F027—RCRA hazardous wastes under Part 261 because they contain high concentrations of dioxins.

a. What Is the MACT Floor for Existing Sources? Existing sources are currently subject to DRE standards under § 264.342 and § 264.343(a) that require 99.99 percent DRE for each POHC, except that 99.9999 percent DRE is required if specified dioxin-listed hazardous wastes are burned. Accordingly, these standards represent MACT floor. Since all hazardous waste incinerators are currently subject to these DRE standards, they represent floor control, *i.e.*, greater than 12 percent of existing sources are achieving these controls.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? Beyond-the-floor control would be a requirement to achieve a higher percentage DRE, for example, 99.9999 percent DRE for POHCs for all hazardous wastes. A higher DRE could be achieved by improving the design, operation, or maintenance of the combustion system to achieve greater combustion efficiency.

Sources will not incur costs to achieve the 99.99 percent DRE floor because it is an existing RCRA standard. A substantial number of existing incinerators are not likely to be routinely achieving 99.999 percent DRE, however, and most are not likely to be achieving 99.9999 percent DRE. Improvements in combustion efficiency will be required to meet these beyond-the-floor DREs. Improved combustion efficiency is accomplished through better mixing, higher temperatures, and longer residence times. As a practical matter, most combustors are mixing-limited. Thus, improved mixing is

[106] USEPA, ''Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies,'' July 1999.

[107] See Performance Specification 8A, appendix B, part 60, ''Specifications and test procedures for carbon monoxide and oxygen continuous monitoring systems in stationary sources.''

[108] Because we cannot quantify good combustion practices, floor control for the single best controlled soruce is the same as for existing sources (*i.e.*, that combination of design, operation, and maintenance that achieves good combustion as evidenced by hydrocarbon levels of 10 ppmv or less on an hourly rolling average).

necessary for improved DREs. For a less-than-optimum burner, a certain amount of improvement may typically be accomplished by minor, relatively inexpensive combustor modifications—burner tuning operations such as a change in burner angle or an adjustment of swirl—to enhance mixing on the macro-scale. To achieve higher and higher DREs, however, improved mixing on the micro-scale may be necessary requiring significant, energy intensive and expensive modifications such as burner redesign and higher combustion air pressures. In addition, measurement of such DREs may require increased spiking of POHCs and more sensitive stack sampling and analysis methods at added expense.

Although we have not quantified the cost-effectiveness of a beyond-the-floor DRE standard, we do not believe that it would be cost-effective. For reasons discussed above, we believe that the cost of achieving each successive order-of-magnitude improvement in DRE will be at least constant, and more likely increasing. Emissions reductions diminish substantially, however, with each order of magnitude improvement in DRE. For example, if a source were to emit 100 gm/hr of organic hazardous air pollutants assuming zero DRE, it would emit 10 gm/hr at 90 percent DRE, 1 gm/hr at 99 percent DRE, 0.1 gm/hr at 99.9 percent DRE, 0.01 gm/hr at 99.99 percent DRE, and 0.001 gm/hr at 99.999 percent DRE. If the cost to achieve each order of magnitude improvement in DRE is roughly constant, the cost-effectiveness of DRE decreases with each order of magnitude improvement in DRE. Consequently, we conclude that this relationship between compliance cost and diminished emissions reductions associated with a more stringent DRE standard suggests that a beyond-the-floor standard is not warranted.

c. What Is the MACT Floor for New Sources? The single best controlled source, and all other hazardous waste incinerators, are subject to the existing RCRA DRE standard under § 264.342 and § 264.343(a). Accordingly, we adopt this standard as the MACT floor for new sources.

d. What Are Our Beyond-the-Floor Considerations for New Sources? As discussed above, although we have not quantified the cost-effectiveness of a more stringent DRE standard, diminishing emissions reductions with each order of magnitude improvement in DRE suggests that cost-effectiveness considerations would likely come into play. We conclude that a beyond-the-floor standard is not warranted.

VII. What Are the Standards for Hazardous Waste Burning Cement Kilns?

A. To Which Cement Kilns Do Today's Standards Apply?

The standards promulgated today apply to each existing, reconstructed, and newly constructed Portland cement manufacturing kiln that burns hazardous waste. These standards apply to all hazardous waste burning cement kilns (both major source and area source cement plants). Portland cement kilns that do not engage in hazardous waste burning operations are not subject to this NESHAP. However, these hazardous waste burning kilns would be subject to the NESHAP for other sources of hazardous air pollutants at the facility (*e.g.*, clinker cooler stack) that we finalized in June 1999.[109]

B. How Did EPA Initially Classify Cement Kilns?

1. What Is the Basis for a Separate Class Based on Hazardous Waste Burning?

Portland cement manufacturing is one of the initial 174 categories of major and area sources of hazardous air pollutants listed pursuant to section 112(c)(1) for which section 112(d) standards are to be established.[110] We divided the Portland cement manufacturing source category into two different classes based on whether the cement kiln combusts hazardous waste. This action was taken for two principal reasons: If hazardous wastes are burned in the kiln, emissions of hazardous air pollutants can be different for the two types of kilns in terms of both types and concentrations of hazardous air pollutants emitted, and metals and chlorine emissions are controlled in a significantly different manner.

A comparison of metals levels in coal and in hazardous waste fuel burned in lieu of coal on a heat input basis reveals that hazardous waste frequently contains higher concentrations of hazardous air pollutant metals (*i.e.*, mercury, semivolatile metals, low volatile metals) than coal. Hazardous waste contains higher levels of semivolatile metals than coal by more than an order of magnitude at every cement kiln in our data base.[111] In addition, coal concentrations of mercury and low volatile metals were less than hazardous waste by approximately an order of magnitude at every facility except one. Thus, a cement kiln feeding a hazardous waste fuel is likely to emit more metal hazardous air pollutants than a nonhazardous waste burning cement kiln. Given this difference in emissions characteristics, we divided the Portland cement manufacturing source category into two classes based on whether hazardous waste is burned in the cement kiln.

Today's rule does not establish hazardous air pollutant emissions limits for other hazardous air pollutant-emitting sources at a hazardous waste burning cement plant. These other sources of hazardous air pollutants may include materials handling operations, conveyor system transfer points, raw material dryers, and clinker coolers. Emissions from these sources are subject to the requirements promulgated in the June 14, 1999 Portland cement manufacturing NESHAP. See 64 FR 31898. These standards are applicable to these other sources of hazardous air pollutants at all Portland cement plants, both for nonhazardous waste burners and hazardous waste burners.

In addition, this regulation does not establish standards for cement kiln dust management facilities (*e.g.*, cement kiln dust piles or landfills). We are developing cement kiln dust storage and disposal requirements in a separate rulemaking.

2. What Is the Basis for Differences in Standards for Hazardous Waste and Nonhazardous Waste Burning Cement Kilns?

Today's final standards for hazardous waste burning cement kilns are identical in some respects to those finalized for nonhazardous waste burning cement kilns on June 14, 1999. The standards differ, however, in several important aspects. A comparison of the major features of the two sets of standards and the basis for major differences is discussed below.

a. How Does the Regulation of Area Sources Differ? As discussed earlier, this rule makes a positive area source finding under section 112(c)(3) of the CAA (*i.e.*, a finding that hazardous air pollutant emissions from an area source can pose potential risk to human health and the environment) for existing hazardous waste burning cement kilns and subjects area sources to the same standards that apply to major sources. (See Part Three, Section III.B of today's preamble.) For nonhazardous waste burning cement kilns, however, we regulate area sources under authority of

[109] On June 14, 1999, we promulgated regulations for kiln stack emissions for nonhazardous waste burning cement kilns and other sources of hazardous air pollutants at all Portland manufacturing plants. (See 64 FR 31898.)

[110] EPA published an initial list of 174 categories of area and major sources in the **Federal Register** on July 16, 1992. (See 57 FR at 31576.)

[111] USEPA, ''Final Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies,'' July 1999.

section 112(c)(6) of the CAA, and so apply MACT standards only to the section 112(c)(6) hazardous air pollutants emitted from such sources.

The positive finding for hazardous waste burning cement kilns is based on several factors and, in particular, on concern about potential health risk from emissions of mercury and nondioxin/furan organic hazardous air pollutants which are products of incomplete combustion.

However, we do not have this same level of concern with hazardous air pollutant emissions from nonhazardous waste burning cement kilns located at area source cement plants, and so did not make a positive area source finding. As discussed above, mercury emissions from hazardous waste burning cement kilns are generally higher than those from nonhazardous waste burning cement kilns. Also, nondioxin and nonfuran organic hazardous air pollutants emitted from hazardous waste burning cement kilns have the potential to be greater than those from nonhazardous waste burning cement kilns because hazardous waste can contain high concentrations of a wide-variety of organic hazardous air pollutants. In addition, some hazardous waste burning cement kilns feed containers of hazardous waste at locations (*e.g.*, midkiln, raw material end of the kiln) other than the normal coal combustion zone. If such firing systems are poorly designed, operated, or maintained, emissions of nondioxin and furan organic hazardous air pollutants could be substantial (and, again, significantly greater than comparable emissions from nonhazardous waste Portland cement plants). Finally, hazardous air pollutant emissions from nonhazardous waste burning cement kilns currently are not regulated uniformly under another statute as is the case for hazardous waste burning cement kilns which affects which pollutants are controlled at the floor for each class.

Under the June 1999 final rule, existing and new nonhazardous waste burning cement kilns at area source plants are subject to dioxin and furan emission standards, and a hydrocarbon[112] standard for new nonhazardous waste burning cement kilns that are area sources. These standards are promulgated under the authority of section 112(c)(6). That section requires the Agency to establish MACT standards for source categories contributing significantly in the aggregate to emissions of identified, particularly hazardous air pollutants. The MACT process was also applied to the control of mercury, although the result was a standard of no control.

b. How Do the Emission Standards Differ? The dioxin, furan and particulate matter emission standards for nonhazardous waste burning cement kilns are identical to today's final standard for hazardous waste burning cement kilns. The standards for both classes of kilns are floor standards and are identical because hazardous waste burning is not likely to affect emissions of either dioxin/furan[113] or particulate matter. We also conclude that beyond-the-floor standards for these pollutants would not be cost-effective for either class of cement kilns.

Under today's rule, hazardous waste burning cement kilns are subject to emission standards for mercury, semivolatile metals, low volatile metals, and hydrochloric acid/chlorine gas, but we did not finalize such standards for nonhazardous waste burning cement kilns. Currently, emissions of these hazardous air pollutants from hazardous waste burning cement kilns are regulated under RCRA. Therefore, we could establish floor levels for each pollutant under the CAA. These hazardous air pollutants, however, currently are not controlled for nonhazardous waste burning cement kilns and floor levels would be uncontrolled levels (*i.e.*, the highest emissions currently achieved).[114] We considered beyond-the-floor controls and emission standards for mercury and hydrochloric acid for nonhazardous waste burning cement kilns, but conclude that beyond-the-floor standards are not cost-effective, especially considering the lower rates of current emissions for nonhazardous waste burning plants.

Finally, under today's rule, hazardous waste burning cement kilns are subject to emission limits on carbon monoxide and hydrocarbon and a destruction and removal efficiency standard to control nondioxin/furan organic hazardous air pollutants. We identified these controls as floor controls because carbon monoxide and hydrocarbon emissions are controlled for these sources under RCRA regulations, as is destruction and removal efficiency.[115] For nonhazardous waste burning cement kilns, carbon monoxide and hydrocarbon emissions currently are not controlled, and the destruction and removal efficiency standard, established under RCRA, does not apply. Therefore, carbon monoxide, hydrocarbon control and the destruction and removal efficiency standard are not floor controls for this second group of cement kilns. We considered beyond-the-floor controls for hydrocarbon from nonhazardous waste burning cement kilns and determined that beyond-the-floor controls for existing sources are not cost-effective. The basis of this conclusion is discussed in the proposed rule for nonhazardous waste burning cement kilns (see 63 FR at 14202). We proposed and finalized, however, a hydrocarbon emission standard for new source nonhazardous waste cement kilns based on feeding raw materials without an excessive organic content.[116] See 63 FR at 14202 and 64 FR 31898.

We did not consider a destruction and removal efficiency standard as a beyond-the-floor control for nonhazardous waste burning cement kilns because, based historically on a unique RCRA statutory provision, the DRE standard is designed to ensure destruction of organic hazardous air pollutants in hazardous waste fed to hazardous waste combustors. The underlying rationale for such a standard is absent for nonhazardous waste burning cement kilns that do not combust hazardous waste and that feed materials (*e.g.*, limestone, coal) that contain only incidental levels of organic hazardous air pollutants.

c. How Do the Compliance Procedures Differ? We finalized compliance procedures for nonhazardous waste burning cement kilns that are similar to those finalized today for hazardous waste burning cement kilns. For particulate matter, we are implementing a coordinated program to document the feasibility of particulate matter continuous emissions monitoring

[112] Hydrocarbon emissions would be limited as a surrogate for polycyclic organic matter, a category of organic hazardous air pollutants identified in section 112(c)(6).

[113] Later in the text, however, we discuss how hazardous waste burning may potentially affect dioxin and furan emissions and the additional requirements for hazardous waste burning cement kilns that address this concern.

[114] Although semivolatile metal and low volatile metal are controlled by nonhazardous waste burning cement kilns, along with other metallic hazardous air pollutants, by controlling particulate matter. These metals are not individually controlled by nonhazardous waste burning cement kilns as they are for hazardous waste burning cement kilns by virtue of individual metal feedrate limits established under existing RCRA regulations.

[115] For hazardous waste burning cement kilns, existing RCRA carbon monoxide and hydrocarbon standards do not apply to the main stack of a kiln equipped with a by-pass or other means of measuring carbon monoxide or hydrocarbon at mid kiln to ensure good combustion of hazardous waste. Therefore, there is no carbon monoxide or hydrocarbon floor control for such stacks, and we conclude that beyond-the-floor controls would not be cost-effective.

[116] Consistent with the nonhazardous waste burnign cement kiln proposal, however, we subject the main stack of such new source hazardous waste burning cemen tkilns to a hydrocarbon standard.

systems on both nonhazardous waste and hazardous waste burning cement kilns. We plan to establish a continuous emissions monitoring systems-based emission level through future rulemaking that is achievable by sources equipped with MACT control (*i.e.*, an electrostatic precipitator or fabric filter designed, operated, and maintained to meet the New Source Performance Standard particulate matter standard). In the interim, we use the opacity standard as required by the New Source Performance Standard for Portland cement plants under § 60.62 to ensure compliance with the particulate matter standard for both hazardous waste and nonhazardous waste burning cement kilns.

For dioxin/furan, the key compliance parameter will be identical for both hazardous waste and nonhazardous waste burning cement kilns—control of temperature at the inlet to the particulate matter control device. Other factors that could contribute to the formation of dioxins and furans, however, are not completely understood. As a result, hazardous waste burning cement kilns have additional compliance requirements to ensure that hazardous waste is burned under good combustion conditions. These additional controls are necessary because of the dioxin and furan precursors that can be formed from improper combustion of hazardous waste, given the hazardous waste firing systems used by some hazardous waste burning cement kilns and the potential for hazardous waste to contain high concentrations of many organic hazardous air pollutants not found in conventional fuels or cement kiln raw materials.

We also require both hazardous waste and nonhazardous waste burning cement kilns to conduct performance testing midway between the five-year periodic comprehensive performance testing to confirm that dioxin/furan emissions do not exceed the standard when the source operates under normal conditions.

C. What Further Subcategorization Considerations Are Made?

We also fully considered further subdividing the class of hazardous waste burning cement kilns itself. For the reasons discussed below, we decided that subcategorization is not needed to determine achievable MACT standards for all hazardous waste burning cement kilns.

We considered, but rejected, subdividing the hazardous waste burning cement kiln source category on the basis of raw material feed preparation, more specifically wet process versus dry process. In the wet process, raw materials are ground, wetted, and fed into the kiln as a slurry. Approximately 70 percent of the hazardous waste burning cement kilns in operation use a wet process. In the dry process, raw materials are ground dry and fed into the kiln dry. Within the dry process there are three variations: Long kiln dry process, preheater process, and preheater-precalciner process. We decided not to subcategorize the hazardous waste burning cement kiln category based on raw material feed preparation because: (1) The wet process kilns and all variations of the dry process kilns use similar raw materials, fossil fuels, and hazardous waste fuels; (2) the types and concentrations of uncontrolled hazardous air pollutant emissions are similar for both process types;[117] (3) the same types of particulate matter pollution control equipment, specifically either fabric filters or electrostatic precipitators, are used by both process types, and the devices achieve the same level of performance when used by both process types; and (4) the MACT controls we identify are applicable to both process types of cement kilns. For example, MACT floor controls for metals and chlorine include good particulate matter control and hazardous waste feedrate control, as discussed below, the particulate matter standard promulgated today is based on the New Source Performance Standard, which applies to all cement kilns irrespective of process type. Further, a cement kiln operator has great discretion in the types of hazardous waste they accept including the content of metals and chlorine in the waste. These basic control techniques—particulate matter control and feedrate control of metals and chlorine—clearly show that subcategorization based on process type is not appropriate.

Some commenters stated that it is not feasible for wet process cement kilns to use fabric filters, especially in cold climates, and thus subcategorization based on process type is appropriate. The problem, commenters contend, is that the high moisture content of the flue gas will clog the fabric if the cement-like particulate is wetted and subsequently dried, resulting in reduced performance and early replacement of the fabric filter bags. Other commenters disagreed with these assertions and stated that fabric filter technology can be readily applied to wet process kilns given the exit temperatures of the combustion gases and the ease of insulating fabric filter systems to minimize cold spots in the baghouse to avoid dew point problems and minimize corrosion. These commenters pointed to numerous wet process applications currently in use at cement kilns with fabric filter systems located in cold climates to support their claims.[118] In light of the number of wet process kilns already using fabric filters and their various locations, we conclude that wet process cement kilns can be equipped with fabric filter systems and that subdividing by process type on this basis is not necessary or warranted. A review of the particulate matter emissions data for one wet hazardous waste burning cement kiln using a fabric filter shows that it is achieving the particulate matter standard. We do not have data in our data base from the only other wet hazardous waste burning cement kiln using a fabric filter; however, this cement kiln recently installed and upgraded to a new fabric filter system.

We also fully considered, but ultimately rejected, subdividing the hazardous waste burning cement kiln source category between long kilns and short kilns (preheater and preheater-precalciner) technologies, and those with in-line kiln raw mills. This subcategorization approach was recommended by many individual cement manufacturing member companies and a cement manufacturing trade organization. Based on information on the types of cement kilns that are currently burning hazardous waste, these three subcategories consist of the following four subdivisions: (1) Short kilns with separate by-pass and main stacks; (2) short kilns with a single stack that handles both by-pass and preheater or precalciner emissions; (3) long dry kilns that use kiln gas to dry raw meal in the raw mill; and (4) others wet kilns, and long dry kilns not using in-line kiln raw mill drying. Currently, each of the first three categories consists of only one cement kiln facility while

[117] Although dry process kilns with a separate by-pass stack can have higher metals emissions from that stack compared to the main stack of other kilns, today's rule allows such kilns to flowrate-average its emissions between the main and by-pass stack. The average emissions are similar to the emissions from dry and wet kilns that have only one stack. Similarly, kilns with in-line raw mills have higher mercury emissions when the raw mill is off. Today's rule allows such kilns to time-weight average their emissions, however, and the time-weighted emissions for those kilns are similar to emissions from other hazardous waste burning cement kilns.

[118] We are aware of four wet process cement kiln facilities operating with fabric filters: Dragon (Thomaston, ME), Giant (Harleyville, SC), Holnam (Dundee, MI), and LaFarge (Paulding, OH). Commenters also identified kilns in Canada operating with fabric filters.

the kilns at the remaining 15 facilities are in the fourth category: wet kilns or long dry kilns that do not use in-line kiln raw mill drying.

Commenters state that these subcategories should be considered because the unique design or operating features of the different types of kilns could have a significant impact on emissions of one or more hazardous air pollutants that we proposed to regulate. Specifically, commenters noted the potential flue gas characteristic differences for cement kilns using alkali bypasses on short kilns and in-line kiln raw mills. For example, kilns with alkali bypasses are designed to divert a portion of the flue gas, approximately 10–30%, to remove the problematic alkalis, such as potassium and sodium oxides, that can react with other compounds in the cool end of the kiln resulting in operation problems. Thus, bypasses allow evacuation of the undesirable alkali metals and salts, including semivolatile metals and chlorides, entrained in the kiln exit gases before they reach the preheater cyclones. As a result, the commenters stated that the emission concentration of semivolatile metals in the bypass stack is greater than in the main stack, and therefore the difference in emissions supports subcategorization.

We agree, in theory, that the emissions profile for some hazardous air pollutants can be different for the three kilns types—short kilns with and without separate bypass stacks, long kilns with in-line kiln raw mills. To consider this issue further, we analyzed floor control and floor emissions levels based only on the data and information from the other long wet kilns and long dry kilns not using raw mill drying. We then considered whether the remaining three kiln types could apply the same MACT controls and achieve the resulting emission standards. We conclude that these three types of kilns at issue can use the MACT controls and achieve the corresponding emission levels identified in today's rule for the wet kilns and long dry kilns not using raw mill drying.[119] As a result, we conclude that there is no practical necessity driving a subcategorization approach even though one would be theoretically possible. Further, to ensure that today's standards are achievable by all cement kilns, we establish a provision that allows cement kilns operating in-line kiln raw mills to average their emissions based on a time-weighted average concentration that considers the length of time the in-line raw mill is on-line and off line. We also adopt a provision that allows short cement kilns with dual stacks to average emissions on a flow-weighted basis to demonstrate compliance with the emissions standards. (See Part Five, Section X—Special Provisions for a discussion of these provisions.)

In the case of hydrocarbons and carbon monoxide, we developed final standards that reflect the concerns raised by several commenters. We determined that this approach best accommodated the unique design and operating differences between long wet and long dry process and short kilns using either a preheater or a preheater and precalciner.

Existing hazardous waste preheater and preheater-precalciner cement kilns, one of each type is burning hazardous waste, are equipped with bypass ducts that divert a portion of the kiln off-gas through a separate particulate matter control device to remove problematic alkali metals. Long cement kilns do not use bypasses designed to remove alkali metals. The significance of this operational difference is that hydrocarbon and carbon monoxide levels in the bypass gas of short kilns is more representative of the combustion efficiency of burning hazardous waste and other fuels in the kiln than the measurements made in the main stack. Main stack gas measurements of hydrocarbons and carbon monoxide, regardless of process type, also include contributions from trace levels of organic matter volatilized from the raw materials, which can mask the level of combustion efficiency achieved in the kiln.

Today's tailored standards require cement kilns to monitor hydrocarbons and carbon monoxide at the location best indicative of good combustion. For short kilns with bypasses, the final rule requires monitoring of hydrocarbons and carbon monoxide in the bypass. Long kilns are required to comply with the hydrocarbon and carbon monoxide standards in the main stack. However, long kilns that operate a mid-kiln sampling system, for the purpose of removing a representative portion of the kiln off-gas to measure combustion efficiency, can comply with the hydrocarbon and carbon monoxide standards at the midkiln sampling point.

In addition, establishing separate hydrocarbon and carbon monoxide standards reflects the long and short kiln subcategorization approach recommended by some commenters. The standards differ because MACT floor control for hydrocarbons and carbon monoxide is based primarily on the existing requirements of the Boiler and Industrial Furnace rule. In that rule, the unique design and operating features of long and short kilns were considered in establishing type specific emission limits for hydrocarbons and carbon monoxide. Thus, MACT floor control for long and short kilns is different. However, we note these same unique design and operating features were not a factor in establishing standards for other pollutants, including mercury, semivolatile and low volatile metals, and hydrochloric acid/chlorine gas, in the Boiler and Industrial Furnace rule.

For the reasons discussed above, subcategorization would not appear to be needed to establish uniform, achievable MACT standards for all cement kilns burning hazardous waste. Thus, because the differences among kiln types ''does not affect the feasibility and effectiveness of air pollution control technology,'' subcategorization is not appropriate. S. Rep. No. 228, 101st Cong. 1st sess. 166.

D. What Are The Standards for Existing and New Cement Kilns?

1. What Are the Standards for Cement Kilns?

In this section, the basis for the emissions standards for cement kilns is discussed. The kiln emission limits apply to the kiln stack gases, in-line kiln raw mill stack gases if combustion gases pass through the in-line raw mill, and kiln alkali bypass stack gases if discharged through a separate stack from cement plants that burn hazardous waste in the kiln. The emissions standards are summarized below:

[119] USEPA, ''Final Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies,'' July 1999.

STANDARDS FOR EXISTING AND NEW CEMENT KILNS

Hazardous air pollutant or hazardous air pollutant surrogate	Emissions standard [1]	
	Existing sources	New sources
Dioxin and furan	0.20 ng TEQ/dscm; or 0.40 ng TEQ/dscm and control of flue gas temperature not to exceed 400°F at the inlet to the particulate matter control device.	0.20 ng TEQ/dscm; or 0.40 ng TEQ/dscm and control of flue gas temperature not to exceed 400°F at the inlet to the particulate matter control device.
Mercury	120 μg/dscm	56 μg/dscm.
Particulate matter [2]	0.15 kg/Mg dry feed and 20% opacity	0.15 kg/Mg dry feed and 20% opacity.
Semivolatile metals	240 μg/dscm	180 μg/dscm.
Low volatile metals	56 μg/dscm	54 μg/dscm.
Hydrochloric acid and chlorine gas	130 ppmv	86 ppmv.
Hydrocarbons: kilns without by-pass [3,6]	20 ppmv (or 100 ppmv carbon monoxide) [3]	Greenfield kilns: 20 ppmv (or 100 ppmv carbon monoxide and 50 ppmv [5] hydrocarbons).
		All others: 20 ppmv (or 100 ppmv carbon monoxide) [3].
Hydrocarbons: kilns with by-pass; main stack [4,6].	No main stack standard	50 ppmv [5].
Hydrocarbons: kilns with by-pass; by-pass duct and stack [3,4,6].	10 ppmv (or 100 ppmv carbon monoxide)	10 ppmv (or 100 ppmv carbon monoxide).
Destruction and removal efficiency	For existing and new sources, 99.99% for each principal organic hazardous constituent (POHC) designated. For sources burning hazardous wastes F020, F021, F022, F023, F026, or F027, 99.9999% for each POHC designated.	

[1] All emission levels are corrected to 7% O_2, dry basis.
[2] If there is an alkali by-pass stack associated with the kiln or in-line kiln raw mill, the combined particulate matter emissions from the kiln or in-line kiln raw mill and the alkali by-pass must be less than the particulate matter emissions standard.
[3] Cement kilns that elect to comply with the carbon monoxide standard must demonstrate compliance with the hydrocarbon standard during the comprehensive performance test.
[4] Measurement made in the by-pass sampling system of any kiln (e.g., alkali by-pass of a preheater and/or precalciner kiln; midkiln sampling system of a long kiln).
[5] Applicable only to newly-constructed cement kilns at greenfield sites (see discussion in Part Four, Section VII.D.9). 50 ppmv standard is a 30-day block average limit. Hydrocarbons reported as propane.
[6] Hourly rolling average. Hydrocarbons are reported as propane.

2. What Are the Dioxin and Furan Standards?

In today's rule, we establish a standard for new and existing cement kilns that limits dioxin/furan emissions to either 0.20 ng TEQ/dscm; or 0.40 ng TEQ/dscm and temperature at the inlet to the particulate matter control device not to exceed 400°F.[120] Our rationale for these standards is discussed below.

a. What Is the MACT Floor for Existing Sources? In the April 1996 proposal, we identified floor control as either temperature control at the inlet to the particulate matter control device of less than 418°F, or achieving a specific level of dioxin/furan emissions based upon levels achievable using proper temperature control. (61 FR at 17391.) The proposed floor emission level was 0.20 ng TEQ/dscm, or temperature at the inlet to the electrostatic precipitator or fabric filter not to exceed 418°F. In the May 1997 NODA, we identified an alternative data analysis method to identify floor control and the floor emission level. Floor control for dioxin/furan was defined as temperature control at the inlet to the electrostatic precipitator or fabric filter at 400°F, which was based on further engineering evaluation of the emissions data and other available information. That analysis resulted in a floor emission level of 0.20 ng TEQ/dscm, or 0.40 ng TEQ/dscm and temperature at the inlet to the electrostatic precipitator or fabric filter not to exceed 400°F. (62 FR at 24226.) The 0.40 ng TEQ/dscm standard is the level that all cement kilns, including data from nonhazardous waste burning cement kilns, are achieving when operating at the MACT floor control level or better. We considered a data set that included dioxin/furan emissions from nonhazardous waste burning cement kilns because these data are adequately representative of general dioxin/furan behavior and control in either type of kiln. The impacts of hazardous waste constituents (HAPs) on the emissions of those HAPs prevent us from expanding our database for other HAPs in a similar way.

We conclude that the floor methodology discussed in the May 1997 NODA is appropriate and we adopt this approach in today's final rule. We identified two technologies for control of dioxin/furan emissions from cement kilns in the May 1997 NODA. The first technology achieves low dioxin/furan emissions by quenching kiln gas temperatures at the exit of the kiln so that gas temperatures at the inlet to the particulate matter control device are below the temperature range of optimum dioxin/furan formation. For example, we are aware of several cement kilns that have recently added flue gas quenching units upstream of the particulate matter control device to reduce the inlet particulate matter control device temperature resulting in significantly reduced dioxin/furan levels.[121] The other technology is activated carbon injected into the kiln exhaust gas. Since activated carbon injection is not currently used by any hazardous waste burning cement kilns, this technology was evaluated only as part of a beyond-the-floor analysis.

As discussed in the May 1997 NODA, specifying a temperature limitation of 400°F or lower is appropriate for floor control because, from an engineering perspective, it is within the range of

[120] The temperature limit applies at the inlet to a dry particulate matter control device that suspends particulate matter in the combustion gas stream (*e.g.*, electrostatic precipitator, fabric filter) such that surface-catalyzed formation of dioxin/furan is enhanced. The temperature limit does not apply to a cyclone control device, for example.

[121] USEPA, ''Final Technical Support Document for HWC MACT Standards. Volume III: Selection of Proposed MACT Standards and Technologies'', July 1999. See Section 3.2.1.

reasonable values that could have been selected considering that: (1) The optimum temperature window for surface-catalyzed dioxin/furan formation is approximately 450–750°F; and (2) temperature levels below 350°F can cause dew point condensation problems resulting in particulate matter control device corrosion, filter cake cementing problems, increased dust handling problems, and reduced performance of the control device. (62 FR at 24226.)

Several commenters disagreed with our selection of 400°F as the particulate matter control device temperature limitation and stated that other higher temperature limitations were equally appropriate as MACT floor control. Based on these NODA comments, we considered selecting a temperature limitation of 450°F, generally regarded to be the lower end of the temperature range of optimum dioxin/furan formation. However, available data indicate that dioxin/furan formation can be accelerated at kilns operating their particulate matter control device at temperatures between 400–450°F. Data from several kilns show dioxin/furan emissions as high as 1.76 ng TEQ/dscm when operating in the range of 400–450°F. Identifying a higher temperature limit such as 450°F is not consistent with other sources achieving much lower emissions at 400°F, and thus identifying a higher temperature limit would not be MACT floor control.

Some commenters also state that EPA has failed to demonstrate that the best performing 12 percent of existing sources currently use temperature control to reduce dioxin/furan emissions, and therefore, temperature control is more appropriately considered in subsequent beyond-the-floor analyses. However, particulate matter control device operating temperatures associated with the emissions data used to establish the dioxin/furan standard are based on the maximum operating limits set during compliance certification testing required by the Boiler and Industrial Furnace rule. See 40 CFR 266.103(c)(1)(viii). As such, cement kilns currently must comply with these temperature limits on a continuous basis during day-to-day operations, and therefore, these temperature limits are properly assessed during an analysis of MACT floors.

Several commenters also oppose consideration of dioxin/furan emissions data from nonhazardous waste burning cement kilns in establishing the floor standard. Commenters state that pooling the available emissions data from hazardous waste burning cement kiln with data from nonhazardous waste burning cement kilns to determine the MACT floor violates the separate category approach that EPA decided upon for the two classes of cement kilns. Notwithstanding our decision to divide the Portland cement manufacturing source category based on the kiln's hazardous waste burning status, we considered both hazardous waste burning cement kiln and nonhazardous waste burning cement kiln data together because both data sets are adequately representative of general dioxin/furan behavior and control in either type of kiln. This similarity is based on our engineering judgement that hazardous waste burning does not have an impact on dioxin/furan formation, dioxin/furan is formed post-combustion. Though the highest dioxin/furan emissions data point from MACT (*i.e.*, operating control device less than 400°F) hazardous waste and nonhazardous waste burning cement kiln sources varies somewhat (0.28 vs 0.37 ng TEQ/dscm respectively), it is our judgment that additional emissions data, irrespective of hazardous waste burning status, would continue to point to a floor of within the range of 0.28 to 0.37 ng TEQ/dscm. This approach ensures that the floor levels for hazardous waste burning cement kilns are based on the maximum amount of relevant data, thereby ensuring that our judgment on what floor level is achievable is as comprehensive as possible.

We estimate that approximately 70 percent of test condition data from hazardous waste burning cement kilns are currently emitting less than 0.40 ng TEQ/dscm (irrespective of the inlet temperature to the particulate matter control device). In addition, approximately 50 percent of all test condition data are less than 0.20 ng TEQ/dscm. The national annualized compliance cost for cement kilns to reduce dioxin/furan emissions to comply with the floor standard is $4.8 million for the entire hazardous waste burning cement industry and will reduce dioxin/furan emissions by 5.4 g TEQ/yr or 40 percent from current baseline emissions.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? We considered in the April 1996 proposal and May 1997 NODA a beyond-the-floor standard of 0.20 ng TEQ/dscm based on activated carbon injection at a temperature of less than 400°F. We continue to believe that a beyond-the-floor standard 0.20 ng TEQ/dscm based on activated carbon injection is the appropriate beyond-the-floor standard to evaluate given the risks posed by dioxin/furan emissions.

Carbon injection is routinely effective at removing 99 percent of dioxin/furans for numerous municipal waste combustor and mixed waste incinerator applications and one hazardous waste incinerator application. However, currently no hazardous waste burning cement kilns use activated carbon injection for dioxin/furan removal. For cement kilns, we believe that it is conservative to assume only 95 percent is achievable given that the floor level is already low at 0.40 ng/dscm. As dioxin/furans decrease, activated carbon injection efficiency is expected to decrease. In addition, we assumed for cost-effectiveness calculations that cement kilns needing activated carbon injection to achieve the beyond-the-floor standard would install the activated carbon injection system after the normal particulate matter control device and add a new, smaller fabric filter to remove the injected carbon with the absorbed dioxin/furan and mercury.[122] The costing approach addresses commenter's concerns that injected carbon may interfere with cement kiln dust recycling practices.

The national incremental annualized compliance cost for the remaining cement kilns to meet this beyond-the-floor level, rather than comply with the floor controls, would be approximately $2.5 million for the entire hazardous waste burning cement industry and would provide an incremental reduction in dioxin/furan emissions nationally beyond the MACT floor controls of 3.7 g TEQ/yr. Based on these costs, approximately $0.66 million per g dioxin/furan removed, we determined that this dioxin/furan beyond-the-floor option for cement kilns is not justified. Therefore, we are not adopting a beyond-the-floor standard of 0.2 ng TEQ/dscm.

We note that one possible explanation of high cost-effectiveness of the beyond-the-floor standard may be due to the significant reduction in national dioxin/furan emissions achieved over the past several years by hazardous waste burning cement kilns due to emissions improving modifications. The hazardous waste burning cement kiln national dioxin/furan emissions estimate for 1997 decreased by nearly

[122] We received many comments on the use of activated carbon injection as a beyond-the-floor control techniques at cement kilns. Since we do not adopt a beyond-the-floor standard based on activated carbon injection in the final rule, these comments and our responses to them are only discussed in our document that responds to public comments.

97% since 1990, from 431 g TEQ/yr to 13.1 g TEQ/yr.[123]

c. What Is the MACT Floor for New Sources? At proposal, we identified floor control for new sources as temperature control at the inlet to the particulate matter control device at 409°F. The proposed floor emission level was 0.20 ng TEQ/dscm, or temperature at the inlet to the particulate matter control device not to exceed 409°F. In the May 1997 NODA, we identified an alternative data analysis method to identify floor control and the floor emission level. The May 1997 NODA dioxin/furan floor control for new sources was defined as temperature control at the inlet to the electrostatic precipitator or fabric filter at 400°F, which was based on an engineering evaluation of the emissions data and other available information. That analysis resulted in a floor emission level of 0.20 ng TEQ/dscm, or 0.40 ng TEQ/dscm and temperature at the inlet to the electrostatic precipitator or fabric filter not to exceed 400°F. We continue to believe that the floor methodology is appropriate for new sources and we adopt this approach in this final rule.

d. What Are Our Beyond-the-Floor Considerations for New Sources? In both the April 1996 proposal and May 1997 NODA, we proposed activated carbon injection as beyond-the-floor control and a beyond-the-floor standard of 0.20 ng TEQ/dscm for new sources. For reasons discussed above for existing sources, we conclude that it is also not cost-effective for new cement kilns to achieve this level. Thus, we do not adopt a beyond-the-floor dioxin/furan standard for new cement kilns.

3. What Are the Mercury Standards?

In today's rule, we establish a standard for existing and new cement kilns that limits mercury emissions to 120 and 56 µg/dscm, respectively. The rationale for these standards is discussed below.

a. What Is the MACT Floor for Existing Sources? All cement kilns use either electrostatic precipitators or fabric filters for particulate matter control. However, since mercury is generally in the vapor form in and downstream of the combustion chamber, including the air pollution control device, electrostatic precipitators and fabric filters do not achieve good mercury control. Mercury emissions from cement kilns are currently regulated by the Boiler and Industrial Furnace rule, which establishes limits on the maximum feedrate of mercury in total feedstreams (e.g., hazardous waste, raw materials, coal). Thus, MACT floor control is based on hazardous waste feed control.

In the April 1996 proposal, we identified floor control as hazardous waste feedrate control not to exceed a feedrate level of 110 µg/dscm, expressed as a maximum theoretical emission concentration, and proposed a floor standard of 130 µg/dscm based on an analysis of data from all cement kilns with a hazardous waste mercury feedrate of this level or lower. (61 FR at 17393.) In May 1997 NODA, we conducted a breakpoint analysis on low to high ranked mercury emissions data from sources floor control and established the floor level as the test condition average emission of the breakpoint source. The breakpoint analysis was intended to reflect an engineering-based evaluation of the data so that the few cement kilns spiking mercury during compliance testing did not drive the floor standard to levels higher than the preponderance of the emissions data. We reasoned that sources with emissions higher than the breakpoint source were not controlling the hazardous waste feedrate of mercury to levels representative of MACT. This analysis resulted in a MACT floor level of 72 µg/dscm. (62 FR at 24227.)

For today's rule, in response to comments questioning our May 1997 NODA approach, we use a revised engineering evaluation and data analysis method to establish the MACT floor for mercury. As discussed in greater detail in the methodology section previously, we use an aggregate feedrate approach to establish MACT floors for the three metal hazardous air pollutant groups and hydrochloric acid/chlorine gas. The aggregate feedrate approach first identifies a MACT floor feedrate level for mercury and then establishes the floor emission level as the highest emissions level achieved by any cement kilns using floor control or better. Using this approach, the resulting mercury floor emission level is 120 µg/dscm.

We received comments on several overarching issues including the appropriateness of considering feedrate control of mercury in hazardous waste as a MACT floor control technique and the specific procedure of identifying breakpoints in arrayed emissions data. These issues and our response to them are discussed in the floor methodology section in Part Four, Section V. In addition, we received comment on a special provision that would allow cement kilns (and lightweight aggregate kilns) to petition the Administrator for an alternative mercury standard for kilns with mercury concentrations in their mineral and related process raw materials that causes an exceedance of the emission standard. This issue and the alternative standard promulgated in the final rule is fully discussed in Part Five, Section X.A.

We also received comments from the cement manufacturing industry indicating that cement kilns with in-line raw mills have unique design and operating procedures that necessitate the use of emission averaging when demonstrating compliance with the emission standards. These commenters stated that the mercury standard is not achievable without a procedure for kilns to emissions average. The commenters supported a provision allowing cement kilns with in-line raw mills to demonstrate compliance with the emission standards on a time-weighted average basis to account for different emission characteristics when the raw mill is active as opposed to when it is inactive. After fully considering comments received, we adopt an emission averaging provision in the final rule. This provision is fully discussed in Part Five, Section X.E.

Several commenters expressed concern that the mercury emissions data base for cement kilns is comprised of normal data, that is, cement kilns did not spike mercury during RCRA compliance testing as they did for other metals and chlorine. Thus, commenters stated that an emissions variability factor should be added to a floor level derived directly from the emissions data to ensure that the floor emission level is being achieved in practice. As discussed in Section V.D.1 above, we conclude that emissions variability is adequately accounted for by the MACT floor methodology finalized today.

We estimate that 85 percent of cement kilns currently meet the floor level. The national annualized compliance cost for cement kilns to reduce mercury emissions to comply with the floor level is $1.1 million for the entire hazardous waste burning cement industry and will reduce mercury emissions by 0.2 Mg/yr or 15 percent from current baseline emissions.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? In the April 1996 NPRM, we proposed a beyond-the-floor standard of 50 µg/dscm based on flue gas temperature reduction to 400 °F followed by activated carbon injection for mercury capture. (61 FR at 17394.) In the May 1997 NODA, we considered a beyond-the-floor standard of 30 µg/dscm based on activated carbon

[123] USEPA, ''Final Technical Support Document for HWC MACT Standards, Volume V: Emission Estimates and Engineering Costs'', July 1999. See also 63 FR 17338, April 10, 1998.

injection; however, an evaluation was not conducted to determine if such a level would be cost-effective. (62 FR at 24227.)

In developing the final rule, we identified three techniques for control of mercury as a basis to evaluate a beyond-the-floor standard: (1) Activated carbon injection; (2) limiting the feed of mercury in the hazardous waste; and (3) limiting the feed of mercury in the raw materials. The results of each analysis are discussed below.

i. Activated Carbon Injection. To investigate activated carbon injection, we applied a carbon injection capture efficiency of 80 percent to the floor emission level of 120 µg/dscm. Our basis for selecting a capture efficiency of 80 percent [124] is discussed in the support document.[125] The resulting beyond-the-floor emission level is 25 µg/dscm.

We then determined the cost of achieving this reduction to determine if a beyond-the-floor standard of 25 µg/dscm would be appropriate. The national incremental annualized compliance cost for the remaining cement kilns to meet this beyond-the-floor level, rather than comply with the floor controls, would be approximately $11.1 million for the entire hazardous waste burning cement kiln industry and would provide an incremental reduction in mercury emissions nationally beyond the MACT floor controls of 0.7 Mg/yr. Based on these costs of approximately $16 million per additional Mg of mercury removed, we conclude that this mercury beyond-the-floor option for cement kilns is not acceptably cost-effective nor otherwise justified. Therefore, we do not adopt this beyond-the-floor standard.

ii. Limiting the Feedrate of Mercury in the Hazardous Waste. We also considered a beyond-the-floor standard of 50 µg/dscm based on limiting the feedrate of mercury in the hazardous waste. An emission level of 50 µg/dscm represents the practicable extent that additional feedrate control of mercury in hazardous waste (beyond feedrate control needed to achieve the floor emission level) can be used and still achieve modest emissions reductions. We investigated the cost of achieving this reduction to determine if this beyond-the-floor standard would be appropriate. The national incremental annualized compliance cost for cement kilns to meet a beyond-the-floor level of 50 µg/dscm, rather than comply with the floor controls, would be approximately $4.2 million for the entire hazardous waste burning cement kiln industry and would provide an incremental reduction in mercury emissions nationally beyond the MACT floor controls of 0.4 Mg/yr. Based on these costs of approximately $10.9 million per additional Mg of mercury removed, we conclude that this mercury beyond-the-floor option for cement kilns is not warranted. Therefore, we did not adopt this mercury beyond-the-floor standard.

iii. Limiting the Feedrate of Mercury in Raw Materials. Finally, we considered a beyond-the-floor standard based on limiting the feedrate of mercury in the raw materials. Cement manufacturing involves the heating of raw materials such as limestone, clay, shale, sand, and iron ore. Limestone, shale, and clay comprise the vast majority of raw material feed to the kiln, and these materials are typically mined at quarries nearby the cement kiln. Since feed materials can contain significant quantities of hazardous air pollutants, we considered establishing a beyond-the-floor standard based on limiting the feedrate of mercury in these raw materials. A source can achieve a reduction in mercury emissions by substituting a feed material containing lower levels of mercury for a primary raw material with higher mercury levels. For example, shale is the primary feed material used as a source of silica. Under this beyond-the-floor option, a source using a high mercury-containing shale could substitute a feed material lower in mercury such as a coal ash to achieve lower mercury emissions. This beyond-the-floor option appears to be less cost-effective compared to either of the options evaluated above, however. This conclusion is based on the fact that cement kilns are sited proximate to primary raw material supply and transporting large quantities of an alternative source of raw material(s) is likely to be cost-prohibitive, thereby making a beyond-the-floor standard not cost-effective. Therefore, we do not adopt this mercury beyond-the-floor standard.

Thus, the promulgated mercury standard for existing hazardous waste burning cement kilns is the floor level of 120 µg/dscm.

c. What Is the MACT Floor for New Sources? In the April 1996 proposal, we identified floor control for new sources as hazardous waste mercury feedrate control not to exceed a feedrate level of 28 µg/dscm expressed as a maximum theoretical emission concentration. We proposed a floor level of 82 µg/dscm. We discussed a floor emission level for new cement kilns in the May 1997 NODA of 72 µg/dscm, based on a floor feedrate control level of 110 µg/dscm.

Today we identify floor control for new cement kilns as feedrate control of mercury in the hazardous waste, expressed as a maximum theoretical emission concentration, based on the single source with the best aggregate feedrate of mercury in hazardous waste. Using the aggregate feedrate approach to establish this floor level of control and the corresponding floor emission level, we identify a MACT floor emission level of 56 µg/dscm for new hazardous waste burning cement kilns.[126]

d. What Are Our Beyond-the-Floor Considerations for New Sources? At proposal, we based beyond-the-floor control for new cement kilns on activated carbon injection and proposed a standard of 50 µg/dscm. In the May 1997 NODA we considered a beyond-the-floor standard of 30 µg/dscm based on activated carbon injection as done for existing sources.

We identified two techniques for control of mercury as a basis to evaluate a beyond-the-floor standard for new sources: (1) Activated carbon injection; and (2) limiting the feedrate of mercury in the hazardous waste. The results of each analysis are discussed below.

i. Activated Carbon Injection. As discussed above, we conclude that flue gas temperature reduction to 400°F followed by activated carbon injection to remove mercury is an appropriate beyond-the-floor control option for improved mercury control at cement kilns. Based on the MACT floor emission level of 56 µg/dscm and assuming a carbon injection capture efficiency of 80 percent, we identified a beyond-the-floor emission level of 10 µg/dscm. We then determined the cost of achieving this reduction to determine if a beyond-the-floor standard of 10 µg/dscm would be appropriate. The incremental annualized compliance cost for one new large cement kiln to meet this beyond-the-floor level, rather than comply with floor controls, would be approximately $2.3 million and would provide an incremental reduction in mercury emissions beyond the MACT floor controls of approximately 0.17 Mg/yr. For a new small cement kiln, the

[124] We received many comments on the use of activated carbon injection as a beyond-the-floor control technique at cement kilns. Since we do not adopt a beyond-the-floor standard based on activated carbon injection in the final rule, these comments and our responses to them are only discussed in our document that responds to public comments.

[125] USEPA, ''Final Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies.'' July 1999.

[126] Given that the emission level is substantially higher than the feedrate level expressed as a maximum theoretical emission concentration, 56 vs 7 µg/dscm, the contributions of mercury from raw materials and coal for the floor-setting source must be substantial.

incremental annualized compliance cost would be approximately $0.9 million and would provide an incremental reduction in mercury emissions beyond the MACT floor controls of approximately 0.04 Mg/yr. Based on these costs of approximately $13–22 million per additional Mg of mercury removed, we concluded that a beyond-the-floor standard of 10 µg/dscm is not justified due to the high cost of compliance and relatively small mercury emissions reductions.

ii. Limiting the Feedrate of Mercury in Hazardous Waste. We also considered a beyond-the-floor standard based on limiting the feedrate of mercury in the hazardous waste. Considering that the floor emission level for new cement kilns is approximately half of the floor emission level for existing kilns (56 versus 120 µg/dscm), we conclude that a mercury beyond-the-floor standard for cement kilns is not warranted. This conclusion is based on the limited incremental emissions reductions achieved [127] and because the cost-effectiveness of beyond-the-floor controls for new cement kilns would be even higher than for existing sources, which we found unacceptable in paragraph (b) above. Therefore, we do not adopt a mercury beyond-the-floor standard based on limiting feedrate of mercury in hazardous waste.

Thus, the promulgated mercury standard for new hazardous waste burning cement kilns is the floor emissions level of 56 µg/dscm.

4. What Are the Particulate Matter Standards?

We establish standards for both existing and new cement kilns which limit particulate matter emissions to 0.15 kg/Mg dry feed.[128] In addition, opacity cannot exceed 20 percent. We chose the particulate matter standard as a surrogate control for the metals antimony, cobalt, manganese, nickel, and selenium. We refer to these five metals as ''nonenumerated metals'' because standards specific to each metal have not been established. The rationale for adopting these standards is discussed below.

a. What Is the MACT Floor for Existing Sources? In the April 1996 proposal, we discussed particulate matter floor control based upon the performance of a fabric filter with an air-to-cloth ratio of 2.3 acfm/f, ^{2} resulting in a nominal floor emission level of 0.065 gr/dscf. However, we believed it more appropriate to establish the floor standard based on the cement kiln 1971 New Source Performance Standard. (See discussion in 61 FR at 17392.) The 1971 New Source Performance Standard is 0.15 kg/Mg dry feed (0.30 lb/ton of dry feed). (see 40 CFR 60.60.) Cement kilns currently achieve this standard with well-designed and properly operated electrostatic precipitators and fabric filters.

In the May 1997 NODA, we considered two data analysis methods to identify the particulate matter floor emission level. The first method established and expressed the floor level equivalent to the existing New Source Performance Standard promulgated in 1971. We subsequently proposed and finalized this approach for nonhazardous waste burning cement kilns. See 63 FR at 14198–199 and 64 FR 31898, respectively. The second approach discussed expressed the New Source Performance Standard as a stack gas concentration limit, as opposed to a production-based emission limit format. The May 1997 reevaluation suggested that the 1971 New Source Performance Standard was approximately equivalent to a particulate matter concentration of 0.03 gr/dscf (69 mg/dscm).[129] We indicated a preference for expressing the particulate matter standard on a concentration basis because we also proposed that sources would comply with the particulate matter standard with a particulate matter continuous emissions monitoring system.

However, we now conclude that basing the floor on the 1971 New Source Performance Standard is the most appropriate approach. Cement kilns achieve the 1971 New Source Performance Standard with well-designed and properly operated fabric filters and electrostatic precipitators. Since approximately 20% of hazardous waste burning cement kilns now are subject to the 1971 New Source Performance Standard, consideration of this existing federal regulation as a floor is appropriate because greater than 12% of existing sources are achieving it. The available emissions test data show a wide range of particulate matter results—some emissions data are well below while other data are at the 1971 New Source Performance Standard level.[130] Even though the hazardous waste burning cement kiln particulate matter data span two orders of magnitude,[131] we have limited data on design parameters of the particulate matter control device and could not identify a cause (i.e., differentiate among control equipment) for the wide range in particulate matter emissions. We thus believe that the variation reflects normal operating variability. Therefore, the MACT floor emission level for existing cement kilns is the 1971 New Source Performance Standard.

The New Source Performance Standard at § 60.62 also specifies that opacity must be monitored continuously and establishes an opacity standard of 20 percent as a measure to ensure compliance with the particulate matter standard. We are therefore also adopting this opacity standard for today's rule.[132] We are adopting it for the final rule because: (1) We proposed to base the particulate matter standard for hazardous waste burning cement kilns on the New Source Performance Standard, and the opacity standard is an integral component of that standard; and (2) we proposed to base the MACT particulate matter standard for nonhazardous waste burning cement kilns on the New Source Performance Standard and explicitly identified both the particulate emission and opacity components of the standard. Hazardous waste burning cement kiln stakeholders have commented on both the nonhazardous waste and hazardous waste cement kiln proposed rules and suggest that there is little or no difference in emissions from the two classes of kilns and that they should be regulated the same. Although we do not agree that emissions of all hazardous pollutants are the same for both classes of kilns and should be regulated the same, we agree that particulate

[127] Achieving substantial additional mercury emissions reductions by further controls on hazardous waste feedrate may be problematic because the mercury contribution from raw materials and coal represents an even larger proportion of the total mercury fed to the kiln.

[128] Approximately equivalent to a particulate matter concentration of 0.03 gr/dscf (69 mg/dscm) as expressed in the April 1996 NPRM and May 1997 NODA. The calculation is approximate due to the different types of cement kilns and their associated flow rates.

[129] See USEPA, ''Final Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies,'' July 1999 for a discussion of the approximate equivalency.

[130] The variation in the particulate matter data is consistent with data from nonhazardous waste burning cement kilns. We neither expect nor have any data indicating that waste-burning operations increase particulate matter emissions at a cement kiln. An estimated 30% of existing nonhazardous waste burning cement kilns are subject to the requirements of the new Source Performance Standard for cement plants. The particulate matter data for these kilns also exhibit a wide range in measurements. (63 FR at 14198.)

[131] USEPA, ''Final Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies,'' July 1999.

[132] Given that we adopt the New Source Performance Standard for particulate matter and opacity for the MACT standards for hazardous waste burning cement kilns, we exempt these sources from the New Source Performance Standard to avoid duplicative regulation. See § 63.1204(h).

emissions are comprised largely of entrained raw material and are not significantly affected by burning hazardous waste. Thus, we concur that the standard for particulate matter should be the same for both classes of sources and are therefore adopting the New Source Performance Standard opacity standard for the final rule.[133] In the NPRM and the May 1997 NODA, we proposed to express the particulate matter standard on a concentration basis rather than express it as the same format as the 1971 New Source Performance Standard, which is a production-based emission limit format. However, because we are not yet requiring sources to document compliance with the particulate matter standard by using a particulate matter continuous emissions monitoring system in this final rule [134], we establish and express the floor emission level equivalent to the 1971 New Source Performance Standard. Thus, the particulate matter floor is 0.15 kg/Mg dry feed based on the performance of a well-designed and operated fabric filter or electrostatic precipitator.

Several commenters expressed concern in their comments to the NPRM that the Agency identified separate, different MACT pools and associated MACT controls for particulate matter, semivolatile metals, and low volatile metals, even though all three are controlled, at least in part, by a particulate matter control device. Commenters stated that our approach is likely to result in three different design specifications. We agree with the need to use the same pool for particulate matter, semivolatile metals, and low volatile metals and used the same initial MACT pool to establish the floor levels for these pollutants. See Part Four, Section V for a detailed discussion of our floor methodology.

We estimate that over 60 percent of cement kilns currently meet the floor emission level. The national annualized compliance cost for cement kilns to reduce particulate matter emissions to comply with the floor level is $6.2 million for the entire hazardous waste burning cement industry and will reduce nonenumerated metals and particulate matter emissions by 1.1 Mg/yr and 873 Mg/yr, respectively, or over 30 percent from current baseline emissions.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? In the proposal and May 1997 NODA, we considered a beyond-the-floor level of 34 mg/dscm (0.015 gr/dscf) based on improved particulate matter control. However, after examining the costs of such control and the relatively low incremental reductions in air emissions that would result, we determined that a beyond-the-floor standard would not likely be cost-effective. (61 FR at 17393.)

Several commenters support a beyond-the-floor option for particulate matter because some cement kilns are readily achieving particulate matter levels well below the floor emission level based on the New Source Performance Standard. Other commenters oppose a beyond-the-floor option for cement kilns because of the high costs and anticipated poor cost-effectiveness. In the final rule, we evaluated a beyond-the-floor emission level for existing cement kilns to determine if such a level would be appropriate.

Improved particulate matter control for existing cement kilns would require the use of high efficiency electrostatic precipitators and fabric filters. These may include fabric filters with low air-to-cloth ratios, high performance fabrics, electrostatic precipitators with large specific collection areas, and advanced control systems. Currently, the majority of hazardous waste burning cement kilns use electrostatic precipitators for particulate matter control and usually achieve removal efficiencies greater than 99.8%. Cement kilns can meet the MACT floor with well designed and properly operated particulate matter control equipment that for many kilns may require only minor system upgrades from their current systems. A beyond-the-floor standard, however, would likely involve more than a minor system upgrade, and may require new control equipment or retrofitting a baghouse with new higher performance fabric materials. The total annualized costs associated with such major system upgrades would be significant, while only achieving modest incremental emissions reductions in particulate matter and nonenumerated metals.

In the final rule, we considered a beyond-the-floor level of 34 mg/dscm, approximately one-half the New Source Performance Standard, for existing cement kilns based on improved particulate matter control. For analysis purposes, improved particulate matter control entails the use of higher quality fabric filter bag material. We then determined the cost of achieving this level of particulate matter, with corresponding reductions in the nonenumerated metals for which particulate matter is a surrogate, to determine if this beyond-the-floor level would be appropriate. The national incremental annualized compliance cost for cement kilns to meet this beyond-the-floor level, rather than comply with the floor controls, would be approximately $7.4 million for the entire hazardous waste burning cement kiln industry and would provide an incremental reduction in nonenumerated metals emissions nationally beyond the MACT floor controls of 0.7 Mg/yr. Based on these costs of approximately $10.7 million per additional Mg of nonenumerated metals emissions removed, we conclude that this beyond-the-floor option for cement kilns is not acceptably cost-effective nor otherwise justified. Therefore, we do not adopt this beyond-the-floor standard. The promulgated particulate matter standard for existing hazardous waste burning cement kilns is the floor emission level of 0.15 kg/Mg dry feed and opacity not to exceed 20 percent.

c. What Is the MACT Floor for New Sources? In the proposal, we defined floor control based on the performance of a fabric filter with an air-to-cloth ratio of less than 1.8 acfm/ft2. As discussed for existing sources, we proposed the floor level based on the existing cement kiln New Source Performance Standard. 61 FR at 17400. In the May 1997 NODA, we again considered basing the floor emission level on the New Source Performance Standard and solicited comment on the two alternatives to express the standard identical to those discussed above for existing cement kilns. (62 FR at 24228.)

All cement kilns use fabric filters and electrostatic precipitators to control particulate matter. As discussed earlier, we have limited detailed information on the design and operation characteristics of existing control equipment currently used by cement kilns. As a result, we are unable to identify a specific design or technology that can consistently achieve lower emission levels than the controls used by cement kilns achieving the New Source Performance Standard. Cement kilns meet the New Source Performance Standard with well-

[133] We are not adopting the opacity standard component of the New Source Performance Standard for hazardous waste burning lightweight aggregate kilns, however. This is because that opacity standard (see § 60.732) is a measure to ensure compliance with the particulate emissions component of that standard, which is substantially higher than the MACT standard that we promulgate today. Thus, the NSPS opacity standard for lightweight aggregate kilns would not be a useful measure of compliance with today's particulate matter standard for lightweight aggregate kilns.

[134] We anticipate rulemaking on a particulate matter continuous emissions monitoring system requirement for hazardous waste combustors in the near future. Under this rulemaking, combustors would be required to document compliance with national emission standards by complying with continuous emissions monitoring system-based particulate matter levels that are being achieved by sources equipped with MACT controls. See Part Five, Section VII.C. for details.

designed and properly operated fabric filters and electrostatic precipitators. Thus, floor control for new cement kilns is also a well-designed and properly operated fabric filter and electrostatic precipitator. As discussed for existing sources, we conclude that expressing the floor based on the New Source Performance Standards is appropriate for the final rule. Therefore, the MACT floor level for new cement kilns is 0.15 kg/Mg dry feed and opacity not to exceed 20 percent.

d. What Are Our Beyond-the-Floor Considerations for New Sources? In the April 1996 NPRM and May 1997 NODA, we considered a beyond-the-floor standard based on improved particulate matter control to be consistent with existing sources. However, we proposed that such a beyond-the-floor level was not likely cost-effective.

As discussed for existing sources, we considered a beyond-the-floor level of 34 mg/dscm, approximately one-half the New Source Performance Standard, for new cement kilns based on improved particulate matter control. For analysis purposes, improved particulate matter control entails the use of higher quality fabric filter bag material. We then determined the cost of achieving this level of particulate matter, with corresponding reductions in the nonenumerated metals for which particulate matter is a surrogate, to determine if this beyond-the-floor level would be appropriate. The incremental annualized compliance cost for one new large cement kiln to meet this beyond-the-floor level, rather than comply with floor controls, would be approximately $309,000 and would provide an incremental reduction in nonenumerated metals emissions of approximately 0.18 Mg/yr.[135] For a new small cement kiln, the incremental annualized compliance cost would be approximately $120,000 and would provide an incremental reduction in nonenumerated metals emissions of approximately 0.04 Mg/yr. Based on these costs of approximately $1.7–3.0 million per additional Mg of nonenumerated metals removed, we conclude that a beyond-the-floor standard of 0.015 gr/dscf is not justified due to the high cost of compliance and relatively small nonenumerated metals emission reductions. Thus, the particulate matter standard for new cement kilns is the floor level of 0.15 kg/Mg dry feed and opacity not to exceed 20 percent.

5. What Are the Semivolatile Metals Standards?

Today's rule establishes standards for existing and new cement kilns that limit semivolatile metals emissions to 240 and 180 µg/dscm, respectively. The rationale for these standards is discussed below.

a. What Is the MACT Floor for Existing Sources? In the April 1996 proposal, we defined floor control as a fabric filter with an air-to-cloth ratio less than 2.1 acfm/ft^2 and a hazardous waste feedrate level of 84,000 µg/dscm, expressed as a maximum theoretical emission concentration. The proposed floor emission level was 57 µg/dscm, based on the level a source with properly designed and operated floor technology could achieve. In the proposed rule, we also solicited comment on an alternative floor approach whereby "equivalent technology" to MACT control is identified and evaluated. This approach resulted in an emission level of 160 µg/dscm (See 61 FR at 17395.) In the May 1997 NODA, we discussed a floor methodology where we used a breakpoint analysis to identify sources that were not using floor control with respect either to semivolatile metals hazardous waste feedrate or emissions control. Under this approach, we ranked semivolatile metals emissions data from sources that were using MACT floor particulate matter control, i.e., sources achieving the New Source Performance Standard or better. We identified the floor level as the test condition average associated with the breakpoint source. Thus, sources with atypically high emissions because of high semivolatile metals feedrates or poor semivolatile metals control even though they appeared to be using floor control for particulate matter were screened from the pool of sources used to define the floor emission level. Based on this analysis, we identified a floor level in the May 1997 NODA of 670 µg/dscm. (See 62 FR at 24228.)

As discussed previously in the methodology section, we use a revised engineering evaluation and data analysis method to establish the MACT floor for semivolatile metals based on the same underlying data previously noticed for comment. The aggregate feedrate approach, in conjunction with floor control for particulate matter, identified a semivolatile metals floor emission level of 650 µg/dscm.

In addition, several commenters stated strongly that the feedrate of semivolatile metals in hazardous waste cannot be considered MACT floor control in conjunction with particulate matter control. These commenters believe that floor control for semivolatile metals is control of particulate matter only. We disagree with these commenters for reasons we discuss in Part Four, Section V of the preamble, mainly that feedrate is currently control for hazardous waste combustors under RCRA regulations, and conclude that control of the feedrate of semivolatile metals in hazardous waste is floor control, in conjunction with particulate matter control.

We estimate that approximately 60 percent of cement kilns currently meet this floor level. The national annualized compliance cost for cement kilns to reduce semivolatile metal emissions to comply with the floor level is $1.3 million for the entire hazardous waste burning cement industry and will reduce semivolatile metal emissions by 19.5 Mg/yr or 65 percent from current baseline emissions.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? In the proposal, we considered a beyond-the-floor standard for semivolatile metals based on improved particulate matter control below the New Source Performance Standard. However, we concluded that a beyond-the-floor standard would not be cost-effective, given that the semivolatile metal floor level of 57 µg/dscm alone resulted in an estimated 94 percent semivolatile metal reduction in emissions. (see 61 FR at 17396.) In the May 1997 NODA, we considered a lower particulate matter emissions level of 0.015 gr/dscf, based on improved particulate matter control, as a beyond-the-floor standard to further reduce semivolatile and low volatile metals. Even though we did not quantify cost-effectiveness values, we expressed concern that a beyond-the-floor standard would not likely be cost-effective. (see 62 FR at 24229.)

Commenters believed there were several control techniques that should be considered, therefore, we identified three potential beyond-the-floor control techniques in developing the final rule: (1) Limiting the feedrate of semivolatile metals in hazardous waste; (2) improved particulate matter control; and (3) limiting the feedrate of semivolatile metals in raw materials. We conclude that a beyond-the-floor standard is warranted based on limiting the feedrate of semivolatile metals in hazardous waste. The results of each analysis are discussed below.

i. Limiting the Feedrate of Semivolatile Metals in Hazardous Waste. Under this approach, we selected a beyond-the-floor emission level of 240

[135] Based on the data available, the average emissions in sum of the five nonenumerated metals from cement kilns using MACT particulate matter control is approximately 80 µg/dscm. To estimate emission reductions of the nonenumerated metals, we assume a linear relationship between a reduction in particulate matter and these metals.

µg/dscm from among the range of possible levels that reflect improved feedrate control. This emission level represents a significant increment of emission reduction from the floor of 650 µg/dscm, it is within the range of levels that are likely to be reasonably achievable using feedrate control, and it is consistent with the incinerator standard thereby advancing a potential policy objective of essentially common standards among combustors of hazardous waste.

The national incremental annualized compliance cost for the remaining cement kilns to meet this beyond-the-floor level, rather than comply with the floor controls, would be approximately $2.7 million for the entire hazardous waste burning cement kiln industry and would provide an incremental reduction, beyond emissions at the MACT floor, in semivolatile metal emissions nationally of 5.5 Mg/yr. The cost-effectiveness of this standard would be approximately $500,000 per additional Mg of semivolatile metals removed. Notwithstanding the relatively poor cost-effectiveness of this standard on a dollar per Mg removed basis, we conclude that additional beyond-the-floor control of the feedrate of semivolatile metals in hazardous waste to achieve an emission level of 240 µg/dscm is warranted because this standard would reduce lead and cadmium emissions which are particularly toxic hazardous air pollutants. See Health Human Effects discussion in USEPA, ''Technical Background Document for HWC MACT Standards: Health and Ecological Risk Assessment'', July 1999. Further, approximately 90% of the lead and cadmium fed to the cement kiln is from the hazardous waste,[136] not the raw material (about 9%) or coal (about 1%). We are willing to accept a more marginal cost-effectiveness to ensure that hazardous waste combustion sources are using the best controls for pollutants introduced almost exclusively for the burning of hazardous waste. We do so to provide a strong incentive for waste minimization of lead and cadmium sent for combustion. By providing stringent limits, we can help assure that hazardous waste with lead does not otherwise move from better controlled units in other subcategories to units in this subcategory because of a lesser degree of control. Moreover, this beyond-the-floor semivolatile metal standard supports our Children's Health Initiative in that lead emissions, which are of highest significance to children's health, will be reduced by another 20–25 percent from today's baseline. As part of this initiative, we are committed to reducing lead emissions wherever and whenever possible. Finally, this beyond-the-floor standard is consistent with European Union standards for hazardous waste incinerators of approximately 200 µg/dscm for lead and cadmium combined. For all these reasons, we accept the cost-effectiveness of this level of feedrate control and adopt a beyond-the-floor standard of 240 µg/dscm for existing cement kilns.

Additionally, we received comments shortly before promulgation from the cement kiln industry that expressed their achievability and economic concerns with a beyond-the-floor standard in the range of 240 µg/dscm based on limiting the feedrate of semivolatile metals in the hazardous waste. We considered their comments in adopting the 240 µg/dscm beyond-the-floor standard and included a copy of their November 18, 1998 presentation to the Office of Management and Budget in the docket along with our responses to their concerns, many of which are addressed above.

ii. Improved Particulate Matter Control. We also evaluated improved particulate matter control as a beyond-the-floor control option for improved semivolatile metals control. Cadmium and lead are volatile at the high temperatures within the cement kiln itself, but typically condense onto the fine particulate at control device temperatures, where they are collected. As a result, control of semivolatile metals emissions is closely associated with particulate matter control. Examples of improved particulate matter control include the use of more expensive fabric filter bags, optimizing the design and operation features of the existing control equipment, and the addition to or the replacement of control equipment with a new fabric filter.

We evaluated the costs to achieve a beyond-the-floor emission level of 240 µg/dscm based on improved particulate matter control. The national incremental annualized compliance cost for cement kilns to meet this beyond-the-floor level, rather the floor level, would be approximately $4.1 million for the entire hazardous waste burning cement kiln industry and would provide an incremental reduction in semivolatile metal emissions beyond the MACT floor controls of 5.5 Mg/yr. Because this beyond-the-floor control option would have a cost-effectiveness of approximately $800,00 per additional Mg of semivolatile metal removed, contrasted to a cost-effectiveness of approximately $500,000 using hazardous waste feedrate control and remove an identical amount of semivolatile metals, we conclude that basing the beyond-the-floor standard on improved particulate matter control is not warranted.

iii. Limiting the Feedrate of Semivolatile Metals in Raw Materials. A source can achieve a reduction in semivolatile metal emissions by substituting a feed material containing lower levels of lead and/or cadmium for a primary raw material with higher levels of these metals. We expect this beyond-the-floor option to be less cost-effective compared to either of the options evaluated above. Cement kilns are sited proximate to primary raw material supply and transporting large quantities of an alternative source of raw material(s) is likely to be cost-prohibitive. Therefore, we are not adopting a semivolatile metal beyond-the-floor standard based on limiting the feedrate of semivolatile metals in raw materials.[137]

Thus, the promulgated semivolatile metals standard for existing hazardous waste burning cement kilns is a beyond-the-floor standard of 240 µg/dscm based on limiting the feedrate of semivolatile metals in the hazardous waste.

c. What Is the MACT Floor for New Sources? In the proposal, we defined floor control as a fabric filter with an air-to-cloth ratio less than 2.1 acfm/ft^2 and a hazardous waste feedrate level of 36,000 µg/dscm, expressed as a maximum theoretical emission concentration. The proposed floor emission level for new cement kilns was 55 µg/dscm. (See 61 FR at 17400.) In the May 1997 NODA, we concluded that the floor control and emission level for existing sources for semivolatile metals also would be appropriate for new sources. Floor control was based on a combination of good particulate matter control *and* limiting hazardous waste feedrate of semivolatile metals. We used a breakpoint analysis of the semivolatile metal emissions data to exclude sources achieving substantially poorer semivolatile metal control than the majority of sources because of atypically high semivolatile metals feedrates or poor emission control. We established the floor level at the test condition average of the breakpoint source: 670 µg/dscm. (See 62 FR at 24229.)

As discussed above for existing sources, we developed the final rule

[136] USEPA, ''Final Technical Support document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies'', July 1999.

[137] We, however, reject the proposition in comments that we are without legal authority to regulate HAPs in raw materials processed in cement kilns based on legislative history to the 1990 amendments. This legislative history is not reflected in the statutory text, which unambiguously gives us that authority.

using the aggregate feedrate approach to identify MACT floors for the metals. See Methodology Section for detailed discussion of aggregate feedrate approach. Using this approach, we establish the semivolatile metal floor emission level for new sources at 180 μg/dscm.

d. What Are Our Beyond-the-Floor Considerations for New Sources? In the April 1996 NPRM and May 1997 NODA, we considered a semivolatile metal beyond-the-floor emission level for new sources, but determined that it would not be cost-effective.

For the final rule, we do not consider a beyond-the-floor level for new cement kilns because the MACT floor for new cement kilns is already lower than the beyond-the-floor emission standard for existing sources. As a result, a beyond-the-floor standard for new cement kilns is not warranted due to the likely significant costs of control and the minimal incremental emissions reductions. In addition, our policy goal of state of the art control of lead is achieved at the floor standard for new sources. We, therefore, adopt a semivolatile metal floor standard of 180 μg/dscm for new hazardous waste burning cement kilns.

6. What Are the Low Volatile Metals Standards?

We establish standards for existing and new cement kilns in today's rule that limit low volatile metal emissions to 56 and 54 μg/dscm, respectively. The rationale for these standards is discussed below.

a. What Is the MACT Floor tor Existing Sources? In the April 1996 NPRM, we defined floor control as either: (1) A fabric filter with an air-to-cloth ratio less than 2.3 acfm/ft^2 and a hazardous waste feedrate level of 140,000 μg/dscm, expressed as a maximum theoretical emission concentration; or (2) an electrostatic precipitator with a specific collection area of 350 ft^2/kacfm and the same hazardous waste feedrate level of 140,000 μg/dscm. The proposed floor level was 130 μg/dscm. (See 61 FR at 17396.) In the May 1997 NODA, we used a breakpoint analysis to identify sources that were not using floor control with respect either to low volatile metals hazardous waste feedrate or emissions control. Under this approach, we ranked low volatile metals emissions data from sources that were achieving the particulate matter floor of 69 mg/dscm or better. We identified the floor level as the test condition average associated with the breakpoint source. Thus, sources with atypically high emissions because of high low volatile metals feedrates or poor low volatile metals control, even though they were using floor control for particulate matter, were screened from the pool of sources used to define the floor emission level. The May 1977 NODA MACT floor level was 63 μg/dscm. (See 62 FR at 24229.)

We received limited comments in response to the NPRM and May 1997 NODA concerning the low volatile metals floor standard. We received comments, however, on several overarching issues including the appropriateness of considering feedrate control of metals including low volatile metals in hazardous waste as a MACT floor control technique and the specific procedure of identifying breakpoints in arrayed emissions data. These issues and our responses to them are discussed in the floor methodology section in Part Four, Section V.

Today we use a revised engineering evaluation and data analysis method to establish the MACT floor for low volatile metals on the same underlying data previously noticed for comment. As explained earlier, the aggregate feedrate approach, in conjunction with floor control for particulate matter, replaces the breakpoint analysis for metals and results in a low volatile metal floor emission level of 56 μg/dscm.

We estimate that over 76 percent of cement kilns in our data base meet the floor level. The national annualized compliance cost for cement kilns to reduce low volatile metal emissions to comply with the floor level is $0.8 million for the entire hazardous waste burning cement industry, and will reduce low volatile metal emissions by 0.2 Mg/yr or approximately 25 percent from current baseline emissions.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? In the proposal, we considered a beyond-the-floor standard for low volatile metals based on improved particulate matter control. However, we concluded that a beyond-the-floor standard would not likely be cost-effective based on the limited emissions reductions of low volatility metals. In the May 1997 NODA, we considered a lower particulate matter emissions level, based on improved particulate matter control, as a beyond-the-floor standard with corresponding beyond-the-floor reductions in low volatile and semivolatile metals. Even though we did not quantify cost-effectiveness values, we expressed concern that a beyond-the-floor standard would not likely be cost-effective. (62 FR at 24229.)

For today's final rule, we identified three potential beyond-the-floor techniques for control of low volatile metals: (1) Improved particulate matter control; (2) limiting the feedrate of low volatile metals in the hazardous waste; and (3) limiting the feedrate of low volatile metals in the raw materials. We discuss the results of our analysis of each option below.

Improved Particulate Matter Control. Our judgment is that a beyond-the-floor standard based on improved particulate matter control would be less cost-effective than a beyond-the-floor standard based on limiting the feedrate of low volatile metals in the hazardous waste. First, our data show that all cement kilns are already achieving greater than a 99% system removal efficiency for low volatile metals, with most attaining 99.99% removal. Thus, equipment retrofit costs for improved control would be significant and result in only a small increment in reduction of emissions. Our beyond-the-floor analysis for semivolatile metals supports this conclusion. There, the semivolatile metals analysis showed that the beyond-the-floor option based on limiting the feedrate of semivolatile metals was approximately 30% more cost-effective than a beyond-the-floor option based on improved particulate matter control. We believe the low volatile metals would require similar particulate matter control device retrofits at cement kilns as for semivolatile metals. However, the total emissions reduction achieved would be less because hazardous waste burning cement kilns emit less low volatile metals than semivolatile metals. We do not have any of the serious concerns present for semivolatile metals that suggest we should accept a more marginal cost-effectiveness. Thus, we conclude that a beyond-the-floor standard for low volatile metals based on improved particulate matter control is not warranted.

Limiting the Feedrate of Low Volatile Metals in the Hazardous Waste. We also considered a beyond-the-floor standard of 40 μg/dscm for low volatile metals based on additional feedrate control of low volatile metals in the hazardous waste. This would reduce the floor emission level by approximately 30 percent. Our investigation shows that this beyond-the-floor option would achieve an incremental reduction in low volatile metals of only 0.1 Mg/yr. Given that this beyond-the-floor level would not achieve appreciable emissions reductions, we conclude that cost-effectiveness considerations would likely come into play suggesting that this beyond-the-floor standard is not warranted.

Limiting the Feedrate of Low Volatile Metals in the Raw Materials. Sources can achieve a reduction in low volatile metal emissions by substituting a feed material containing lower levels of arsenic, beryllium, and/or chromium for a primary raw material with higher levels of these metals. We believe that this beyond-the-floor option would be even less cost-effective than either of the options evaluated above, however. Cement kilns are sited proximate to primary raw material supply and transporting large quantities of an alternative source of raw material(s) is likely to be cost-prohibitive. Therefore, we do not adopt a low volatile metal beyond-the-floor standard based on limiting the feedrate of low volatile metals in raw materials.

For the reasons discussed above, we do not adopt a beyond-the-floor level for low volatile metals and establish the emission standard for existing hazardous waste burning cement kilns at 56 µg/dscm.

c. What Is the MACT Floor for New Sources? In the proposal, we defined floor control as a fabric filter with an air-to-cloth ratio less than 2.3 acfm/ft^2 and a hazardous waste feedrate control level of 25,000 µg/dscm, expressed as a maximum theoretical emission concentration. The proposed floor for new cement kilns was 44 µg/dscm. (61 FR at 17400.) In the May 1997 NODA, we concluded that the floor control and emission level for existing sources for low volatile metals would also be appropriate for new sources. Floor control was based on a combination of good particulate matter control and limiting hazardous waste feedrate of low volatile metals. We used a breakpoint analysis of the low volatile metal emissions data to exclude sources achieving substantially poorer low volatile metal control than the majority of sources. We established the floor level at the test condition average of the breakpoint source. The NODA floor was 63 µg/dscm. (62 FR at 24230.)

As discussed above for existing sources, in developing the final rule we use the aggregate feedrate approach to identify MACT floors for the metals and hydrochloric acid/chlorine gas in combination with MACT floor control for particulate matter. Based on the low volatile metal feedrate in hazardous waste from the single best performing cement kiln using floor control for particulate matter, the MACT floor for new hazardous waste burning cement kilns is 54 µg/dscm.

d. What Are Our Beyond-the-Floor Considerations for New Sources? In the proposal and May 1997 NODA, we considered a low volatile metal beyond-the-floor level for new sources, but determined it would not be cost effective. For reasons similar to those discussed for existing sources, we do not believe that a beyond-the-floor standard is warranted for new cement kilns due to the high expected compliance cost and relatively low reductions in emissions of low volatile metals. Therefore, we adopt a low volatile metals standard of 54 µg/dscm for new hazardous waste burning cement kilns.

7. What Are the Hydrochloric Acid and Chlorine Gas Standards?

In today's rule, we establish standards for existing and new cement kilns that limit hydrochloric acid and chlorine gas emissions to 130 and 86 ppmv, respectively. The rationale for these standards is discussed below.

a. What Is the MACT Floor for Existing Sources? In the proposal, we identified floor control for hydrochloric acid/chlorine gas as feedrate control of chlorine in the hazardous waste and proposed a floor standard of 630 ppmv. (61 FR at 17396.) In the May 1997 NODA, we used a data analysis method similar to that at proposal and discussed a floor emission level of 120 ppmv. (62 FR at 24230.)

Some commenters to the May 1997 NODA expressed concern that cement kilns may not be able to meet the hydrochloric acid/chlorine gas standard while making low alkali cement. Commenters noted that chlorine is sometimes added specifically to volatilize potassium and sodium compounds that must be removed to produce low alkali cement. One commenter manufacturing a low alkali cement submitted data showing a large range in hydrochloric acid/chlorine gas emissions while operating under varying conditions and production requirements. This commenter stated that they may not be able to meet the NODA hydrochloric acid/chlorine gas standard of 120 ppmv while making low alkali cement. We conclude, however, that the data they submitted do not adequately support this ultimate conclusion. The commenter's emissions data range from 6 ppmv to 83 ppmv while operating under RCRA compliance testing conditions. These emission levels are well below the final standard of 130 ppmv, and the expected operational range in this rule is 70% of the standard. We conclude that the hydrochloric acid/chlorine gas standard of 130 ppmv finalized today is readily achievable by all cement kilns irrespective of the type of cement manufactured.

For today's rule, we use a revised engineering evaluation and data analysis method to establish the MACT floor for hydrochloric acid and chlorine gas on the same underlying data previously noticed for comment. Using the aggregate feedrate approach discussed previously, we establish a hydrochloric acid/chlorine gas floor emission level of 130 ppmv.

We estimate that approximately 88 percent of cement kilns in our data base currently meet the floor level. The national annualized compliance cost for cement kilns to reduce hydrochloric acid/chlorine gas emissions to comply with the floor level is $1.4 million for the entire hazardous waste burning cement industry and will reduce hydrochloric acid/chlorine gas emissions by 383 Mg/yr or 12 percent from current baseline emissions.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? In the proposal, we defined beyond-the-floor control as wet scrubbing with a 99 percent removal efficiency, but determined that a beyond-the-floor standard would not be cost-effective. (61 FR at 17397.) In the May 1997 NODA, we identified a more stringent floor standard and therefore reasoned that a beyond-the-floor standard based on wet scrubbing would likely also not be cost-effective. (62 FR at 24230.)

For today's rule, we identified three potential beyond-the-floor techniques for control of hydrochloric acid/chlorine gas emissions: (1) Scrubbing; (2) limiting the feedrate of chlorine in the hazardous waste; and (3) limiting the feedrate of chlorine in the raw materials. We discuss our analysis of each option below.

Scrubbing. We continue to believe that a beyond-the-floor standard based on dry or wet scrubbing is not likely to be cost-effective. Cement kilns achieve control of hydrochloric acid/chlorine gas emissions from alkaline raw materials in the kiln. Control effectiveness varies among kilns based on the alkalinity of the raw materials. Thus, the cement manufacturing process serves essentially as a dry scrubber. We conclude, therefore, that the addition of a dry scrubber will only marginally improve hydrochloric acid/chlorine gas removal and is not warranted as beyond-the-floor control.

It is also our judgment that a beyond-the-floor standard based on wet scrubbing is not warranted. The total estimated engineering retrofit costs would be approximately equivalent to those identified at proposal for this option. However, emissions reductions would be less given that the final MACT floor level is more stringent than the level proposed. Therefore, the cost-effectiveness of a beyond-the-floor standard would be less attractive than the number we rejected at proposal. As a result, we must reaffirm that conclusion here.

Limiting the Feedrate of Chlorine in the Hazardous Waste. We also considered a beyond-the-floor standard for hydrochloric acid/chlorine gas based on additional feedrate control of chlorine in the hazardous waste. We are concerned, however, that cement kilns making low alkali cement may not be able to achieve a beyond-the-floor standard by controlling feedrate of chlorine in the hazardous waste. As noted above, chlorine is sometimes added specifically to volatilize potassium and sodium compounds that must be removed from the clinker to produce low alkali cement. Based on limited data submitted by a cement facility manufacturing low alkali cement, achievability of a beyond-the-floor standard of 70 ppmv, representing a 45% reduction from the floor level, may not be feasible for this source using feedrate control and others by inference. Therefore, we conclude that a beyond-the-floor standard based on chlorine feedrate control in the hazardous waste is not appropriate.

Limiting the Feedrate of Chlorine in the Raw Materials. A source can achieve a reduction in hydrochloric acid/chlorine gas emissions by substituting a feed material containing lower levels of chlorine for a primary raw material with higher levels of chlorine. This beyond-the-floor option is less cost-effective compared to the scrubbing options evaluated above because cement kilns are sited proximate to the primary raw material supply and transporting large quantities of an alternative source of raw material(s) is not technically achievable. Therefore, we do not adopt a hydrochloric acid/chlorine gas beyond-the-floor standard based on limiting the feedrate of chlorine in raw materials.

In summary, we establish the hydrochloric acid/chlorine gas standard for existing hazardous waste burning cement kilns at the floor level of 130 ppmv.

c. What Is the MACT Floor for New Sources? At proposal, we defined floor control for new sources as hazardous waste feedrate control for chlorine and the proposed floor level was 630 ppmv. (See 61 FR at 17401.) In the May 1997 NODA, we concluded that the floor control and emission level for existing sources for hydrochloric acid/chlorine gas would also be appropriate for new sources. Floor control was based on limiting hazardous waste feedrates of chlorine. After screening out some data with anomalous system removal efficiencies compared to the majority of sources, we established the floor level at the test condition average of the breakpoint source. We identified a floor level for new kilns of 120 ppmv. (See 62 FR at 24230.)

As discussed above for existing sources, in developing the final rule, we use the aggregate feedrate approach to identify MACT floors for hydrochloric acid/chlorine gas. The resulting MACT emissions floor for new hazardous waste burning cement kilns is 86 ppmv.

d. What Are Our Beyond-the-Floor Considerations for New Sources? In the proposal, we considered a beyond-the-floor standard for new cement kilns of 67 ppmv based on wet scrubbing and concluded that it would not be cost-effective. In the May 1997 NODA, we also concluded that a beyond-the-floor standard based on wet scrubbing would likewise not be cost-effective. Considering the level of the floor standard for new kilns, we do not believe that a more stringent beyond-the-floor standard is warranted for the final rule, especially considering our concerns for cement kilns manufacturing low alkali cements.

In summary, we adopt the floor level of 86 ppmv as the standard for hydrochloric acid/chlorine gas for new sources.

8. What Are the Hydrocarbon and Carbon Monoxide Standards for Kilns Without By-Pass Sampling Systems? [138]

See § 63.1205(a)(5) and (b)(5).

In today's rule, we establish hydrocarbon and carbon monoxide standards for new and existing cement kilns without by-pass sampling systems as surrogates to control emissions of nondioxin organic hazardous air pollutants. The standards for existing sources limit hydrocarbon or carbon monoxide concentrations to 20 ppmv [139] or 100 ppmv, [140] respectively. The standards for new sources limit: (1) Hydrocarbons to 20 ppmv; or (2) carbon monoxide to 100. New, greenfield [141] kilns that elect to comply with the 100 ppmv carbon monoxide standard, however, must also comply with a 50 ppmv [142] hydrocarbon standard. New and existing sources that elect to comply with the 100 ppmv carbon monoxide standard, including new greenfield kilns that elect to comply with the carbon monoxide standard and 50 ppmv hydrocarbon standard, must also demonstrate compliance with the 20 ppmv hydrocarbon standard during the comprehensive performance test.[143] (See Part Four, Section IV.B of the preamble for the rationale for this requirement.) We discuss the rationale for these standards below.

a. What Is the MACT Floor for Existing Sources? As discussed in Part Four, Section II.B.2, we proposed limits on hydrocarbon emissions for kilns without by-pass sampling systems as a surrogate to control nondioxin organic hazardous air pollutants. In the April 1996 proposal (61 FR at 17397), we identified a hydrocarbon floor emission level of 20 ppmv for cement kilns not equipped with by-pass sampling systems, and proposed that floor control be based on the current federally-enforceable RCRA boiler and industrial furnace standards, control of organics in raw materials coupled with operating under good combustion practices to minimize fuel-related hydrocarbon. In the May 1997 NODA, we also indicated that this approach was appropriate.

Some commenters stated that a carbon monoxide limit of 100 ppmv was necessary for these cement kilns to better control organic hazardous air pollutants. Commenters also wrote that, alone, neither carbon monoxide nor hydrocarbons is an acceptable surrogate for organic hazardous air pollutant emissions. Additionally, commenters suggested that by requiring both carbon monoxide and hydrocarbon limits, we would further reduce emissions of organic hazardous air pollutants.

We conclude that continuous compliance with both a carbon monoxide and hydrocarbon standard is unwarranted for the following reasons. First, stack gas carbon monoxide levels are not a universally reliable indicator

[138] See USEPA, ''Final Technical Support Document for Hazardous Waste Combustor MACT Standards, Volume I: Description of Source Categories,'' July 1999, for further explanation of by-pass and midkiln sampling systems. Hydrocarbon and carbon monoxide standards for kilns equipped with by-pass sampling systems are discussed in Section VI.D.9 f the text.

[139] Hourly rolling average, reported as propane, dry basis, and corrected to 7% oxygen.

[140] Hourly rolling average, dry basis, corrected to 7% oxygen.

[141] A greenfield cement kiln is a kiln that commenced construction or reconstruction after April 19, 1996 at a site where no cement kiln previously existed, irrespective of the class of kiln (i.e., nonhazardous waste or hazardous waste burning). A newly constructed or reconstructed cement kiln at an existing site would not be classified as a greenfield cement kiln, and would be subject to the same carbon monoxide and hydrocarbon standards as an existing cement kiln.

[142] Thirty day block average, reported as propane, dry basis, and corrected to 7 percent oxygen.

[143] As discussed in Part 5, Section X.F, sources that feed hazardous waste at a location other than the end where products are normally discharged and where fuels are normally fired must comply with the 20 ppmv hydrocarbon standard i.e., these sources do not have the option to comply with the carbon monoxide standard).

of combustion intensity and efficiency for kilns without by-pass sampling systems. This is due to carbon monoxide generation by disassociation of carbon dioxide to carbon monoxide at the high sintering zone temperatures and evolution of carbon monoxide from the trace organic constituents in raw material feedstock.[144] (See 56 FR at 7150, 7153–55). Thus, carbon monoxide can be a too conservative surrogate for this type of kiln for potential emissions of hazardous air pollutants from combustion of hazardous waste. There are other sources of carbon monoxide unrelated to combustion of hazardous waste.[145]

Second, requiring continuous compliance with both a carbon monoxide and hydrocarbon emission limitation in the stack can be redundant for control of organic emissions from combustion of hazardous waste because: (1) Hydrocarbon alone is a direct and reliable surrogate for organic hazardous air pollutants; and (2) in most cases carbon monoxide is a conservative indicator of good combustion conditions and thus good control of organic hazardous air pollutants. As discussed in the following paragraphs, however, we have concluded that a source must demonstrate compliance with the hydrocarbon standard during the comprehensive performance test if it elects to continuously comply with the carbon monoxide standard to ensure that carbon monoxide is an adequate continuously monitored indicator of combustion efficiency. See Part Four, Section IV of the preamble for a discussion of the merits of using limits on stack gas concentrations of carbon monoxide and hydrocarbon to control organic emissions.

One commenter suggested cement kilns be given the option to comply with a carbon monoxide limit of 100 ppmv instead of the 20 ppmv hydrocarbon limit. The commenter emphasized that this option is currently allowed under the RCRA boiler and industrial furnace regulations, and that it would be conservative because hydrocarbon levels would always be below 20 ppmv when carbon monoxide levels are below 100 ppmv. As discussed below, we agree that cement kilns should be given the option to comply with either standard, but do not agree that compliance with the carbon monoxide standard ensures compliance with the hydrocarbon standard.

We have determined that it is necessary to require a source that elects to continuously comply with the carbon monoxide standard to also demonstrate compliance with the 20 ppmv hydrocarbon standard during the comprehensive performance test. We concluded that this requirement is necessary because we have limited data that shows a source can produce high hydrocarbon emissions while simultaneously producing low carbon monoxide emissions. This requirement to demonstrate compliance with the hydrocarbon standard during the performance test is sufficient to ensure that carbon monoxide alone is an appropriate continuously monitored indicator of combustion efficiency. See Part 4, Section IV.B, for a more detailed discussion. Consistent with this principle, incinerators and lightweight aggregate kilns are also required to demonstrate compliance with hydrocarbon standard during the comprehensive performance test if they elect to comply with the carbon monoxide standard.

In today's final rule, we are identifying a carbon monoxide level of 100 ppmv and a hydrocarbon level of 20 ppmv as floor control for existing sources because they are currently enforceable Federal standards for hazardous waste burning cement kilns. See § 266.104(b) and (c). As current rules allow, sources would have the option of complying with either limit. However, sources that elect to comply with the carbon monoxide standard must also demonstrate compliance with the hydrocarbon standard during the comprehensive performance test.

Given that these are current RCRA rules, all cement kilns without by-pass sampling systems can currently achieve these emission levels. Thus, we estimate no emissions reductions (or new costs) for compliance with these floor levels.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? In the April 1996 proposal, we identified beyond-the-floor control levels for carbon monoxide and hydrocarbon in the main stack of 50 ppmv and 6 ppmv, respectively. (See 61 FR at 17397.) These beyond-the-floor levels were based on the use of a combustion gas afterburner. We indicated in the proposal, however, that the beyond-the-floor control was not practical since no kilns currently achieved these emission levels, and because of the high costs to retrofit a kiln with an afterburner.

One commenter wrote that we rejected the 50 ppmv and 6 ppmv beyond-the-floor carbon monoxide and hydrocarbon standards, respectively, without providing any justification. In order to confirm the reasoning discussed above, we have now estimated that the annualized cost for an afterburner for cement kilns will range from $3–8 million dollars per facility.[146] As proposed, and as we reiterated in the May 1997 NODA a beyond-the-floor standard based on an afterburner would be not be cost-effective due to the high retrofit costs and minimal incremental emissions reductions, and we do not adopt a beyond-the-floor standard for existing cement kilns.

In summary, we adopt the floor emission levels as standards for carbon monoxide, 100 ppmv, and hydrocarbons, 20 ppmv.

c. What Is the MACT Floor for New Sources? In the April 1996 proposal (see 61 FR at 17401) and the May 1997 NODA, we identified a new source hydrocarbon floor emission level of 20 ppmv for new cement kilns not equipped with by-pass sampling systems based on the current Federally-enforceable BIF standards. The hydrocarbon limit is based on control of organics in raw materials coupled with good combustion practices.

In developing the final rule, we considered the comment discussed above that the rule should allow compliance with either a carbon monoxide standard of 100 ppmv or a hydrocarbon standard of 20 ppmv. Given that this option is available under the current BIF rule for new and existing sources, we now conclude that it represents MACT floor for new sources, except as discussed below.

As discussed previously, we have also proposed MACT standards for nonhazardous waste burning cement kilns. See 63 FR 14182, March 24, 1998. In that proposal, we determined that some existing sources have used the combination of feed material selection, site location, and feed material blending to optimize operations. We then concluded that site selection based on availability of acceptable raw material hydrocarbon content is a feasible approach to control hydrocarbon emissions at new sources. See 63 FR at 14202–03. We proposed a new source

[144] Raw materials enter the upper end of the kiln and move counter-current to the combustion gas. Thus, as the raw materials are heated in the kiln, organic compounds can evolve from trace levels of organics in the raw materials. These organic compounds can be measured as hydrocarbons and, when only partially oxidized, carbon monoxide. This process is not related to combustion of hazardous waste or other fuels in the combustion zone at the other end of the kiln.

[145] Of course, if a source elects to comply with the carbon monoxide standard, then we are more assured of good combustion conditions in the combustion zone, and thus good control of organic hazardous air pollutants that could be potentially emitted from feeding hazardous waste in the combustion zone.

[146] See 'Final Technical Support Document for Hazardous Waste Combustor MACT Standards, Volume V: Emission Estimates and Engineering Costs'', February, 1999.

floor hydrocarbon emission level of 50 ppmv at nonhazardous waste burning Portland cement kilns because it is being consistently achieved during thirty-day block averaging periods when high hydrocarbon content raw materials are avoided. We have since promulgated a standard of 50 ppmv for hydrocarbons for new nonhazardous waste burning cement kilns. 64 FR 31898.

We now conclude for the same reasons that site selection is floor control for new source, greenfield hazardous waste burning cement kilns [147] and that the floor hydrocarbon emission level is 50 ppmv.[148] Sources must document compliance with this standard for each thirty-day block period of operation. We reconcile this hydrocarbon floor level of 50 ppmv with the floor levels discussed above of 20 ppmv hydrocarbons or 100 ppmv carbon monoxide by establishing the floor as follows. For new source greenfield kilns, the floor is either: (1) 20 ppmv hydrocarbons; or (2) 100 ppmv carbon monoxide and 50 ppmv hydrocarbons. For other new sources not located at greenfield sites, the floor is either 20 ppmv hydrocarbons or 100 ppmv carbon monoxide, which is identical to the standards for existing sources.

The combined 20 ppmv hydrocarbon and 100 ppmv carbon monoxide standards control organic hazardous air pollutant emissions that originate from the incomplete combustion of hazardous waste. The 50 ppmv hydrocarbon standard for new greenfield kilns controls organic hazardous air pollutant emissions that originate from the raw material. We conclude that the 50 ppmv hydrocarbon standard is necessary to deter new kilns from siting at locations that have on-site raw material that is high in organic content, since siting a cement kiln at such a location could result in elevated hydrocarbon emissions.

We considered whether new greenfield kilns would be required to monitor hydrocarbons continuously, or just document compliance with the 50 ppmv limit during the comprehensive performance test. We determined that hydrocarbons must be continuously monitored because compliance with the 100 ppmv carbon monoxide limit may not always ensure compliance with the 50 ppmv hydrocarbon limit. This is because hydrocarbons could potentially evolve from raw materials in the upper drying zone end of the kiln under conditions that inhibit sufficient oxidation of the hydrocarbons to form carbon monoxide.

As with existing sources, we are requiring new sources that elect to continuously comply with the carbon monoxide standard, and new greenfield sources that elect to comply with the carbon monoxide and 50 ppmv hydrocarbon standard, to also demonstrate compliance with the 20 ppmv hydrocarbon standard during the comprehensive performance test. Consistent with this principle, incinerators and lightweight aggregate kilns are also required to demonstrate compliance with the hydrocarbon standard during the comprehensive performance test if they elect to comply with the carbon monoxide standard.

d. What Are Our Beyond-the-Floor Considerations for New Sources? In the April 1996 proposal, we identified beyond-the-floor emission levels for carbon monoxide and hydrocarbon of 50 ppmv and 6 ppmv, respectively, for new sources. (See 61 FR at 17401.) These beyond-the-floor levels were based on the use of a combustion gas afterburner. We indicated in the proposal, however, that beyond-the-floor control was not practical since none of the kilns in our data base are achieving these emission levels, and because of the high costs to retrofit kilns with an afterburner. We reiterated in the May 1997 NODA that a beyond-the-floor standard based on use of an afterburner would not be cost-effective.

One commenter supported these beyond-the-floor standards for new sources, but did not explain why these were considered to be appropriate standards. As discussed above for existing sources, we continue to believe that a beyond-the-floor standard based on use of an afterburner would not be cost-effective.

In summary, we adopt the floor levels as standards for new sources. For new source greenfield kilns, the standard monitored continuously is either: (1) 20 ppmv hydrocarbons; or (2) 100 ppmv carbon monoxide and 50 ppmv hydrocarbons. For other new source kilns, the standard is either 20 ppmv hydrocarbons or 100 ppmv carbon monoxide monitored continuously. New sources that elect to comply with the carbon monoxide standard, and new greenfield sources that elect to comply with the carbon monoxide and 50 ppmv hydrocarbon standard, must also demonstrate compliance with the 20 ppmv hydrocarbon standard, but only during the comprehensive performance test.

9. What Are the Carbon Monoxide and Hydrocarbon Standards for Kilns With By-Pass Sampling Systems? [149]

See § 63.1204(a)(5) and (b)(5).

We establish carbon monoxide and hydrocarbon standards for existing and new cement kilns with by-pass sampling systems as surrogates to control emissions of nondioxin organic hazardous air pollutants.[150] Existing kilns are required to comply with either a carbon monoxide standard of 100 ppmv or a hydrocarbon standard of 10 ppmv on an hourly rolling average basis. Both standards apply to combustion gas sampled in the by-pass or a midkiln sampling port that samples representative kiln gas. Sources that elect to comply with the carbon monoxide standard, however, must also document compliance with the hydrocarbon standard during the comprehensive performance test.[151] See Part Four, Section IV.B of the preamble for the rationale for this requirement.

New kilns are subject to the same by-pass gas carbon monoxide and hydrocarbon standards as existing sources. But, new, greenfield [152] kilns must also comply with a 50 ppmv hydrocarbon standard continuously monitored in the main stack. Sources must document compliance with this standard for each thirty-day block period of operation.

We discuss the rationale for adopting these standards below.

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[147] At least one hazardous waste burning cement kiln in our data base used raw material substitution to control hydrocarbon emissions.

[148] We concluded that this new source hydrocarbon standard of 50 ppms should not apply to new sources that are not located at greenfield sites since these kilns are not capable of using site-selection to control hydrocarbon emissions.

[149] This also includes cement kilns which have midkiln sampling systems. See USEPA, ''Final Technical Support Document for Hazardous Waste Combustor MACT Standards, Volume I: Description of Source Categories,'' July 1999, for further explanation of by-pass and midkiln sampling systems.

[150] As discussed in Part 5, Section X.F, cement kilns equipped with bypass sampling systems that feed hazardous waste at a location other than the end where products are normally discharged and at a location downstream of the bypass sampling location (relative to the combustion gas flow direction) must comply with the 20 ppmv main stack hydrocarbon standard discussed in the previous section in lieu of the bypass gas hydrocarbon standard.

[151] As discussed in Part 5, Section X.F, cement kilns that feed hazardous waste at a location other than the end where products are normally discharged and where fuels are normally fired must comply wit the 10 ppmv hydrocarbon standard (i.e., these sources do not have the option to comply with the carbon monoxide standard).

[152] A greenfield cement kiln is a kiln that commenced construction or reconstruction after April 19, 1996 at a site where no cement kiln previously existed, irrespective of the class of kiln (i.e., nonhazardous waste or hazardous waste burning). A newly constructed or reconstructed cement kiln at an existing site would not be classified as a greenfield cement kiln, and would be subject to the same carbon monoxide and hydrocarbon standards as an existing cement kiln.

a. What Is the MACT Floor for Existing Sources? In the April 1996 proposal, we identified floor carbon monoxide and hydrocarbon emission standards for by-pass gas of 100 ppmv and 6.7 ppmv, respectively. Floor control was good combustion practices. (See 61 FR at 17397.) In the May 1997 NODA, we used an alternative data analysis method to identify a hydrocarbon floor level of 10 ppmv.[153] See 62 FR at 24230. Our decision to use engineering information and principles to set the proposed floor standard was based, in part, on the limited hydrocarbon data in our data base. In addition, we reasoned that the hydrocarbon levels being achieved in an incinerator, (*i.e.*, 10 ppmv) are also being achieved in a cement kiln's by-pass duct.[154]

Some commenters stated that we did not have sufficient hydrocarbon emissions data from cement kilns equipped with by-pass sampling systems to justify a by-pass duct hydrocarbon standard. We disagree and conclude that we have adequate data because the MACT data base includes seven cement kilns that monitored hydrocarbons at the bypass sampling location. These sources are achieving hydrocarbon levels of 10 ppmv or less.[155] The fact that these sources achieve hydrocarbon levels below 10 ppmv supports our use of engineering information and principles to set the floor limit at 10 ppmv.[156]

Many commenters questioned whether cement kilns with by-pass sampling systems should comply with both a hydrocarbon and carbon monoxide standard. Those in favor of requiring cement kilns to comply with both standards wrote that neither carbon monoxide nor hydrocarbons are sufficient surrogates for organic hazardous air pollutant emissions. Commenters also noted that by requiring both a carbon monoxide and hydrocarbon limit, we would achieve appropriate organic hazardous air pollutant emission reductions. Other commenters wrote that continuous compliance with both a hydrocarbon and a carbon monoxide standard would be redundant and unnecessarily costly. We agree with the latter view, in that requiring continuous compliance with both standards for bypass gas is redundant for control of organic emissions from combustion of hazardous waste because, as previously discussed: (1) Hydrocarbon alone is a direct and reliable surrogate for organic hazardous air pollutants; and (2) in most cases, carbon monoxide is a conservative indicator of good combustion conditions and thus good control of organic hazardous air pollutants. However, as discussed earlier, we have concluded that a source must demonstrate compliance with the hydrocarbon standard during the comprehensive performance test if it elects to continuously comply with the carbon monoxide standard to ensure that carbon monoxide is an adequate continuously monitored indicator of combustion efficiency. See discussion in Part Four, Section IV.B of the preamble for more discussion on this issue.

One commenter stated that due to some by-pass gas quenching methods, and the need to correct for moisture and oxygen, it may not be possible to accurately measure hydrocarbons to the level of the proposed standard, i.e., 6.7 ppmv. We disagree with this reasoning because, as explained in the technical support document, cement kiln by-pass hydrocarbon levels should be reasonably achievable and measurable by decreasing the span and increasing the calibration frequency of the hydrocarbon monitor.[157] We also note that a cement kiln has the option to petition the Administrator for alternative monitoring approaches under § 63.8(f) if the source has valid reasons why a total hydrocarbon monitor cannot be used to document compliance.

We conclude that floor control can achieve by-pass gas emission levels of 100 ppmv for carbon monoxide and 10 ppmv for hydrocarbons. As discussed in Part Four, Section IV.B, a source may comply with either standard. If the source elects to comply with the carbon monoxide standard, however, it must also demonstrate compliance with the hydrocarbon standard during comprehensive performance testing.

We estimate that all cement kilns with by-pass sampling systems can currently achieve the carbon monoxide floor of 100 ppmv. We also estimate that approximately 97 percent of cement kilns with by-pass sampling systems meet the hydrocarbon floor level of 10 ppmv. The national annualized compliance cost for cement kilns to comply with the floor level is $37K and hydrocarbon emissions will be reduced by 11 Mg/yr, two percent from current baseline emissions .

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? In the April 1996 proposal, we identified a beyond-the-floor control level for carbon monoxide and hydrocarbons in the main stack of 50 ppmv and 6 ppmv, respectively, based on the use of a combustion gas afterburner. (See 61 FR at 17399.) We indicated in the proposal that this beyond-the-floor level was not practical, however, since none of the kilns currently achieve these emission levels and because of the high costs of retrofitting kilns with an afterburner. We estimate that the annualized cost for each cement kiln to operate afterburners range from three to eight million dollars.[158] We continue to believe that it is not cost-effective based on the high retrofit costs and minimal incremental emissions reductions to adopt these beyond-the-floor standards.

In the April 1996 NPRM, we also considered limiting main stack hydrocarbon emissions to a beyond-the-floor level of 20 ppmv based on the use of a low-organic raw material.[159] This was in addition to floor controls limiting carbon monoxide and/or hydrocarbon levels in the by-pass. See 61 FR at 17398. We considered this beyond-the-floor option to address concerns that: (1) organics desorbed from raw materials may contain hazardous air pollutants, even absent any influence from burning hazardous waste; and, (2) it is reasonable to hypothesize that the chlorine released from burning hazardous waste can react with the organics desorbed from the raw material to form generally more toxic chlorinated hazardous air pollutants. Many commenters supported this approach. For the reasons discussed below, however, we conclude it is not appropriate to adopt this beyond-the-

[153] The proposed hydrocarbon standard of 6.7 ppmv was based on a statistical and breakpoint analysis. Today's final rule, consistent with May 1997 NODA, instead uses engineering information and principles to identify the floor hydrocarbon level of 10 ppmv.

[154] See USEPA, ''Final Technical Support Document for Hazardous Waste Combustor MACT Standards, Volume III: Selection of MACT Standards and Technologies,'' February, 1999.

[155] Four of these kilns have ceased hazardous waste operations, and one of the kilns collected that data during time periods other than Certification of Compliance testing.

[156] We note that we could have elected to establish this 10 ppmv hydrocarbon standard as a beyond-the-floor standard rather than a floor standard.

[157] See USEPA, ''Final Technical Support Document for Hazardous Waste Combustor MACT Standards, Volume III: Selection of MACT Standards and Technologies,'' February, 1999.

[158] See ''Final Technical Support Document for Hazardous Waste Combustor MACT Standards, Volume V: Emission Estimates and Engineering Costs'', February, 1999.

[159] The definition of floor control for existing cement kilns equipped with by-pass sampling systems does not include the use of low organic raw material. Although we have limited data indicating that some kilns used low organic raw material to control hydrocarbon emissions, there are enough facilities using this method of control to establish it as a floor control for existing sources.

floor hydrocarbon standard for existing sources.

Also, many commenters stated that we should establish a main stack hydrocarbon standard because, as stated above, hazardous waste combustion byproducts from cement kilns, particularly chlorine, can react with organic compounds desorbed from raw materials to form hazardous air pollutants. Commenters believe that an additional main stack hydrocarbon emission standard would limit the emissions of chlorinated organic hazardous air pollutants that are generated due to the interaction of the hazardous waste combustion byproducts and the organics desorbed from the raw material.

We disagree that a main stack hydrocarbon emission limit is an appropriate beyond-the-floor control for existing sources. First, we do not believe it is cost-effective to require an existing kiln to substitute its raw material with an off-site raw material.[160] Cement kilns are sited proximate to the primary raw material supply and transporting large quantities of an alternative source of raw material(s) is likely to be very costly. Second, establishing a main stack hydrocarbon limit for existing sources is likely to be counter-productive in controlling organic hazardous air pollutants. It may compel the operator to avoid the unacceptable costs of importing low organic raw material by increasing back-end kiln temperatures to oxidize organics desorbed from raw material, thus lowering hydrocarbon levels. This increase in temperature may result in increased dioxin formation and is counter to our dioxin control strategy. Third, it is debatable whether there is a strong relationship between chlorine feedrates and chlorinated organic hazardous air pollutant emissions, as is suggested by commenters.[161] Finally, we anticipate that any potential risks associated with the possible formation of these chlorinated hazardous air pollutants at high hydrocarbon emission levels can be adequately addressed in a site-specific risk assessment conducted as part of the RCRA permitting process. This increased potential for emissions of chlorinated hazardous air pollutants is not likely to warrant evaluation via a site-specific risk assessment under RCRA, however, unless main stack hydrocarbon levels are substantially higher than the 20 ppmv limit currently applicable under RCRA for cement kilns not equipped with by-pass systems.

In summary, we adopt the floor levels as standards for carbon monoxide, 100 ppmv, and hydrocarbons, 10 ppmv. As discussed above, a source may comply with either standard. If the source elects to comply with the carbon monoxide standard, however, it must also demonstrate compliance with the hydrocarbon standard during comprehensive performance testing.

c. What Is the MACT Floor for New Sources? In the April 1996 proposal, we identified new source floor standards for carbon monoxide and hydrocarbon emissions in the by-pass of 100 ppmv and 6.7 ppmv, respectively. We identified good combustion practices as floor control. (See 61 FR at 17401.) In the May 1997 NODA, we used an alternative data analyses method, in part, to identify an alternative new source hydrocarbon floor level. (See 62 FR at 24230.) As a result of this analysis and the use of engineering information and principles, we identified a floor hydrocarbon emission level of 10 ppmv in the by-pass for new cement kilns. We continue to believe that the new source hydrocarbon floor methodology discussed in the May 1997 NODA, and the new source carbon monoxide floor methodology discussed in the April 1996 proposal, are appropriate. Therefore, we adopt these floor emission levels for by-pass gas in today's final rule.

We also establish a 50 ppmv hydrocarbon floor level for the main stack of new greenfield kilns. As discussed above (Part Four, Section VII.8.c), we concluded during development of the final rule that some cement kilns are currently controlling their feed material selection, site location, and feed material blending to optimize operations. Because these controls can be used to control hydrocarbon content of the raw material and, thus, hydrocarbon emissions in the main stack, they represent floor control for main stack hydrocarbons for new sources.[162] We established a floor hydrocarbon emission level of 50 ppmv because it is being consistently achieved during thirty-day block averaging periods when high hydrocarbon content raw materials are avoided.

d. What Are Our Beyond-the-Floor Considerations for New Sources? In the April 1996 proposal, we identified main stack beyond-the-floor emission levels for carbon monoxide and hydrocarbon of 50 ppmv and 6 ppmv, respectively, for new sources. (See 61 FR at 17401.) These beyond-the-floor levels were based on the use of a combustion gas afterburner. We indicated in the proposal, however, that beyond-the-floor control was not practical since none of the kilns in our data base are achieving these emission levels, and because of the high costs to retrofit kilns with an afterburner. We reiterated in the May 1997 NODA, that a beyond-the-floor standard based on use of an afterburner would not be cost-effective.

One commenter wrote that we rejected these beyond-the-floor carbon monoxide and hydrocarbon standards without providing any justification. Another commenter supported these beyond-the-floor standards for new sources. As discussed above (in greater detail) for existing sources, we continue to believe that a beyond-the-floor standard based on use of an afterburner would not be cost-effective.

In the April 1996 proposal, we considered limiting main stack hydrocarbon emissions at new sources equipped with by-pass sampling systems to a beyond-the-floor level of 20 ppmv.[163] This addressed concerns that: (1) Organics desorbed from raw materials contain hazardous air pollutants, even absent any influence from burning hazardous waste; and (2) it is reasonable to hypothesize that the chlorine released from burning hazardous waste can react with the organics desorbed from the raw material to form generally more toxic chlorinated hazardous air pollutants. Although not explicitly stated, beyond-the-floor control would have been control of feed material selection, site location, and feed material blending to control the hydrocarbon content of the raw material and, thus, hydrocarbon emissions in the main stack. As discussed above, however, we adopt today a main stack hydrocarbon floor standard of 50 ppmv for newly constructed greenfield cement kilns equipped with by-pass systems. We are not adopting a main stack beyond-the floor hydrocarbon standard of 20 ppmv for these kilns because we

[160] We did not quantify actual costs associated with raw material substitution due to the lack of information.

[161] It is true that some studies have shown a relationship between chlorine levels in the flue gas and the generation of chlorobenzene in cement kiln emissions: the more chlorine, the more chlorobenzene is generated. Some full-scale tests, however, have shown that there is no observable or consistent trend when comparing ''baseline'' (*i.e.,* nonhazardous waste operation) organic hazardous air pollutant emissions with organic hazardous air pollutant emissions associated with hazardous waste operations, as well as comparing hazardous waste conditions with varying levels of chlorine. See USEPA, ''Final Technical Support Document for Hazardous Waste Combustor MACT Standards, Volume III: Selection of MACT Standards and Technologies,'' July 1999, for further discussion.

[162] At least one hazardous waste burning cement kiln in our data base used raw material substitution to control hydrocarbon emissions.

[163] This was in addition to limiting hydrocarbon and/or carbon monoxide at the by-pass sampling location.

are concerned that it may not be readily achievable using beyond-the-floor control.

In summary, we establish the following standards for new sources based on floor control: (1) By-pass gas emission standards for carbon monoxide and hydrocarbons of 100 ppmv and 10 ppmv, respectively;[164] and (2) a main stack hydrocarbon standard of 50 ppmv at greenfield sites.

10. What Are the Destruction and Removal Efficiency Standards?

We establish a destruction and removal efficiency (DRE) standard for existing and new cement kilns to control emissions of organic hazardous air pollutants other than dioxins and furans. Dioxins and furans are controlled by separate emission standards. See discussion in Part Four, Section IV.A. The DRE standard is necessary, as previously discussed, to complement the carbon monoxide and hydrocarbon emission standards, which also control these hazardous air pollutants.

The standard requires 99.99 percent DRE for each principal organic hazardous constituent (POHC), except that 99.9999 percent DRE is required if specified dioxin-listed hazardous wastes are burned. These wastes are listed as—F020, F021, F022, F023, F026, and F027—RCRA hazardous wastes under part 261 because they contain high concentrations of dioxins.

a. What Is the MACT Floor for Existing Sources? Existing sources are currently subject to DRE standards under § 266.104(a) that require 99.99 percent DRE for each POHC, except that 99.9999 percent DRE is required if specified dioxin-listed hazardous wastes are burned. Accordingly, these standards represent MACT floor. Since all hazardous waste cement kilns are currently subject to these DRE standards, they represent floor control, *i.e.*, greater than 12 percent of existing sources are achieving these controls.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? Beyond-the-floor control would be a requirement to achieve a higher percentage DRE, for example, 99.9999 percent DRE for POHCs for all hazardous wastes. A higher DRE could be achieved by improving the design, operation, or maintenance of the combustion system to achieve greater combustion efficiency.

Sources will not incur costs to achieve the 99.99% DRE floor because it is an existing RCRA standard . A substantial number of existing hazardous waste combustors are not likely to be routinely achieving 99.999% DRE, however, and most are not likely to be achieving 99.9999% DRE. Improvements in combustion efficiency will be required to meet these beyond-the-floor DREs. Improved combustion efficiency is accomplished through better mixing, higher temperatures, and longer residence times. As a practical matter, most combustors are mixing-limited. Thus, improved mixing is necessary for improved DREs. For a less-than-optimum burner, a certain amount of improvement may typically be accomplished by minor, relatively inexpensive combustor modifications—burner tuning operations such as a change in burner angle or an adjustment of swirl—to enhance mixing on the macro-scale. To achieve higher and higher DREs, however, improved mixing on the micro-scale may be necessary requiring significant, energy intensive and expensive modifications such as burner redesign and higher combustion air pressures. In addition, measurement of such DREs may require increased spiking of POHCs and more sensitive stack sampling and analysis methods at added expense.

Although we have not quantified the cost-effectiveness of a beyond-the-floor DRE standard, we do not believe that it would be cost-effective. For reasons discussed above, we believe that the cost of achieving each successive order-of-magnitude improvement in DRE will be at least constant, and more likely increasing. Emissions reductions diminish substantially, however, with each order of magnitude improvement in DRE. For example, if a source were to emit 100 gm/hr of organic hazardous air pollutants assuming zero DRE, it would emit 10 gm/hr at 90 percent DRE, 1 gm/hr at 99 percent DRE, 0.1 gm/hr at 99.9 percent DRE, 0.01 gm/hr at 99.99 percent DRE, and 0.001 gm/hr at 99.999 percent DRE. If the cost to achieve each order of magnitude improvement in DRE is roughly constant, the cost-effectiveness of DRE decreases with each order of magnitude improvement in DRE. Consequently, we conclude that this relationship between compliance cost and diminished emissions reductions associated with a more stringent DRE standard suggests that a beyond-the-floor standard is not warranted.

c. What Is the MACT Floor for New Sources? The single best controlled source, and all other hazardous waste cement kilns, are subject to the existing RCRA DRE standard under § 266.104(a). Accordingly, we adopt this standard as the MACT floor for new sources.

d. What Are Our Beyond-the-Floor Considerations for New Sources? As discussed above, although we have not quantified the cost-effectiveness of a more stringent DRE standard, diminishing emissions reductions with each order of magnitude improvement in DRE suggests that cost-effectiveness considerations would likely come into play. We conclude that a beyond-the-floor standard is not warranted.

VIII. What Are the Standards for Existing and New Hazardous Waste Burning Lightweight Aggregate Kilns?

A. To Which Lightweight Aggregate Kilns Do Today's Standards Apply?

The standards promulgated today apply to each existing, reconstructed, and newly constructed lightweight aggregate plant where hazardous waste is burned in the kiln. These standards apply to major source and area source lightweight aggregate facilities. Lightweight aggregate kilns that do not engage in hazardous waste burning operations are not subject to this NESHAP; however, these kilns will be subject to future MACT standards for the Clay Products source category.

B. What Are the Standards for New and Existing Hazardous Waste Burning Lightweight Aggregate Kilns?

1. What Are the Standards for Lightweight Aggregate Kilns?

In this section, the basis for the emissions standards for hazardous waste burning lightweight aggregate kilns is discussed. The kiln emission limits apply to the kiln stack gases from lightweight aggregate plants that burn hazardous waste. The emissions standards are summarized below:

[164] A source may comply with either bypass gas standard. If the source elects to comply with the carbon monoxide standard, however, it must also demonstrate compliance with the hydrocarbon standard during comprehensive performance testing.

STANDARDS FOR EXISTING AND NEW LIGHTWEIGHT AGGREGATE KILNS

Hazardous air pollutant or hazardous air pollutant surrogate	Emissions standard[1]	
	Existing sources	New sources
Dioxin/furan	0.20 ng TEQ/dscm; or 0.40 ng TEQ/dscm and rapid quench of the flue gas at the exit of the kiln to less than 400°F.	0.20 ng TEQ/dscm; or 0.40 ng TEQ/dscm and rapid quench of the flue gas at the exit of the kiln to less than 400°F.
Mercury	47 µg/dscm	43 µg/dscm.
Particulate matter	57 mg/dscm (0.025 gr/dscf)	57 mg/dscm (0.025 gr/dscf).
Semivolatile metals[2]	250 µg/dscm	43 µg/dscm.
Low volatile metals[3]	110 µg/dscm	110 µg/dscm.
Hydrochloric acid/chlorine gas	230 ppmv	41 ppmv.
Hydrocarbons[2,3]	20 ppmv (or 100 ppmv carbon monoxide)	20 ppmv (or 100 ppmv carbon monoxide).
Destruction and removal efficiency	For existing and new sources, 99.99% for each principal organic hazardous constituent (POHC) designated. For sources burning hazardous wastes F020, F021, F022, F023, F026, or F027, 99.9999% for each POHC designated.	

[1] All emission levels are corrected to 7% O_2, dry basis.
[2] Hourly rolling average. Hydrocarbons are reported as propane.
[3] Lightweight aggregate kilns that elect to continuously comply with the carbon monoxide standard must demonstrate compliance with the hydrocarbon standard of 20 ppmv during the comprehensive performance test.

2. What Are the Dioxin and Furan Standards?

In today's rule, we establish a standard for new and existing lightweight aggregate kilns that limits dioxin/furan emissions to either 0.20 ng TEQ/dscm; or 0.40 ng TEQ/dscm and rapid quench of the flue gas at the exit of the kiln to less than 400°F. Our rationale for adopting these standards is discussed below.

a. What Is the MACT Floor for Existing Sources? In the April 1996 proposal, we had dioxin/furan emissions data from only one lightweight aggregate kiln and pooled that data with the dioxin/furan data for hazardous waste burning cement kilns to identify the MACT floor emission level. We stated that it is appropriate to combine the two data sets because they are adequately representative of general dioxin/furan behavior and control in either type of kiln. Consequently, floor control and the floor emission level for lightweight aggregate kilns were the same as for cement kilns. We proposed a floor emission level of 0.20 ng TEQ/dscm, or temperature at the inlet to the fabric filter not to exceed 418°F. (61 FR at 17403.)

Several commenters opposed our proposed approach of pooling the lightweight aggregate kiln data with the cement kiln dioxin/furan data for the MACT floor analysis. In order to respond to commenter concerns, we obtained additional dioxin/furan emissions data from lightweight aggregate kiln sources. In a MACT reevaluation discussed in the May 1997 NODA, we presented an alternative data analysis method to identify floor control and the floor emission level. In that NODA, dioxin/furan floor control was defined as temperature control not to exceed 400°F at the inlet to the fabric filter. That analysis resulted in a floor emission level of 0.20 ng TEQ/dscm, or 4.1 ng TEQ/dscm and temperature at the inlet to the fabric filter not to exceed 400°F. (62 FR at 24231.) An emission level of 4.1 ng TEQ/dscm represents the highest single run from the test condition with the highest run average. We concluded that 4.1 ng TEQ/dscm was a reasonable floor level, from an engineering perspective, given our limited dioxin/furan data base for lightweight aggregate kilns. (We noted that if this were a large data set, we would have identified the floor emission level simply as the highest test condition average.) Due to variability among the runs of the test condition with the highest condition average and because a floor level of 4.1 ng TEQ/dscm is 40 percent higher than the highest test condition average of 2.9 ng TEQ/dscm lightweight aggregate kilns using floor control will be able to meet routinely a floor emission level of 4.1 ng TEQ/dscm.

We maintain that the floor methodology discussed in the May 1997 NODA is appropriate and we adopt this approach in today's rule. In that NODA we identified two technologies for control of dioxin/furan emissions from lightweight aggregate kilns. The first technology controls dioxin/furans by quenching kiln gas temperatures at the exit of the kiln so that gas temperatures at the inlet to the particulate matter control device are below the temperature range of optimum dioxin/furan formation. The other technology is activated carbon injected into the kiln exhaust gas. Because activated carbon injection is not currently used by any hazardous waste burning lightweight aggregate kilns, this technology was evaluated only as part of a beyond-the-floor analysis.

One commenter opposes our approach specifying a MACT floor control temperature limitation of 400°F at the particulate matter control device. Instead, the commenter supports a temperature limitation of 417°F, which is the highest temperature associated with any dioxin/furan test condition in our data base. Although only two of the three test conditions for which we have dioxin/furan emissions data operated the fabric filter at 400°F or lower (the third operated at 417°F), we do have other fabric filter operating temperatures from kilns performing RCRA compliance testing for other hazardous air pollutants that document fabric filter operations at 400°F or lower. From these data, we conclude that lightweight aggregate kilns can operate the fabric filter at temperatures of 400°F or lower. Thus, identifying floor control at a temperature limitation of 400°F ensures that all lightweight aggregate kilns will be operating consistent with sound operational practices for controlling dioxin/furan emissions.

As discussed in the May 1997 NODA, specifying a temperature limitation of 400°F or lower is appropriate for floor control because, from an engineering perspective, it is within the range of reasonable values that could have been selected considering that: (1) The optimum temperature window for surface-catalyzed dioxin/furan formation is approximately 450–750°F; and (2) temperature levels below 350°F can cause dew point condensation problems resulting in particulate matter control device corrosion. Further, lightweight aggregate kilns can operate at air pollution control device temperatures between 350 to 400°F. In fact, all lightweight aggregate kilns use (or have available) fabric filter ''tempering'' air dilution and water quench for cooling kiln exit gases prior to the fabric filter (some kilns also augment this with uninsulated duct radiation cooling). Thus, the capability of operating fabric filters at temperatures lower than 400°F currently exists and is practical. See the technical support document for further discussion.[165]

In summary, today's floor emission level for dioxin/furan emissions for existing lightweight kilns is 0.20 ng TEQ/dscm or 4.1 ng TEQ/dscm and control of temperature at the inlet to the fabric filter not to exceed 400°F. We estimate that all lightweight aggregate kiln sources currently are meeting the floor level.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? We considered in the April 1996 proposal a beyond-the-floor standard of 0.20 ng TEQ/dscm based on injection of activated carbon at a flue gas temperature of less than 400°F. (61 FR at 17403.) In the May 1997 NODA, we considered a beyond-the-floor standard of 0.20 ng TEQ/dscm standard based on rapidly quenching combustion gases at the exit of the kiln to 400°F, and insulating the duct-work between the kiln exit and the fabric filter to maintain gas temperatures high enough to avoid dew point problems. (62 FR at 24232.)

One commenter, however, disagrees that there is adequate evidence (test data) supporting rapid quench of kiln exit gases to less than 400°F can achieve a level of 0.20 ng TEQ/dscm. Based on these NODA comments and upon closer analysis of all available data, we find that a level of 0.20 ng TEQ/dscm has not been clearly demonstrated for lightweight aggregate kilns with rapid quench less than 400°F prior to the particulate matter control device. The data show that some lightweight aggregate kilns can achieve a level of 0.20 TEQ ng/dscm with rapid quench. In addition, one commenter, who operates two lightweight aggregate kilns with heat exchangers that cool the flue gas to a temperature of approximately 400°F at the fabric filter, stated that they achieve dioxin/furan emissions slightly below 0.20 ng TEQ/dscm. However, because of the small dioxin/furan data base we are concerned that these limited data may not show the full range of emissions. Due to the similarity of dioxin/furan control among cement kilns and lightweight aggregate kilns, we looked to the cement kiln data to complement our limited lightweight aggregate kiln dataset. As discussed earlier, cement kilns are able to control dioxin/furans to 0.40 ng TEQ/dscm with temperature control. Since we do not expect a lightweight aggregate kiln to achieve lower dioxin/furan emissions than a cement kiln with rapid quench, we agree with these commenters and conclude that lightweight aggregate kilns can control dioxin/furans to 0.40 ng TEQ/dscm with rapid quench of kiln exit gases to less than 400°F.

Thus, for the final rule, we considered two beyond-the-floor levels: (1) Either 0.20 ng TEQ/dscm; or 0.40 ng TEQ/dscm and rapid quench of the kiln exhaust gas to a temperature less than 400°F; and (2) a level of 0.20 ng TEQ/dscm based on activated carbon injection.

The first option is a beyond-the-floor standard of either 0.20 ng TEQ/dscm, or 0.40 ng TEQ/dscm and rapid quench of the kiln exhaust gas to less than 400°F. The national incremental annualized compliance cost for lightweight aggregate kilns to meet this beyond-the-floor level rather than comply with the floor controls would be approximately $50,000 for the entire hazardous waste burning lightweight aggregate kiln industry, and would provide an incremental reduction in dioxin/furan emissions beyond the MACT floor controls of nearly 2 g TEQ/yr.

Based on these costs of approximately $25 thousand per additional g of dioxin/furan removed and on the significant reduction in dioxin/furan emissions achieved, we have determined that this dioxin/furan beyond-the-floor option for lightweight aggregate kilns is justified, especially given our special concern about dioxin/furans. Dioxin/furans are some of the most toxic compounds known due to their bioaccumulation potential and wide range of health effects, including carcinogenesis, at exceedingly low doses. Exposure via indirect pathways is a chief reason that Congress singled out dioxin/furans for priority MACT control in section 112(c)(6) of the CAA. See S. Rep. No. 128, 101st Cong. 1st Sess. at 154–155.

We also evaluated, but rejected, activated carbon injection as a beyond-the-floor option. Carbon injection is routinely effective at removing 99 percent of dioxin/furans at numerous municipal waste combustor and medical waste combustor applications and one hazardous waste incinerator application. However, no hazardous waste burning lightweight aggregate kiln currently uses activated carbon injection for dioxin/furan removal. We believe that it is conservative to assume that only 95 percent is achievable given potential uncertainties in its application to lightweight aggregate kilns. In addition, we assumed for cost-effectiveness calculations that lightweight aggregate kilns needing activated carbon injection would install the activated carbon injection system after the existing fabric filter device and add a new smaller fabric filter to remove the injected carbon with the absorbed dioxin/furans and mercury. This costing approach addresses commenter's concerns that injected carbon may interfere with current dust recycling practices.

The national incremental annualized compliance cost for lightweight aggregate kilns to meet a beyond-the-floor level based on activated carbon injection rather than comply with the floor controls would be approximately $1.2 million for the entire hazardous waste burning lightweight aggregate kiln industry. This would provide an incremental reduction in dioxin/furan emissions beyond the MACT floor controls of 2.2 g TEQ/yr, or 90 percent. Based on these costs of approximately $0.53 million per additional g of dioxin/furan removed and the small incremental dioxin/furan emissions reduction beyond the dioxin/furan beyond-the-floor option discussed above (2.0 g TEQ/yr versus 2.2 g TEQ/ yr), we have determined that this second beyond-the-floor option for lightweight aggregate kilns is not justified. Therefore, we are not promulgating a beyond-the-floor standard of 0.20 ng TEQ/dscm for lightweight aggregate kilns based on activated carbon injection.

Thus, the promulgated dioxin/furan standard for existing lightweight aggregate kilns is a beyond-the-floor standard of 0.20 ng TEQ/dscm; or 0.40 ng TEQ/dscm and rapid quench to a temperature not to exceed 400°F based on rapid quench of flue gas at the exit of the kiln.

c. What Is the MACT Floor for New Sources? In the April 1996 proposal, the floor analysis for new lightweight aggregate kilns was the same as for existing kilns, and the proposed standard was the same. The proposed floor emission level was 0.20 ng TEQ/dscm, or temperature at the inlet to the particulate matter control device not to exceed 418°F. (61 FR at 17408.) In the May 1997 NODA, we used an alternative data analysis method to identify floor control and the floor emission level. As done for existing sources, floor control for new sources was defined as temperature control at the inlet to the particulate matter control device to less than 400°F. That

[165] USEPA, ''Final Technical Support document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies,'' July 1999.

analysis resulted in a floor emission level of 0.20 ng TEQ/dscm, or 4.1 ng TEQ/dscm and temperature at the inlet to the fabric filter not to exceed 400°F. Our engineering evaluation indicated that the best controlled source is one that is controlling temperature control at the inlet to the fabric filter at 400°F. (62 FR at 24232.) We continue to believe that the floor methodology discussed in the May 1997 NODA is appropriate for new sources and we adopt this approach in the final rule. The floor level for new lightweight aggregate kilns is 0.20 ng TEQ/dscm, or 4.1 ng TEQ/dscm and temperature at the inlet to the particulate matter control device not to exceed 400°F.

d. What Are Our Beyond-the-Floor Considerations for New Sources? In the April 1996 proposal, we proposed activated carbon injection as beyond-the-floor control and a beyond-the-floor standard of 0.20 ng TEQ/dscm. (61 FR at 17408.) In the May 1997 NODA, we identified a beyond-the-floor standard of 0.20 ng TEQ/dscm based on rapid quench of kiln gas to less than 400°F combined with duct insulation or activated carbon injection operated at less than 400°F. (62 FR at 24232.) These beyond-the-floor considerations are identical to those discussed above for existing sources.

The beyond-the-floor standard identified for existing sources continues to be appropriate for new sources for the same reasons. Thus, the promulgated dioxin/furan standard for new lightweight aggregate kilns is the same as the standard for existing standards, i.e., 0.20 ng TEQ/dscm or 0.40 ng TEQ/dscm and rapid quench of the kiln exhaust gas to less than 400°F.

3. What Are the Mercury Standards?

In the final rule, we establish a standard for existing and new lightweight aggregate kilns that limits mercury emissions to 47 and 33 µg/dscm, respectively. The rationale for adopting these standards is discussed below.

a. What Is the MACT Floor for Existing Sources? All lightweight aggregate kilns use fabric filters, and one source uses a venturi scrubber in addition to a fabric filter. However, since mercury is generally in the vapor form in and downstream of the combustion chamber, including in the air pollution control device, fabric filters alone do not achieve significant mercury control. Mercury emissions from lightweight aggregate kilns are currently controlled under existing regulations through limits on the maximum feedrate of mercury in total feedstreams (e.g., hazardous waste, raw materials). Thus, MACT floor control is based on limiting the feedrate of mercury in hazardous waste.

In the April 1996 proposal, we identified floor control as hazardous waste feedrate control not to exceed a feedrate level of 17 µg/dscm, expressed as a maximum theoretical emissions concentration, and proposed a floor emission level of 72 µg/dscm based on an analysis of data from all lightweight aggregate kilns with a hazardous waste feedrate of mercury of this level or lower. (61 FR at 17404.) In the May 1997 NODA, we conducted a breakpoint analysis on ranked mercury emissions data and established the floor emission level equal to the test condition average of the breakpoint source. (62 FR at 24232.) The breakpoint analysis was intended to reflect an engineering-based evaluation of the data whereby the few lightweight aggregate kilns spiking extra mercury during testing procedures did not drive the floor emission level to levels higher than the preponderance of the emission data. We reasoned that sources with emissions higher than the breakpoint source were not controlling the hazardous waste feedrate of mercury to levels representative of MACT. The May 1997 NODA analysis resulted in a MACT floor level of 47 µg/dscm.

One commenter states that the use of mercury stack gas measurements from RCRA compliance test reports is inappropriate for setting the MACT floor since they are based on feeding normal wastes. With the exception of one source, no mercury spiking was done during the RCRA compliance testing because lightweight aggregate kilns complied with Tier I levels allowable in the Boiler and Industrial Furnace rule. The commenter notes that the Tier I allowable levels are above, by orders of magnitude, the total mercury fed into lightweight aggregate kilns. Thus, to set the mercury MACT floor, the commenter states that we need to consider the potential range of mercury levels in the hazardous waste and raw materials, which may not represented by the RCRA compliance stack gas measurements.

We recognize that stack gas tests generating mercury emissions data were conducted with normal unspiked waste streams containing normal levels of mercury in hazardous waste. However, we concluded that it is appropriate in this particular circumstance to use unspiked data to define a MACT floor. See discussion in Part Four, Section V.D.1. It would hardly reflect MACT to base the floor emission level on a feedrate of mercury greater than that which actually occurs in hazardous waste fuels burned in these units. Furthermore, the final rule standard is projected to be achievable by lightweight aggregate kilns for the vast majority of the wastes they are currently handling. The standard would allow lightweight aggregate kilns to burn wastes with about 0.5 ppmw mercury, without use of add-on mercury control techniques such as carbon injection. Data provided by a commenter indicates that approximately 90% of the waste streams lightweight aggregate kilns currently burn do not contain mercury levels at 2 ppmw. Further, the commenter indicates that these wastes are typically less than 0.02 ppmw mercury when more refined and costly analysis techniques are used. Thus, the standard is consistent with the current practice of lightweight aggregate kilns burning low-mercury waste.

We received comments from the lightweight aggregate kiln industry expressing concern with the stringency of the mercury standard. These commenters oppose a mercury standard of 47 µg/dscm, in part, because of the difficulty and increased cost of demonstrating compliance with day-to-day mercury feedrate limits. One potential problem pertains to raw material mercury detection limits. The commenter states that mercury is generally not measured in the raw material at detectable levels at their facilities. The commenter points out that if a kiln assumes mercury is present in the raw material at the detection limit, the resulting calculated uncontrolled mercury emission concentration could exceed, or be a significant percentage of, the mercury emission standard. This may prevent a kiln from complying with the mercury emission standard even though MACT control is used. Further, the commenter anticipates that more frequent analysis, additional laboratory equipment and staff, and improved testing and analysis procedures will be required to show compliance with a standard of 47 µg/dscm. The commenter states that the costs of compliance will increase significantly at each facility to address this nondetect issue.

Four provisions in the final rule offer flexibility in complying with the mercury standard. For example, one provision allows sources to petition for an alternative mercury standard that only requires compliance with a hazardous waste mercury feedrate limitation, provided that mercury not been present historically in the raw material at detectable levels. This approach ensures that kilns using MACT controls can achieve the mercury standard. The details of this provision are discussed in Part Five, Section

X.A.2. Another provision allows kilns a waiver of performance testing requirements when the source feeds low levels of mercury. Under this provision, a kiln qualifies for a waiver of the performance testing requirements for mercury if all mercury from all feedstreams fed to the combustion unit does not exceed the mercury emission standard. For kilns using this waiver, we allow kilns to assume mercury in the raw material is present at one-half the detection limit whenever the raw materials feedstream analysis determines that mercury is not present at detectable levels. The details of this provision are presented in Part Five, Section X.B. For a discussion of the other two methods that can be used to comply with the mercury emission standard, see Part Five, Section VII.B.6.

For today's rule we use a revised engineering evaluation and data analysis method to establish the MACT floor emission level for mercury. The approach used to establish MACT floors for the three metal hazardous air pollutant groups and hydrochloric acid/chlorine gas is the aggregate feedrate approach. Using this approach, the resulting mercury floor emission level is 47 µg/dscm.

We estimate that approximately 75 percent of lightweight aggregate kiln sources currently are meeting the floor emission level. The national annualized compliance cost for lightweight aggregate kilns to reduce mercury emissions to comply with the floor emission level is $0.7 million for the entire hazardous waste burning lightweight aggregate kiln industry, and will reduce mercury emissions by approximately 0.03 Mg/yr or 47 percent from current baseline emissions.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? In the April 1996 NPRM, we considered a beyond-the-floor standard based on flue gas temperature reduction to 400°F or less followed by activated carbon injection, but determined that a beyond-the-floor level would not be cost-effective and therefore warranted. (61 FR at 17404.) In the May 1997 NODA, we considered a beyond-the-floor standard of 15 µg/dscm based on an activated carbon injection. However, we indicated in the NODA that a beyond-the-floor standard would not likely be justified given the high cost of treatment and the relatively small amount of mercury removed from air emissions. (62 FR at 24232.)

In developing the final rule, we identified three techniques for control of mercury as a basis to evaluate a beyond-the-floor standard: (1) Activated carbon injection; (2) limiting the feed of mercury in the hazardous waste; and (3) limiting the feed of mercury in the raw materials. The results of each analysis are discussed below.

Activated Carbon Injection. To investigate this beyond-the-floor control option, we applied a carbon injection capture efficiency of 80 percent to the floor emission level of 47 µg/dscm. The resulting beyond-the-floor emission level is 10 µg/dscm.

The national incremental annualized compliance cost for lightweight aggregate kilns to meet this beyond-the-floor level rather than comply with the floor controls would be approximately $0.6 million for the entire hazardous waste burning lightweight aggregate kiln industry and would provide an incremental reduction in mercury emissions beyond the MACT floor controls of 0.02 Mg/yr. Based on these costs of approximately $34 million per additional Mg of mercury removed and the small emissions reductions that would be realized, we conclude that this mercury beyond-the-floor option for hazardous waste burning lightweight aggregate kilns is not acceptably cost-effective nor otherwise justified. Therefore, we do not adopt this beyond-the-floor standard.

Limiting the Feedrate of Mercury in Hazardous Waste. We also considered, but rejected, a beyond-the-floor emission level based on limiting the feed of mercury in the hazardous waste. This mercury beyond-the-floor option for lightweight aggregate kilns is not warranted because data submitted by commenters indicate that approximately 90% of the hazardous waste burned by lightweight aggregate kilns contains mercury at levels below method detection limits. We conclude from these data that there are little additional mercury reductions possible by reducing the feed of mercury in the hazardous waste. Therefore, we are not adopting a beyond-the-floor emission level because it will not be cost-effective due to the relatively small amount of mercury removed from air emissions and likely problems with method detection limitations.

Limiting the Feedrate of Mercury in Raw Materials. A source can achieve a reduction in mercury emissions by substituting a feed material containing lower levels of mercury for a primary raw material higher mercury levels. This beyond-the-floor option appears to be less cost effective compared to either of the options evaluated above. Because lightweight aggregate kilns are sited proximate to primary raw material supply and transporting large quantities of an alternative source of raw material(s) is expected to be cost prohibitive. Therefore, we do not adopt this mercury beyond-the-floor standard.

Thus, the promulgated mercury standard for existing hazardous waste burning lightweight aggregate kilns is the floor emission level of 47 µg/dscm.

c. What Is the MACT Floor for New Sources? In the April 1996 proposal, we identified floor control for new sources as hazardous waste feedrate control of mercury not to exceed a feedrate level of 17 µg/dscm expressed as a maximum theoretical emissions concentration. We proposed a floor emission level of 72 µg/dscm. (61 FR at 17408.) In May 1997 NODA, we conducted a breakpoint analysis on ranked mercury emissions data from sources utilizing the MACT floor technology and established the floor emission level as the test condition average of the breakpoint source. The breakpoint analysis was intended to reflect an engineering-based evaluation of the data so that the one lightweight aggregate kiln spiking extra mercury during testing procedures did not drive the floor emission level to levels higher than the preponderance of the emissions data. This analysis resulted in a MACT floor level of 47 µg/dscm. (62 FR at 24233.)

For the final rule, we identify floor control for new lightweight aggregate kilns as feed control of mercury in the hazardous waste, based on the single source with the best aggregate feedrate of mercury in hazardous waste. Using the aggregate feedrate approach to establish this floor level of control and corresponding floor emission level, we identify a MACT floor emission level of 33 µg/dscm for new lightweight aggregate kilns.

d. What Are Our Beyond-the-Floor Considerations for New Sources? In both the proposal and the NODA, we considered a beyond-the-floor standard for new sources based on activated carbon injection, but determined that it would not be cost-effective to adopt the beyond-the-floor standard given the high cost of treatment and the relatively small amount of mercury removed from air emissions. (61 FR at 17408 and 62 FR at 24233.)

In the final rule, we identified three techniques for control of mercury as a basis to evaluate a beyond-the-floor standard: (1) Activated carbon injection; and (2) limiting the feed of mercury in the hazardous waste. The results of each analysis are discussed below.

Activated Carbon Injection. As discussed above, we conclude that flue gas temperature reduction to 400 °F followed by activated carbon injection to remove mercury is an appropriate beyond-the-floor control option for improved mercury control at lightweight aggregate kilns. The control of flue gas temperature is necessary to ensure good collection efficiency. Based on the MACT floor emission level of 33 µg/dscm and assuming a carbon injection capture efficiency of 80 percent, we identified a beyond-the-floor emission level of 7 µg/dscm. As discussed above for existing sources, we do not believe that a beyond-the-floor standard of 7 µg/dscm is warranted for new lightweight aggregate kilns due to the high cost of treatment and relatively small amount of mercury removed from air emissions. The incremental annualized compliance cost for one new lightweight aggregate kiln to meet this beyond-the-floor level, rather than comply with floor controls, would be approximately $0.46 million and would provide an incremental reduction in mercury emissions beyond the MACT floor controls of approximately 0.008 Mg/yr. Based on these costs of approximately $58 million per additional Mg of mercury removed, a beyond-the-floor standard of 7 µg/dscm is not warranted due to the high cost of compliance and relatively small mercury emissions reductions. Notwithstanding our goal of reducing the loading to the environment by bioaccumulative pollutants such as mercury whenever possible, these costs are not justified.

Limiting the Feedrate of Mercury in Hazardous Waste. As discussed above for existing sources, we conclude that a beyond-the-floor based on limiting the feed of mercury in the hazardous waste is not justified. Considering that the floor emission level for new lightweight aggregate kilns is approximately one third lower than the floor emission level for existing kilns (33 versus 47 µg/dscm), we again conclude that a mercury beyond-the-floor standard is not warranted because emission reductions of mercury would be less than existing sources at comparable costs. Thus, the cost-effectiveness is higher for new kilns than for existing kilns. Further, achieving substantial additional mercury reductions by further controls on hazardous waste feedrate may be problematic because the mercury contribution from raw materials and coal represents an even larger proportion of the total mercury fed to the kiln. Therefore, we do not adopt a mercury beyond-the-floor standard based on limiting feed of mercury in hazardous waste for new sources.

Thus, the promulgated mercury standard for new hazardous waste burning lightweight aggregate kilns is the floor emission level of 33 µg/dscm.

4. What Are the Particulate Matter Standards?

We establish standards for both existing and new lightweight aggregate kilns that limit particulate matter emissions to 57 mg/dscm. The particulate matter standard is a surrogate control for the metals antimony, cobalt, manganese, nickel, and selenium. We refer to these five metals as ''nonenumerated metals'' because standards specific to each metal have not been established. The rationale for adopting these standards is discussed below.

a. What Is the MACT Floor for Existing Sources? In the April 1996 NPRM, we defined floor control based upon the performance of a fabric filter with an air-to-cloth ratio of 2.8 acfm/ft^2. The MACT floor was 110 mg/dscm (0.049 gr/dscf). (61 FR at 17403.) In the May 1997 NODA, we defined the technology basis as a fabric filter for a MACT floor, but did not characterize the design and operation characteristics of the particulate matter control equipment, air-to-cloth ratio of a fabric filter, because we had limited information on these parameters. (62 FR at 24233.) Instead, for each particulate matter test condition, we evaluated the corresponding semivolatile metal system removal efficiency and screened out sources with relatively poor system removal efficiencies as a means to identify and eliminate from consideration those sources not using MACT floor control. Our reevaluation of the lightweight aggregate kiln particulate matter data resulted in a MACT floor of 50 mg/dscm (0.022 gr/dscf).

Some commenters state that a floor emission level of 50 mg/dscm (0.022 gr/dscf) is too high and a particulate matter standard of 23 mg/dscm (0.010 gr/dscf) is more appropriate because it is consistent with the level of performance achieved by incinerators using fabric filters. Even though we agree that well designed and properly operated fabric filters in use at all lightweight aggregate kilns can achieve low levels, we are concerned that an emission level of 23 mg/dscm would not be appropriate given the high inlet grain loading inherent with the lightweight aggregate manufacturing process, typically much higher than the particulate loading to incinerators.

Commenters also express concern that the Agency identified separate, different MACT pools and associated MACT controls for particulate matter, semivolatile metals, and low volatile metals, even though all three are controlled, at least in part, by the particulate matter control device. These commenters stated that our approach is likely to result in three different design specifications. We agree with these commenters and, in the final rule, the same initial MACT pool is used to establish the floor levels for particulate matter, semivolatile metals, and low volatile metals. See discussion in Part Four, Section V.

For the final rule, we conclude that the general floor methodology discussed in the May 1997 NODA is appropriate. MACT control for particulate matter is based on the performance of fabric filters. Since we lack data to fully characterize control equipment from all sources and we lack information on the relationship between the design parameters and the system performance, we evaluated both low and semivolatile metal system removal efficiencies associated with the source's particulate matter emissions to identify those sources not using MACT floor control. Our data show that all lightweight aggregate kilns are achieving greater than 99 percent system removal efficiency for both low and semivolatile metals, with some attaining 99.99 percent removal. Since we found no sources with system removal efficiencies indicative of poor performance, we conclude that all lightweight aggregate kilns are using MACT controls and the floor emission limit is identified as 57 mg/dscm (0.025 gr/dscf).

The performance level of 57 mg/dscm is generally consistent with that expected from well designed and operated fabric filters, and that achieved by other similar types of combustion sources operating with high inlet grain loadings. We have particulate matter data from all lightweight aggregate kiln sources, and multiple test conditions, conducted at 3 year intervals, are available for many of the sources. We conclude that the number of test conditions available adequately covers the range of variability of well operated and designed fabric filters.[166]

We considered, but rejected, basing the particulate matter floor for lightweight aggregate kilns on the New Source Performance Standard. The New Source Performance Standard limits particulate matter emissions to 92 mg/dscm (0.040 gr/dscf), uncorrected for oxygen. (See 40 CFR 60.730, Standards of Performance for Calciners and Dryers in Mineral Industries.) We rejected the New Source Performance Standard as the basis for the floor emission level

[166] USEPA, ''Final Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies,'' July 1999.

because our MACT analysis of data from existing sources indicates that a particulate matter floor level lower than the New Source Performance Standard is currently being achieved by existing hazardous waste burning lightweight aggregate kilns. Further, all available emission data for hazardous waste burning lightweight aggregate kilns are well below the New Source Performance Standard particulate matter standard. Thus, the particulate matter floor emission level is 57 mg/dscm based on an analysis of existing emissions data.

We estimate that, based on a design level of 70 percent of the standard, over 90 percent of lightweight aggregate kiln sources currently are meeting the floor level. The national annualized compliance cost for lightweight aggregate kilns to reduce particulate matter emissions to comply with the floor emission level is $18,000 for the entire hazardous waste burning lightweight aggregate kiln industry, and our floor will reduce nonenumerated metals and particulate matter emissions by 0.01 Mg/yr and 2.7 Mg/yr, respectively, or 7 percent from current baseline emissions.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? In the NPRM, we proposed a beyond-the-floor emission level of 69 mg/dscm (0.030 gr/dscf) and solicited comment on an alternative beyond-the-floor emission level of 34 mg/dscm (0.015 gr/dscf) based on improved particulate matter control. (61 FR at 17403.) In the May 1997 NODA, we concluded that a beyond-the-floor standard may not be warranted given a reduced particulate matter floor level compared to the proposed floor emission level. (62 FR at 24233.)

In the final rule, we considered a beyond-the-floor level of 34 mg/dscm for existing lightweight aggregate kilns based on improved particulate matter control. For analysis purposes, improved particulate matter control entails the use of higher quality fabric filter bag material. We then determined the cost of achieving this level of particulate matter, with corresponding reductions in the nonenumerated metals for which particulate matter is a surrogate, to determine if this beyond-the-floor level would be appropriate. The national incremental annualized compliance cost for lightweight aggregate kilns to meet this beyond-the-floor level, rather than comply with the floor controls, would be approximately $110,000 for the entire hazardous waste burning lightweight aggregate kiln industry and would provide an incremental reduction in nonenumerated metals emissions nationally beyond the MACT floor controls of 0.03 Mg/yr. Based on these costs of approximately $3.7 million per additional Mg of nonenumerated metals emissions removed, we conclude that this beyond-the-floor option for lightweight aggregate kilns is not acceptably cost-effective nor otherwise justified. Therefore, we do not adopt this beyond-the-floor standard. Thus, the promulgated particulate matter standard for existing hazardous waste burning lightweight aggregate kilns is the floor emission level of 57 mg/dscm.

c. What Is the MACT Floor for New Sources? In the April 1996 proposal, we defined floor control for new sources based on the level of performance of a fabric filter with an air-to-cloth ratio of 1.5 acfm/ft2. The MACT floor emission level was 120 mg/dscm (0.054 gr/dscf). (61 FR at 17408.) In the May 1997 NODA, MACT control was defined as a well-designed and properly operated fabric filter, and the floor emission level for new lightweight aggregate kilns was 50 mg/dscm (0.022 gr/dscf). (62 FR at 24233.)

All lightweight aggregate kilns use fabric filters to control particulate matter. As discussed earlier, we have limited information on the design and operation characteristics of existing control equipment currently used by lightweight aggregate kilns. As a result, we are unable to identify a specific technology that can consistently achieve lower emission levels than the controls used by lightweight aggregate kilns achieving the MACT floor level for existing sources. Lightweight aggregate kilns achieve the floor emission level with well-designed and properly operated fabric filters. Thus, floor control for new kilns is likewise a well-designed and properly operated fabric filter. Therefore, as discussed for existing sources, the MACT floor level for new lightweight aggregate kilns is 57 mg/dscm (0.025 gr/dscf).

d. What Are Our Beyond-the-Floor Considerations for New Sources? In the April 1996 NPRM, we proposed a beyond-the-floor standard of 69 mg/dscm (0.030 gr/dscf) based on improved particulate matter control, which was consistent with existing sources. (61 FR at 17408.) In the May 1997 NODA, we concluded, as we did for existing sources, that a beyond-the-floor level for particulate matter may not be warranted due to the high costs of control and relatively small amount of particulate matter removed from air emissions. (62 FR at 24233.)

As discussed for existing sources, we considered a beyond-the-floor level of 34 mg/dscm for new lightweight aggregate kilns based on improved particulate matter control. For analysis purposes, improved particulate matter control entails the use of higher quality fabric filter bag material. We then determined the cost of achieving this level of particulate matter, with corresponding reductions in the nonenumerated metals for which particulate matter is a surrogate, to determine if this beyond-the-floor level would be appropriate. The incremental annualized compliance cost for one new lightweight aggregate kiln to meet this beyond-the-floor level, rather than comply with floor controls, would be approximately $38 thousand and would provide an incremental reduction in nonenumerated metals emissions of approximately 0.012 Mg/yr.[167] Based on these costs of approximately $3.1 million per additional Mg of nonenumerated metals removed, we conclude that a beyond-the-floor standard of 34 mg/dscm is not justified due to the high cost of compliance and relatively small nonenumerated metals emission reductions. Further, a standard of 57 mg/dscm would adequately control the unregulated hazardous air pollutant metals for which it is being used as a surrogate. Thus, the particulate matter standard for new lightweight aggregate kilns is the floor level of 57 mg/dscm.

5. What Are the Semivolatile Metals Standards?

In the final rule, we establish a standard for existing and new lightweight aggregate kilns that limits semivolatile metal emissions to 250 and 43 µg/dscm, respectively. The rationale for adopting these standards is discussed below.

a. What Is the MACT Floor for Existing Sources? All lightweight aggregate kilns use a combination of particulate matter control, *i.e.*, a fabric filter, and hazardous waste feedrate to control emissions of semivolatile metals. Current RCRA regulations establish limits on the maximum feedrate of lead and cadmium in all feedstreams. Thus, hazardous waste feedrate control is part of MACT floor control.

In the April 1996 proposal, we defined floor control as either (1) a fabric filter with an air-to-cloth ratio of 1.5 acfm/ft^2 and a hazardous waste feedrate level of 270,000 µg/dscm,

[167] Based on the data available, the average emissions in sum of the five nonenumerated metal from lightweight aggregate kilns using MACT particulate matter control is approximately 83 µg/dscm. To estimate emission reductions of the nonenumerated metals, we assume a linear relationship between a reduction in particulate matter and these metals.

expressed as a maximum theoretical emissions concentration; or (2) a combination of a fabric filter and venturi scrubber with an air-to-cloth ratio of 4.2 acfm/ft^2 and a hazardous waste feedrate level of 54,000 µg/dscm. The proposed floor emission level was 12 µg/dscm. (61 FR at 17405.) In the May 1997 NODA, we discussed a floor methodology where we used a breakpoint analysis to identify sources that were not using floor control with respect either to semivolatile metals hazardous waste feedrate or emissions control. Under this approach, we ranked semivolatile metal emissions data from sources that were achieving the particulate matter floor level of 50 mg/dscm or better. We identified the floor level as the test condition average associated with the breakpoint source. Thus, sources with atypically high emissions because of high semivolatile feedrate levels or poor semivolatile metals control were screened from the pool of sources used to define the floor emission level. Based on this analysis, we identified a floor emission level of 76 µg/dscm. (62 FR at 24234.)

We received few public comments in response to the proposal and May 1997 NODA concerning the lightweight aggregate kiln semivolatile metals floor emission level. We did receive comments on the application of techniques to identify breakpoints in the arrayed emissions data. This issue and our response to it are discussed in the floor methodology section in Part Four, Section V. We also received comments that our semivolatile metals analysis in the proposal and May 1997 NODA included several data base inaccuracies that, when corrected, would result in a higher floor level. We agree with the commenters and we revised the data base as necessary for the final rule analysis.

In the final rule, in general response to these comments, we use a revised engineering evaluation and data analysis method to establish the floor emission level for semivolatile metals. We use the aggregate feedrate approach in conjunction with floor control for particulate matter of 57 mg/dscm to identify a semivolatile metal floor emission level of 1,700 µg/dscm. We estimate that all lightweight aggregate kiln sources currently are meeting the floor level.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? In the April 1996 NPRM, we considered a beyond-the-floor emission level for semivolatile metals based on improved particulate matter control. We concluded that a beyond-the-floor emission level would not be cost-effective given that the proposed semivolatile metal floor level of 12 µg/dscm alone would result in an estimated 97 percent reduction in semivolatile metal emissions. (61 FR at 17405.) In the May 1997 NODA, we considered a beyond-the-floor emission level based on improved particulate matter control, but indicated that such a standard was not likely to be cost-effective due to the high costs of control. (62 FR at 24234.)

In developing the final rule, we identified three techniques for control of semivolatile metals as a basis to evaluate a beyond-the-floor standard: (1) Limiting the feed of semivolatile metals in the hazardous waste; (2) improved particulate matter control; and (3) limiting the feed of semivolatile metals in the raw materials. The results of each analysis are discussed below.

Limiting the Feedrate of Semivolatile Metals in Hazardous Waste. Under this option, as with cement kilns, we selected for evaluation a beyond-the-floor emission level of 240 µg/dscm to evaluate from among the range of possible levels that reflect improved feedrate control of semivolatile metals in hazardous waste. This emission level represents a significant increment of emission reduction from the floor level of 1700 µg/dscm, it is within the range of levels that are likely to be reasonably achievable using feedrate control, and it is generally consistent with the incinerator and cement kiln standards, thereby advancing a policy objective of essentially common standards among combustors of hazardous waste.

In performing an analysis of the 240 µg/dscm beyond-the-floor limit, we found that additional reductions beyond 250 µg/dscm represent a significant reduction in cost-effectiveness of incremental beyond-the-floor levels. A beyond-the-floor standard of 250 µg/dscm achieves the same goals as a beyond-the-floor standard of 240 µg/dscm in a more cost-effective manner. The national incremental annualized compliance cost for the lightweight aggregate kilns to meet this 250 µg/dscm beyond-the-floor level, rather than comply with the floor controls, would be approximately $88,000 and would provide an incremental reduction beyond emissions at the MACT floor in semivolatile metal emissions of an additional 0.17 Mg/yr. The cost-effectiveness of this emission level is approximately $530,000 per additional Mg of semivolatile metal removed.

We conclude that additional control of the feedrate of semivolatile metals in hazardous waste to achieve an emission level of 250 µg/dscm is warranted because this standard would reduce lead and cadmium emissions, which are particularly toxic hazardous air pollutants. In addition, Solite Corporation, which operates the majority of the hazardous waste burning lightweight aggregate kilns, stated in their public comments that a standard of 213 µg/dscm is achievable and adequately reflects the variability of lead and cadmium in raw material for their kilns. Further, the vast majority of the lead and cadmium fed to the lightweight aggregate kiln is from the hazardous waste,[168] not from the raw material or coal. We are willing to accept a more marginal cost-effectiveness for sources voluntarily burning hazardous waste in lieu of other fuels to ensure that sources are using best controls.

Moreover, this beyond-the-floor semivolatile metal standard better supports our Children's Health Initiative in that lead emissions, which are of highest significance to children's health, will be reduced by another 60 percent from today's baseline. We are committed to reducing lead emissions wherever and whenever possible. Finally, we note that this beyond-the-floor standard is also consistent with European Union standards for hazardous waste incinerators of approximately 200 µg/dscm for lead and cadmium combined. Therefore, we are adopting today a beyond-the-floor standard of 250 µg/dscm for existing lightweight aggregate kilns.

Improved Particulate Matter Control. We also evaluated improved particulate matter control as another beyond-the-floor control option for improved semivolatile metals control. We investigated a beyond-the-floor standard of 250 µg/dscm, an emission level consistent with the preferred option based on limiting the feedrate of semivolatile metals in hazardous waste. The national incremental annualized compliance cost for lightweight aggregate kilns to meet this beyond-the-floor level, rather than comply with the floor controls, would be approximately $88,000 thousand for all lightweight aggregate kilns and would provide an incremental reduction in semivolatile metal emissions beyond the MACT floor controls of 0.17 Mg/yr. Based on these costs of approximately $530,000 per additional Mg of semivolatile metal removed, we determined that this beyond-the-floor option may be warranted. However, as discussed below, the cost-effectiveness for this beyond-the-floor option is approximately equivalent to the costs

[168] USEPA, "Final Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies", July 1999.

estimated for a beyond-the-floor option based on limiting the feed of semivolatile metals in the hazardous waste. We decided to base the beyond-the-floor standard for semivolatile metals on the feedrate option to be consistent with the cement kiln approach. Of course light-weight aggregate kilns are free to choose to improve particulate matter control in lieu of feedrate controls as their vehicle to achieve compliance with 250 ug/dscm.

Limiting the Feedrate of Semivolatile Metals in Raw Materials. A source can achieve a reduction in semivolatile metals emissions by substituting a feed material containing lower levels of lead and/or cadmium for a primary raw material higher in lead and/or cadmium levels. This beyond-the-floor option appears to be less cost effective compared to either of the options evaluated above because lightweight aggregate kilns are sited proximate to primary raw material supply. Transporting large quantities of an alternative source of raw material(s) is expected to be cost prohibitive. Therefore, we do not adopt this semivolatile metal beyond-the-floor standard.

Thus, the promulgated semivolatile metals standard for existing hazardous waste burning lightweight aggregate kilns is a beyond-the-floor standard of 250 µg/dscm based on limiting the feedrate of semivolatile metals in the hazardous waste.

c. What Is the MACT Floor for New Sources? In the April 1996 proposal, we defined floor control as a fabric filter with an air-to-cloth ratio of 1.5 acfm/ft^2 and a hazardous waste feedrate level of 270,000 µg/dscm, expressed as a maximum theoretical emissions concentration. The proposed floor emission level was 5.2 µg/dscm. (61 FR at 17408.) In the May 1997 NODA, we concluded that the floor control and emission level for existing sources for semivolatile metals would also be appropriate for new sources. Floor control was based on a combination of good particulate matter control and limiting hazardous waste feedrates of semivolatile metals to control emissions. We used a breakpoint analysis of the semivolatile metal emissions data to exclude sources achieving substantially poorer semivolatile metal control than the majority of sources. The NODA floor emission level was 76 µg/dscm for new sources. (62 FR at 24234.)

In the final rule, as discussed previously, we use a revised engineering evaluation and data analysis method to establish the floor emission level for semivolatile metals. We use the aggregate feedrate approach in conjunction with floor control for particulate matter of 57 mg/dscm to identify a semivolatile metal floor emission level of 43 µg/dscm.

d. What Are Our Beyond-the-Floor Considerations for New Sources? In the April 1996 NPRM and May 1997 NODA, we considered a semivolatile metal beyond-the-floor emission level for new sources, but determined that the standard would not be cost-effective because the floor emission levels already achieved significant reductions in semivolatile metals emissions. (61 FR at 17408 and 62 FR at 24234.)

For the final rule, we do not adopt a beyond-the-floor emission level because the MACT floor for new sources is already substantially lower than the beyond-the-floor emission standard for existing sources. As a result, a beyond-the-floor standard for new lightweight aggregate kilns is not warranted due to the high costs of control versus the minimal emissions reductions that would be achieved. Therefore, we adopt the semivolatile metal MACT floor standard of 43 µg/dscm for new hazardous waste burning lightweight aggregate kilns.

6. What Are the Low Volatile Metals Standards?

In the final rule, we establish a standard for both existing and new lightweight aggregate kilns that limits low volatile metal emissions to 110 µg/dscm. The rationale for adopting these standards is discussed below.

a. What Is the MACT Floor for Existing Sources? In the April 1996 proposal, we defined floor control based on the performance of a fabric filter with an air-to-cloth ratio of 1.8 acfm/ft^2 and a hazardous waste feedrate level of 46,000 µg/dscm, expressed as a maximum theoretical emissions concentration. The proposed floor emission level was 340 µg/dscm. (61 FR at 17405.) In the May 1997 NODA, we discussed a floor methodology where we used a breakpoint analysis to identify sources that were not using floor control with respect either to low volatile metals hazardous waste feedrate or emissions control. Under this approach, we ranked low volatile metal emissions data from sources that were achieving the particulate matter floor level of 50 mg/dscm or better. We identified the floor level as the test condition average associated with the breakpoint source. Thus, sources with atypically high emissions because of high low volatile feedrate levels or poor low volatile metals control were screened from the pool of sources used to define the floor emission level. Based on this analysis, we identified a floor emission level of 37 µg/dscm. (62 FR at 24234.)

We received few comments, in response to the April 1996 NPRM and May 1997 NODA, concerning the low volatile metals floor emission level. We received comments, however, on several overarching issues including the appropriateness of considering feedrate control of metals (including low volatile metals) in hazardous waste as a MACT floor control technique and the specific procedure of identifying breakpoints of arrayed emissions data. These issues and our responses to them are discussed in the floor methodology section in Part Four, Section V.

For today's rule, we use a revised engineering evaluation and data analysis method to establish the MACT floor level for low volatile metals. The aggregate feedrate approach in conjunction with MACT particulate matter control to 57 mg/dscm results in a low volatile metal floor emission level of 110 µg/dscm.

We estimate that over 80 percent of existing lightweight aggregate kiln sources in our data base meet the floor level. The national annualized compliance cost for lightweight aggregate kilns to reduce low volatile metal emissions to comply with the floor emission level is $52,000 for the entire hazardous waste burning lightweight aggregate kiln industry, and will reduce low volatile metal emissions by 0.04 Mg/yr or 40 percent from current baseline emissions.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? In the April 1996 NPRM and May 1997 NODA, we considered a beyond-the-floor standard for low volatile metals based on improved particulate matter control. However, we concluded that a beyond-the-floor standard would not be cost-effective due to the high cost of emissions control and relatively small amount of low volatile metals removed from air emissions. (61 FR at 17406 and 62 FR at 24235.)

For today's rule, we identified three potential beyond-the-floor techniques for control of low volatile metals: (1) Improved particulate matter control; (2) limiting the feed of low volatile metals in the hazardous waste; and (3) limiting the feed of low volatile metals in the raw materials. The results of each analysis are discussed below.

Improved Particulate Matter Control. Our judgment is that a beyond-the-floor standard based on improved particulate matter control would be less cost-effective that a beyond-the-floor option based on limiting the feedrate of low volatile metals in the hazardous waste. Our data show that lightweight aggregate kilns are already achieving a 99.9% system removal efficiency of low volatile metals and some sources are even attaining 99.99%. Thus, pollution control equipment retrofit costs for improved control would be significant. Thus, we conclude a beyond-the-floor emission level for low volatile metals based on improved particulate matter control for lightweight aggregate kilns is not warranted.

Limiting the Feedrate of Low Volatile Metals in the Hazardous Waste. We also considered a beyond-the-floor level of 70 µg/dscm based on additional feedrate control of low volatile metals in the hazardous waste. Our investigation shows that this beyond-the-floor option would achieve an incremental reduction in low volatile metals of only 0.01 Mg/yr. Given that this beyond-the-floor level would not achieve appreciable emissions reductions, significant cost-effectiveness considerations would likely arise, thus suggesting that this beyond-the-floor standard is not warranted.

Limiting the Feedrate of Low Volatile Metals in Raw Materials. A source can achieve a reduction in low volatile metal emissions by substituting a feed material containing lower levels of these metals for a primary raw material higher low volatile metal levels. This beyond-the-floor option appears to be less cost-effective compared to either of the options evaluated above because lightweight aggregate kilns are sited proximate to primary raw material supply. Transporting large quantities of an alternative source of raw material(s) is expected to be very costly and not cost-effective considering the limited emissions reductions that would be achieved. Therefore, we do not adopt this low volatile metals beyond-the-floor standard.

For reasons discussed above, we do not adopt a beyond-the-floor level for low volatile metals, and establish the emissions standard for existing hazardous waste burning lightweight aggregate kilns at 110 µg/dscm.

c. What Is the MACT Floor for New Sources? At proposal, we defined floor control based on the performance of a fabric filter with an air-to-cloth ratio of 1.3 acfm/ft^2 a hazardous waste feedrate level of 37,000 µg/dscm, expressed as a maximum theoretical emissions concentration. The proposed floor level was 55 µg/dscm. (61 FR at 17408.) In the May 1997 NODA, we concluded that the floor control and emission level for existing sources for low volatile metals would also be appropriate for new sources. Floor control was based on a combination of good particulate matter control and limiting hazardous waste feedrate of low volatile metals to control emissions. We used a breakpoint analysis of the low volatile metal emissions data to exclude sources achieving substantially poorer low volatile metal control than the majority of sources. The NODA floor was 37 µg/dscm. (62 FR at 24235.)

In the final rule, in response to general comments on the May 1997 NODA, we use a revised engineering evaluation and data analysis method to establish the floor emission level for low volatile metals. We use the aggregate feedrate approach in conjunction with floor control for particulate matter of 57 mg/dscm to identify a low volatile metal floor emission level of 110 µg/dscm.

d. What Are Our Beyond-the-Floor Considerations for New Sources? In the April 1996 NPRM and May 1997 NODA, we considered a low volatile metal beyond-the-floor level, but determined that a beyond-the-floor standard would not be cost-effective due to the high cost of treatment and relatively small amount of low volatile metals removed from air emissions. We received no comments to the contrary.

For the final rule, as discussed for existing sources, we do not adopt a beyond-the-floor level for new sources, and conclude that the floor emission level is appropriate. Therefore, we adopt the low volatile metal floor level of 110 µg/dscm as the emission standard for new hazardous waste burning lightweight aggregate kilns.

7. What Are the Hydrochloric Acid and Chlorine Gas Standards?

In the final rule, we establish a standard for existing and new lightweight aggregate kilns that limits hydrochloric acid and chlorine gas emissions to 230 and 41 ppmv, respectively. The rationale for adopting these standards is discussed below.

a. What Is the MACT Floor for Existing Sources? In the April 1996 proposal, we identified floor control for hydrochloric acid/chlorine gas as either: (1) Hazardous waste feedrate control of chlorine to 1.5 g/dscm, expressed as a maximum theoretical emissions concentration; or (2) a combination of a venturi scrubber and hazardous waste feedrate level of 14 g/dscm, expressed as a maximum theoretical emissions concentration. The proposed floor emission level was 2100 ppmv. (61 FR at 17406.) In the May 1997 NODA, we used the same data analysis method as proposed, except that a computed emissions variability factor was no longer added. The floor emission level was 1300 ppmv. (62 FR at 24235.)

We received few comments concerning the hydrochloric acid/chlorine gas floor methodology and emission level. One commenter supports the use of a variability factor in calculating the floor emission level. Generally, the final emission standards, including hydrochloric acid/chlorine gas, already accounts for emissions variability without adding a statistically-derived emissions variability factor. This issue and our response to it are discussed in detail in the floor methodology section in Part Four, Section V.

For today's rule, we use a revised engineering evaluation and data analysis method to establish the MACT floor level for hydrochloric acid and chlorine gas. The aggregate feedrate approach results in a floor emission level of 1500 ppmv.

We estimate that approximately 31 percent of lightweight aggregate kilns in our data base currently meet the floor emission level. The national annualized compliance cost for sources to reduce hydrochloric acid and chlorine gas emissions to comply with the floor level is $350,000 for the entire hazardous waste burning lightweight aggregate kiln industry, and will reduce hydrochloric acid and chlorine gas emissions by 182 Mg/yr or 10 percent from current baseline emissions.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? In the April 1996 proposal, we defined beyond-the-floor control as wet or dry lime scrubbing with a control efficiency of 90 percent. We proposed a beyond-the-floor standard of 450 ppmv, which included a statistical variability factor. (61 FR at 17406.) In the May 1997 NODA, the beyond-the-floor standard was 130 ppmv based on wet or dry scrubbing with a control efficiency of 90 percent. (62 FR at 24235.)

We identified three potential beyond-the-floor techniques for control of hydrochloric acid and chlorine gas emissions: (1) Dry lime scrubbing; (2) limiting the feed of chlorine in the hazardous waste; and (3) limiting the feed of chlorine in the raw materials. The result of each analysis is discussed below.

Dry Lime Scrubbing. Based on a joint emissions testing program with Solite Corporation in 1997, dry lime scrubbing at a stoichiometric lime ratio of 3:1 achieved greater than 85 percent removal of hydrochloric acid and chlorine gas. For the final rule, we considered a beyond-the-floor emission level of 230 ppmv based on a 85 percent removal efficiency from the floor level of 1500 ppmv.

The national incremental annualized compliance cost for all lightweight aggregate kilns to meet this beyond-the-floor level is approximately $1.5 million. This would provide an incremental reduction in hydrochloric acid/chlorine gas emissions beyond the MACT floor controls of an additional 1320 Mg/yr, or 80 percent. Based on these costs of approximately $1,100 per additional Mg hydrochloric acid/ chlorine gas removed, this hydrochloric acid/chlorine gas beyond-the-floor option for lightweight aggregate kilns is justified. Therefore, we are adopting a beyond-the-floor standard of 230 ppmv for existing lightweight aggregate kilns.

One commenter disagreed with our proposal to base the beyond-the-floor standard on dry lime scrubbing achieving 90% removal. The commenter states that dry lime scrubbing cannot cost-effectively achieve 90 percent control of hydrochloric acid and chlorine gas emissions. To achieve a 90 percent capture efficiency at a stoichiometric ratio of 3:1, the commenter maintains that a source would need to install special equipment and make operational modifications that are less cost-effective than simple dry lime scrubbing at a lower removal efficiency. The commenter identifies this lower level of control at 80 percent based on the joint emissions testing program.[169] The commenter does agree, however, that dry lime scrubbing can achieve 90 percent capture without the installation of special equipment by operating at a stoichiometric lime ratio greater than 3:1. One significant consequence of operating at higher stoichiometric lime ratios, the commenter states, is the adverse impact to the collected particulate matter. Currently, the collected particulate matter is recycled into the lightweight aggregate product. At higher stoichiometric lime ratios, unreacted lime and collected chloride and sulfur salts would prevent this recycling practice and would require the disposal of all the collected particulate matter at significant and unjustified costs.

We agree with the commenter that data from the joint emissions testing program does not support a 90 percent capture efficiency by simple dry lime scrubbing at a stoichiometric lime ratio of 3:1. We disagree with the commenter that the data support an efficiency no greater than 80 percent. In the testing program, we evaluated the capture efficiency of lime during four runs at a stoichiometric lime ratio of approximately 3:1. The results show that hydrochloric acid was removed at rates ranging from 86 to 91 percent with one exception. For that one run, the removal was calculated as 81 percent. For reasons detailed in the Comment Response Document and in the technical support document,[170] we conclude that the data from this run should not be considered because the calculated stoichiometric lime ratio is suspect. When we remove this data point from consideration, the available information clearly indicates that dry lime scrubbing at a stoichiometric ratio of 3:1 can achieve greater than 85 percent removal. Therefore, in the final rule, we base the beyond-the-floor standard of 230 ppmv on 85 percent removal.

Limiting the Feedrate of Chlorine in the Hazardous Waste. We also considered a beyond-the-floor standard for hydrochloric acid/chlorine gas based on additional feedrate control of chlorine in the hazardous waste. This option achieves lower emission reductions and is less cost-effective than the dry lime scrubbing option discussed above. Therefore, we are not adopting a hydrochloric acid/chlorine gas beyond-the-floor standard based on limiting the feed of chlorine in the hazardous waste.

Limiting the Feedrate of Chlorine in the Raw Materials. A source can achieve a reduction in hydrochloric acid/ chlorine gas emissions by substituting a feed material containing lower levels of chlorine for a primary raw material higher chlorine levels. This beyond-the-floor option appears to be less cost effective compared to either of the options evaluated above because lightweight aggregate kilns are sited proximate to primary raw material supply. Transporting large quantities of an alternative source of raw material(s) is expected to be very costly and not cost-effective considering the limited emissions reductions that would be achieved. Therefore, we do not adopt this hydrochloric acid/chlorine gas beyond-the-floor standard.

In summary, we establish the hydrochloric acid/chlorine gas standard for existing lightweight aggregate kilns at 230 ppmv based on scrubbing.

c. What Is the MACT Floor for New Sources? In the April 1996 proposal, we defined MACT floor control for new sources as a venturi scrubber with a hazardous waste feedrate level of 14 g/ dscm, expressed as a maximum theoretical emissions concentration. We proposed a floor emission level of 62 ppmv. (61 FR at 17409.) In the May 1997 NODA, we concluded that the floor control and emission level for existing sources for hydrochloric acid/ chlorine gas would also be appropriate for new sources. Floor control was based on limiting hazardous waste feedrates of chlorine to control hydrochloric acid/chlorine gas emissions. We screened out some data with anomalous system removal efficiencies compared to the majority of sources. The floor emission level for new lightweight aggregate kilns was 43 ppmv. (62 FR at 24235.)

In the final rule, we use a similar engineering evaluation and data analysis method as discussed in the May 1997 NODA to establish the floor emission level for hydrochloric acid/ chlorine gas. We identified MACT floor control as wet scrubbing since the best controlled source is using this control technology. One lightweight aggregate facility uses venturi-type wet scrubbers for the control of hydrochloric acid/ chlorine gas. We evaluated the chlorine system removal efficiencies achieved by wet scrubbing at this facility. Our data show that this facility is consistently achieving greater than 99 percent control of hydrochloric acid/chlorine gas. Because we have no data with system removal efficiencies indicative of poor performance, we conclude that all data from this facility are reflective of MACT control (wet scrubbers), and, therefore, the floor emission limit for new sources is set equal to the highest test condition average of these data. Thus, the MACT floor emission limit for new lightweight aggregate kilns is identified as 41 ppmv.

d. What Are Our Beyond-the-Floor Considerations for New Sources? In the April 1996 proposal and May 1997 NODA, we did not propose a beyond-the-floor standard for new sources because the floor emission level was based on wet scrubbing, which is the best available control technology for hydrochloric acid/chlorine gas. (61 FR at 17409 and 62 FR at 24235.) We continue to believe that a beyond-the-floor emission level for new sources is not warranted due to the high costs of treatment and the small additional amount of chlorine that would be removed. Therefore, the MACT standard for new lightweight aggregate kilns is identified as 41 ppmv.

8. What Are the Hydrocarbon and Carbon Monoxide Standards?

In the final rule, we establish hydrocarbon and carbon monoxide standards as surrogates to control emissions of nondioxin organic hazardous air pollutants for existing and

[169] See "Final Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies," July 1999.

[170] See "Final Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies," July 1999.

new lightweight aggregate kilns. The standards limit hydrocarbon and carbon monoxide concentrations to 20 ppmv [171] or 100 ppmv, [172] respectively. Existing and new lightweight aggregate kilns can elect to comply with either the hydrocarbon limit or the carbon monoxide limit on a continuous basis. Lightweight aggregate kilns that choose to comply with the carbon monoxide limit on a continuous basis must also demonstrate compliance with the hydrocarbon standard during the comprehensive performance test. However, continuous hydrocarbon monitoring following the performance test is not required.[173] We discuss the rationale for establishing these standards below.

a. What Is the MACT Floor for Existing Sources? As discussed in Part Four, Section II.A.2, we proposed limits on hydrocarbon and carbon monoxide emissions as surrogates to control nondioxin organic hazardous air pollutants. In the April 1996 NPRM, we identified floor control as combustion of hazardous waste under good combustion practices to minimize the generation of fuel-related hydrocarbons. We proposed a hydrocarbon emission level of 14 ppmv and a carbon monoxide level of 100 ppmv. The hydrocarbon level was based on an analysis of the available emissions data, while the basis of the carbon monoxide level was existing federal regulations (see § 266.104(b)). (61 FR at 17407.) In the May 1997 NODA, we solicited comment a hydrocarbon emission level of 10 ppmv. The hydrocarbon floor level was changed to 10 ppmv from 14 ppmv because of a change in the lightweight aggregate kiln universe of facilities. The lightweight aggregate kiln with the highest hydrocarbon emissions stopped burning hazardous waste. With the exclusion of the hydrocarbon data from this one source, the remaining lightweight aggregate kilns appeared to be able to meet a hydrocarbon standard on the order of 6 ppmv. However, since we were unable to identify an engineering reason why lightweight aggregate kilns using good combustion practices should be able to achieve lower hydrocarbon emissions than incinerators, we indicated that it may be more appropriate to establish the hydrocarbon standard at 10 ppmv, which was equal to the incinerator emission level discussed in that NODA. In the NODA, we also continued to indicate our preference for a carbon monoxide emission level of 100 ppmv. (62 FR at 24235.)

One commenter states that some lightweight aggregate kilns may not be able to meet a 10 ppmv hydrocarbon standard due to organics in raw materials. Notwithstanding our data base of short-term data indicating the achievability of a hydrocarbon standard of 10 ppmv, the commenter states that this standard may be unachievable over the long-term because trace levels of organic matter in the raw materials vary significantly. Hydrocarbon emissions could increase as the source uses raw materials from different on-site quarry locations. Thus, the commenter supports a hydrocarbon emission level consistent with cement kilns (*i.e.*, 20 ppmv), and opposes a floor emission level that is comparable to incinerators for which low temperature organics desorption from raw materials is not a complicating issue.

Our limited hydrocarbon data, as discussed above, indicates that a hydrocarbon level of 10 ppmv is achievable for lightweight aggregate kilns.[174] However, we agree that over long-term operations, lightweight aggregate kilns may encounter variations in the level of trace organics in raw materials, similar to cement kilns, that may preclude some kilns from achieving a hydrocarbon limit of 10 ppmv. Thus, we conclude that a hydrocarbon emission level of 20 ppmv, the same floor level for cement kilns, is also appropriate for lightweight aggregate kilns. A hydrocarbon standard of 20 ppmv also is based on existing federally-enforceable RCRA regulations, to which lightweight aggregate kilns are currently subject. (See § 266.104(c).)

Some commenters also support a requirement for both a carbon monoxide and hydrocarbon limit for lightweight aggregate kilns. These commenters state that requiring both hydrocarbon and carbon monoxide limits would further reduce emissions of organic hazardous air pollutants. One commenter notes that 83 percent of existing lightweight aggregate kilns are currently achieving both a hydrocarbon level of 20 ppmv and a carbon monoxide standard of 100 ppmv.

We carefully considered the merits and drawbacks to requiring both a hydrocarbon and carbon monoxide standard. First, stack gas carbon monoxide levels may not be a universally reliable indicator of combustion intensity and efficiency for some lightweight aggregate kilns due, first, to carbon monoxide generation by disassociation of carbon dioxide to carbon monoxide at high temperatures and, second, to evolution of carbon monoxide from the trace organic constituents in raw material feedstock.[175] One commenter supports our view by citing normal variability in carbon monoxide levels at their kiln with no apparent relationship to combustion conditions, such as temperature, residence time, excess oxygen levels. Thus, carbon monoxide can be overly conservative surrogate for some kilns.[176]

Second, requiring both continuous monitoring of carbon monoxide and hydrocarbon in the stack is at least somewhat redundant for control of organic emissions from combustion of hazardous waste because: (1) Hydrocarbons alone are a direct and reliable surrogate for measuring the destruction of organic hazardous air pollutants; and (2) carbon monoxide is generally a conservative indicator of good combustion conditions and thus good control of organic hazardous air pollutants. See Part Four, Section IV.B of the preamble for a discussion of our approach to using carbon monoxide or hydrocarbons to control organic emissions.

We identify a carbon monoxide level of 100 ppmv and a hydrocarbon level of 20 ppmv as floor control for existing sources because they are existing federally enforceable standards for hazardous waste burning lightweight aggregate kilns. See § 266.104(b) and (c). As current rules allow, sources would have the option of complying with either limit. Given that these are current rules, all lightweight aggregate kilns can currently achieve these emission levels. Thus, we estimate no emissions reductions or costs for these floor levels.

Lightweight aggregate kilns that choose to continuously monitor and

[171] Hourly rolling average, reported as propane, dry basis and corrected to 7 percent oxygen.

[172] Hourly rolling average, dry basis, corrected to 7 percent oxygen.

[173] As discussed in Part 5, Section X.F, lightweight aggregate kilns that feed hazardous waste at a location other than the end where products are normally discharged and where fuels are normally fired must comply with the 20 ppmv hydrocarbon standards (*i.e.*, these sources do not have the option to comply with the carbon monoxide standard).

[174] Our data base for hydrocarbons consists of short-term emissions data.

[175] Raw materials enter the upper end of the kiln and move counter-current to the combustion gas. Thus, as the raw materials are convectively heated in the upper end kiln above the flame zone, organic compounds can evolve from trace levels of organics in the raw materials. These organic compounds can be measured as hydrocarbons, and when only partially oxidized, carbon monoxide. This process is not related to combustion of hazardous waste or other fuels in the combustion zone at the other end of the kiln.

[176] Of course, if a source elects to comply with the carbon monoxide standard, then we are sure that it is achieving good combustion conditions and good control of organic hazardous air pollutants that could be potentially emitted from hazardous waste fed into the combustion zone.

comply with the carbon monoxide standard must demonstrate during the performance test that they are also in compliance with the hydrocarbon emission standard. In addition, kilns that monitor carbon monoxide alone must also set operating limits on key parameters that affect combustion conditions to ensure continued compliance with the hydrocarbon emission standard. We developed this modification because of some limited data that show a source can produce high hydrocarbon emissions while simultaneously producing low carbon monoxide emissions. We conclude from this information that it is necessary to confirm the carbon monoxide-hydrocarbon emissions relationship for every source that selects to monitor carbon monoxide emissions alone. See discussion in Part Four, Section IV.B.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? In the April 1996 proposal, we identified beyond-the-floor control levels for carbon monoxide and hydrocarbon in the main stack of 50 ppmv and 6 ppmv, respectively. (61 FR at 17407.) These beyond-the-floor levels were based on the use of a combustion gas afterburner. We indicated in the proposal, however, that this type of beyond-the-floor control would be cost prohibitive. Our preliminary estimates suggested that going beyond-the-floor for carbon monoxide and hydrocarbons would more than double the national costs of complying with the proposed standards. We continue to believe that a beyond-the-floor standard for carbon monoxide and hydrocarbons based on an afterburner is not justified and do not adopt a beyond-the-floor standard for existing lightweight aggregate kilns.

In summary, we adopt the floor emission levels for hydrocarbons, 20 ppmv, or carbon monoxide, 100 ppmv, as standards in the final rule.

c. What Is the MACT Floor for New Sources? In the April 1996 NPRM, we identified MACT floor control as operating the kiln under good combustion practices. Because we were unable to quantify good combustion practices, floor control for the single best controlled source was the same as for existing sources. We proposed, therefore, a floor emission level of 14 ppmv for hydrocarbons and a 100 ppmv limit for carbon monoxide. (61 FR at 17409.) In the May 1997 NODA, we continued to identify MACT floor control as good combustion practices and we took comment on the same emission levels as existing sources: 20 ppmv for hydrocarbons and 100 ppmv for carbon monoxide. (62 FR at 24235.)

In developing the final rule, we considered the comment that the rule should allow compliance with either a carbon monoxide standard of 100 ppmv or a hydrocarbon standard of 20 ppmv. Given that this option is available under the existing regulations for new and existing sources, we conclude that this represents MACT floor for new sources. These emission levels are achieved by operating the kiln under good combustion practices to minimize fuel-related hydrocarbons and carbon monoxide emissions. As current rules allow, sources would have the option of complying with either limit. See § 266.104(b) and (c).

We also considered site selection based on availability of acceptable raw material hydrocarbon content as an approach to establish a hydrocarbon emission level at new lightweight aggregate kilns. This approach is similar to that done for new hazardous waste burning cement kilns at greenfield sites (see discussion above). For cement kilns, we finalize a new source floor hydrocarbon emission standard at a level consistent with the proposed standard for nonhazardous waste burning cement kilns. Because we are planning to issue MACT emission standards for nonhazardous waste lightweight aggregate kiln sources, we will revisit establishing a hydrocarbon standard at new lightweight aggregate kilns at that time so that a hydrocarbon standard, if determined appropriate, is consistent for these sources. We are deferring this decision to a later date to ensure that hazardous waste sources are regulated no less stringently than nonhazardous waste lightweight aggregate kilns.

In summary, we are identifying a carbon monoxide level of 100 ppmv and a hydrocarbon level of 20 ppmv as floor control for new sources because they are existing federally enforceable standards for hazardous waste burning lightweight aggregate kilns. As discussed for existing sources above, lightweight aggregate kilns that choose to continuously monitor and comply with the carbon monoxide standard must demonstrate during the performance test that they are also in compliance with the hydrocarbon emission standard.

d. What Are Our Beyond-the-Floor Considerations for New Sources? In the April 1996 proposal, we identified beyond-the-floor emission levels for hydrocarbons and carbon monoxide of 6 ppmv and 50 ppmv, respectively for new sources. These beyond-the-floor levels were based on the use of a combustion gas afterburner. (61 FR at 17409.) We indicated in the proposal, however, that beyond-the-floor control was not justified due to the significant costs to retrofit kilns with afterburner controls. We estimated that going beyond-the-floor for hydrocarbons and carbon monoxide would more than double the national costs of complying with the proposed standards. We concluded that beyond-the-floor standards were not warranted. In the May 1996 NODA, we again indicated that a beyond-the-floor standard based on use of an afterburner would not be cost-effective and, therefore, justified. As discussed above for existing sources, we conclude that a beyond-the-floor standard for carbon monoxide and hydrocarbons based on use of an afterburner would not be justified and do not adopt a beyond-the-floor standard for new lightweight aggregate kilns. (62 FR 24235.)

In summary, we adopt the floor emission levels for hydrocarbons, 20 ppmv, or carbon monoxide, 100 ppmv, as standards in the final rule.

9. What Are the Standards for Destruction and Removal Efficiency?

We establish a destruction and removal efficiency (DRE) standard for existing and new lightweight aggregate kilns to control emissions of organic hazardous air pollutants other than dioxins and furans. Dioxins and furans are controlled by separate emission standards. See discussion in Part Four, Section IV.A. The DRE standard is necessary, as previously discussed, to complement the carbon monoxide and hydrocarbon emission standards, which also control these hazardous air pollutants.

The standard requires 99.99 percent DRE for each principal organic hazardous constituent (POHC), except that 99.9999 percent DRE is required if specified dioxin-listed hazardous wastes are burned. These wastes—F020, F021, F022, F023, F026, and F027—are listed as RCRA hazardous wastes under part 261 because they contain high concentrations of dioxins.

a. What Is the MACT Floor for Existing Sources? Existing sources are currently subject to DRE standards under § 266.104(a) that require 99.99 percent DRE for each POHC, except that 99.9999 percent DRE is required if specified dioxin-listed hazardous wastes are burned. Accordingly, these standards represent MACT floor. Since all hazardous waste lightweight aggregate kilns must currently achieve these DRE standards, they represent floor control.

b. What Are Our Beyond-the-Floor Considerations for Existing Sources? Beyond-the-floor control would be a requirement to achieve a higher percentage DRE, for example, 99.9999 percent DRE for POHCs for all hazardous wastes. A higher DRE could be achieved by improving the design, operation, or maintenance of the combustion system to achieve greater combustion efficiency.

Even though the 99.99 percent DRE floor is an existing RCRA standard, a substantial number of existing hazardous waste combustors are not likely to be routinely achieving 99.999 percent DRE, however, and most are not likely to be achieving 99.9999 percent DRE. Improvements in combustion efficiency will be required to meet these beyond-the-floor DREs. Improved combustion efficiency is accomplished through better mixing, higher temperatures, and longer residence times. As a practical matter, most combustors are mixing-limited and may not easily achieve 99.9999 percent DRE. For a less-than-optimum burner, a certain amount of improvement may typically be accomplished by minor, relatively inexpensive combustor modifications—burner tuning operations such as a change in burner angle or an adjustment of swirl—to enhance mixing on the macro-scale. To achieve higher DREs, however, improved mixing on the micro-scale may be necessary. This involves significant, energy intensive and expensive modifications such as burner redesign and higher combustion air pressures. In addition, measurement of such DREs may require increased spiking of POHCs and more sensitive stack sampling and analysis methods at added expense.

Although we have not quantified the cost-effectiveness of a beyond-the-floor DRE standard, it would not appear to be cost-effective. For reasons discussed above, the cost of achieving each successive order-of-magnitude improvement in DRE will be at least constant, and more likely increasing. Emissions reductions diminish substantially, however, with each order of magnitude improvement in DRE. For example, if a source were to emit 100 gm/hr of organic hazardous air pollutants assuming zero DRE, it would emit 10 gm/hr at 90 percent DRE, 1 gm/hr at 99 percent DRE, 0.1 gm/hr at 99.9 percent DRE, 0.01 gm/hr at 99.99 percent DRE, and 0.001 gm/hr at 99.999 percent DRE. If the cost to achieve each order of magnitude improvement in DRE is roughly constant, the cost-effectiveness of DRE decreases with each order of magnitude improvement in DRE. Consequently, we conclude that this relationship between compliance cost and diminished emissions reductions suggests that a beyond-the-floor standard is not warranted in light of the resulting, poor cost-effectiveness.

c. What Is the MACT Floor for New Sources? The single best controlled source, and all other hazardous waste lightweight aggregate kilns, are subject to the existing RCRA DRE standard under § 266.104(a). Accordingly, we adopt this standard of 99.99% DRE for most wastes and 99.9999% DRE for dioxin listed wastes as the MACT floor for new sources.

d. What Are Our Beyond-the-Floor Considerations for New Sources? As discussed above, although we have not quantified the cost-effectiveness of a more stringent DRE standard, diminishing emissions reductions with each order of magnitude improvement in DRE suggests that cost-effectiveness considerations would likely come into play. We conclude that a beyond-the-floor standard is not warranted.

Part Five: Implementation

I. How Do I Demonstrate Compliance with Today's Requirements?

If you operate a hazardous waste burning incinerator, cement kiln, or lightweight aggregate kiln, you are required to comply with the standards and requirements in today's rule at all times, with one exception. If you are not feeding hazardous waste to the combustion device and if hazardous waste does not remain in the combustion chamber, these rules do not apply under certain conditions discussed below. You must comply with all of the notification requirements, emission standards, and compliance and monitoring provisions of today's rule by the compliance date, which is three years after September 30, 1999. As referenced later, the effective date of today's rule is September 30, 1999. The compliance and general requirements of this rule are discussed in detail in the follow sections. Also, we have included the following time line that will assist you in determining when many of the notifications and procedures, discussed in the later sections of this part, are required to be submitted or accomplished.

A. What Sources Are Subject to Today's Rules?

Sources affected by today's rule are defined as all incinerators, cement kilns and lightweight aggregate kilns burning hazardous waste on, or following September 30, 1999. This definition is essentially the same as we proposed in the April 1996 NPRM. Comments, regarding this definition, suggested that there was confusion as to when and under what conditions you would be subject to today's hazardous waste MACT regulations. In this rule, we specify that once you are subject to today's regulations, you remain subject to these regulations until you comply with the requirements for sources that permanently suspend hazardous waste burning operations, as discussed later.

However, just because you are subject to today's regulations does not mean that you must comply with the emission standards or operating limits at all times. In later sections of today's rule, we identify those limited periods and situations in which compliance with today's emission standards and operating limits may not be required.

1. What Is an Existing Source?

Today's rule clarifies that existing sources are sources that were constructed or under construction on the publication date for our NPRM—-April 19, 1996. This is consistent with the current regulatory definition of existing sources, but is different from the definition in our April 1996 NPRM. In the April 1996 NPRM, we defined existing sources as those burning hazardous waste on the proposal date (April 19, 1996) and defined new sources as sources that begin burning hazardous waste after the proposal date. Commenters note that the proposed definition of new sources is not consistent with current regulations found in 40 CFR part 63 or the Clean Air Act. Commenters also believe that our definition does not consider the intent of Congress, i.e., to require only those sources that incur significant costs during upgrade or modification to meet the most stringent new source emission standards. Commenters note that a large number of sources that are currently not burning hazardous waste could modify their combustion units to burn hazardous waste at a cost that would not surpass the reconstruction threshold and therefore they should not be required to meet the new source emission standards. Commenters suggest we use the statutory definition of an existing source found at section 112(a)(4) of the CAA and codified at 40 CFR 63.2. We agree with commenters and therefore adopt the definition of an existing source found at 40 CFR 63.2.

2. What Is a New Source?

Today's rule clarifies that new sources are those that commence construction or meet the definition of a reconstructed source following the proposal date of April 19, 1996. In the proposal, we define new sources as those that newly begin to burn hazardous waste after the proposal date. However, as noted earlier, commenters object to the proposed definition because of conflicts with the statutory language of the CAA and the current definition found in MACT regulations. In the CAA regulations, we define new sources as those that are newly constructed or reconstructed after a rule is proposed. Here again, we agree with commenters and adopt the current regulatory definition of new sources. We also adopt the CAA definition of reconstruction. This definition also is generally consistent with the RCRA definition of reconstruction and should avoid any confusion regarding what standards apply to reconstructed sources.

B. How Do I Cease Being Subject to Today's Rule?

Once you become an affected source as defined in § 63.2, you remain an affected source until you: (1) Cease hazardous waste burning operations, (*i.e.*, hazardous waste is not in the combustion chamber); (2) notify the Administrator, and other appropriate regulatory authorities, that you have ceased hazardous waste burning operations; and (3) begin complying with other applicable MACT standards and regulations, if any, including notifications, monitoring and performance tests requirements.

If you permanently stop burning hazardous waste, the RCRA regulations require you to initiate closure procedures within three months of the date you received your last shipment of hazardous waste, unless you have obtained an extension from the Administrator. The requirement to initiate closure pertains to your RCRA status and should not be a barrier to operational changes that affect your regulatory status under today's MACT requirements. This approach is a departure from the requirements proposed in the April 1996 NPRM, but is consistent with the approach we identified in the May 1997 NODA.

Once you permanently stop burning hazardous waste, you may only begin burning hazardous waste under the procedures outlined for new or existing sources that become affected sources following September 30, 1999. See later discussion.

C. What Requirements Apply If I Temporarily Cease Burning Hazardous Waste?

Under today's rule, if you temporarily cease burning hazardous waste for any reason, you remain subject to today's requirements as an affected source. However, even as an affected source, you may not have to comply with the emission standards or operating limits of today's rule when hazardous waste is not in the combustion chamber. Today's standards, associated operating parameter limits, and monitoring requirements are applicable at all times unless hazardous waste is not in the combustion chamber and either: (1) You elect to comply with other MACT standards that would be applicable if you were not burning hazardous waste (e.g. the nonhazardous waste burning Portland Cement Kiln MACT, the nonhazardous waste burning lightweight aggregate kiln MACT (Clay Products Manufacturing), or the Industrial Incinerator MACT); or (2) you are in a startup, shutdown, or malfunction mode of operation. We note that until these alternative MACT standards are promulgated, you need to comply only with other existing applicable air requirements if any. This approach is consistent with the current RCRA regulatory approach for hazardous waste combustion sources, but differs from our April 1996 proposed approach.

In our April 1996 NPRM, we proposed that sources always be subject to all of the proposed regulatory requirements, regardless of whether hazardous waste was in the combustion chamber. Commenters question the legitimacy of this requirement because the requirement was: (1) more stringent than current requirements; (2) not based on CAA statutory authority; and (3) contrary to current allowances under current MACT general provisions.

In response, we agree with commenters on issues (1) and (3) above. However, we disagree with commenters on issue number (2). The CAA does not allow sources to be subject to multiple MACT standards simultaneously. Because current CAA regulations also allow sources to modify their operations such that they can become subject to different MACT rules so long as they provide notification to the Administrator, our proposed approach appears to further complicate a situation that it was intended to resolve. One of the main reasons we proposed to subject hazardous waste burning sources to the final standards at all times was to eliminate the ability of sources to arbitrarily switch between regulation as a hazardous waste burning source and regulation as a nonhazardous waste burning source. We were concerned about the compliance implications associated with numerous notifications to the permitting authority to govern operations that may only occur for a short period of time. However, our concern appears unfounded because the MACT general provisions currently allow sources to change their regulatory status following notification, and we cannot achieve this goal without restructuring the entire MACT program. Therefore, consistent with the current program, we adopt an approach that allows a source to comply with alternative compliance requirements, while remaining subject to today's rule. This regulatory approach eliminates the reporting requirements and compliance determinations we intended to avoid with our proposed approach, while preserving the essence of the current RCRA approach, which applies more stringent emissions standards when hazardous waste is in the combustor.

1. What Must I Do to Comply with Alternative Compliance Requirements?

If you wish to comply with alternative compliance requirements, you must: (1) Comply with all of the applicable notification requirements of the alternative regulation; (2) comply with all the monitoring, record keeping and testing requirements of the alternative regulation; (3) modify your Notice Of Compliance (or Documentation of Compliance) to include the alternative mode(s) of operation; and (4) note in your operating record the beginning and end of each period when complying with the alternative regulation.

If you intend to comply with an alternative regulation for longer than three months, then you also must comply with the RCRA requirements to initiate RCRA closure. You may be able to obtain an extension of the date you are required to begin RCRA closure by submitting a request to the Administrator.

2. What Requirements Apply If I Do Not Use Alternative Compliance Requirements?

If you elect not to use the alternative requirements for compliance during periods when you are not feeding hazardous waste, you must comply with all of the operating limits, monitoring requirements, and emission standards of this rule at all times.[177] However, if you are a kiln operator, you also may be able to obtain and comply with the raw material variance discussed later.

D. What Are the Requirements for Startup, Shutdown and Malfunction Plans?

Sources affected by today's rule are subject to the provisions of 40 CFR 63.6 with regard to startup, shutdown and malfunction plans. However, the plan applies only when hazardous waste is

[177] The operating requirements do not apply during startup, shutdown, or malfunction provided that hazardous waste is not in the combustion chamber. See the discussion below in the text.

not in the combustion chamber. If you exceed an operating requirement during startup, shutdown, or malfunction when hazardous waste is in the combustion chamber, your exceedance is not excused by following your plan. If you exceed an operating requirement during startup, shutdown, or malfunction when hazardous waste is not in the combustion chamber, you must follow your startup, shutdown, and malfunction plan to come back into compliance as quickly as possibly, unless you have elected to comply with the requirements of alternative section 112 or 129 regulations that would apply if you did not burn hazardous waste. Failure to comply with the operating requirements to follow your startup, shutdown, and malfunction plan during the applicable periods is representative of a violation and may subject you to appropriate enforcement action.

In the April 1996 NPRM (see 63 FR at 17449), we proposed that startup, shutdown, and malfunction plans would not be applicable to sources affected by the proposed rule because affected sources must be in compliance with the standards at all times hazardous waste is in the combustion chamber. We reasoned that hazardous waste could not be fired unless you were in compliance with the emission standards and operating requirements, and stated that the information contained in the plan and the purpose of the plan was not intended to apply to sources affected by this rule.

In response, commenters state that startup, shutdown, and malfunction plans are appropriate for hazardous waste burning sources because malfunctioning operations are going to occur, and these plans are designed to reestablish compliant or steady state operations as quickly as possible. Furthermore, commenters maintain that because sources must prepare and follow facility-specific plans to address situations that could lead to increased emissions, rather than just note such an occurrence in the operating record, the public and we are better assured that the noncompliant operations are being remedied rather than awaiting for an after-the-fact enforcement action. Commenters also note that hazardous waste burning sources are no different than other MACT sources who are required to use such plans.

After considering comments, we agree with commenters that startup, shutdown, and malfunction plans are valuable compliance tools and should be applicable to hazardous waste burning sources. However, we are concerned that some sources may attempt to use startup, shutdown, and malfunction plans to circumvent enforcement actions by claiming they were never out of compliance if they followed their plan. Therefore, we restrict the applicability of startup, shutdown, and malfunction plans to periods when hazardous waste is not in the combustion chamber. This restriction addresses the concern that operations under startup, shutdown, and malfunction could lead to increased emissions of hazardous air pollutants.

We considered whether to specifically prohibit sources from feeding hazardous waste during periods of startup and shutdown. However, we decided not to adopt this requirement because of a potential regulatory problem. The requirement could have inadvertently subjected sources that experience unscheduled shutdowns to enforcement action if hazardous waste remained in the combustion chamber during the shutdown process even if operating requirements were not exceeded. Additionally, we decided that the prohibition was unnecessary because performance test protocols restrict the operations of all sources when determining operating parameter limits. The following factors are pertinent in this regard: (1) Sources are required to be in compliance with their operating parameter limits at all times hazardous waste is in the combustion chamber; (2) operating parameter limits are determined through a performance test which must be performed under steady-state conditions (see § 63.1207(g)(1)(iii)); and (3) periods of startup and shutdown are not steady state conditions and therefore operating parameter limits determined through performance testing would not be indicative of those periods. Accordingly, burning hazardous waste during startup or shutdown would significantly increase the potential for a source to exceed an operating parameter limit, and we expect that sources would be unwilling to take that chance as a practical matter.

E. What Are the Requirements for Automatic Waste Feed Cutoffs?

As proposed, you must operate an automatic waste feed cutoff system that immediately and automatically cuts off hazardous waste feed to the combustion device when:

(1) Any of the following are exceeded: Operating parameter limits specified in § 63.1209; an emission standard monitored by a continuous emissions monitoring system; and the allowable combustion chamber pressure; (2) The span value of any continuous monitoring system, except a continuous emissions monitoring system, is met or exceeded; (3) A continuous monitoring system monitoring an operating parameter limit under § 63.1209 or emission level malfunctions; or (4) Any component of the automatic waste feed cutoff system fails.

These requirements are provided at § 63.1206(c)(3). The system must be fully functional on the compliance date and interlocked with the operating parameter limits you specify in the Document of Compliance (as discussed later) as well as the other parameters listed above.

Also as proposed, after an automatic waste feed cutoff, you must continue to route combustion gases through the air pollution control system and maintain minimum combustion chamber temperature as long as hazardous waste remains in the combustion chamber. These requirements minimize emissions of regulated pollutants, including organic hazardous air pollutants, that could result from a perturbation caused by the waste feed cutoff. Additionally, you must continue to calculate all rolling averages and cannot restart feeding hazardous waste until all operating limits are within allowable levels.

Additionally, as currently required for BIFs, we proposed that the automatic waste feed cutoff system and associated alarms must be tested at least once every seven days. This must be done when hazardous waste is burned to verify operability, unless you document in the operating record that weekly inspections will unduly restrict or upset operations and that less frequent inspections will be adequate. At a minimum, you must conduct operational testing at least once every 30 days.

Commenters express the following concerns with the proposed automatic waste feed cutoff requirements: (1) Violations of the automatic waste feed cutoff linked operating parameters should not constitute a violation of the associated emission standard; (2) apparent redundancy exists between the proposed MACT requirements with the current RCRA requirements; (3) the proposed automatic waste feed cutoff requirements are inappropriate for all sources; and (4) uncertainty exists about how ''instantaneous'' is defined with regard to the nature of the automatic waste feed cutoff requirement.

We address issue (1) later in this section. With respect to issue (2), our permitting approach (*i.e.*, a single CAA title V permit to control all stack emissions) minimizes the potential redundancy of two permitting programs.

In response to issue (3), we acknowledge that not all sources may be capable of setting operating limits or continuously monitoring all of the prescribed operating parameters due to unique design characteristics inherent to individual units. However, you may take advantage of the provisions found in § 63.8(f) which allow you to request the use of alternative monitoring techniques. See also § 63.1209(g)(1).

For issue (4), commenters express concern that requiring an immediate, instantaneous, and abrupt cutoff of the entire waste feed can cause perturbations in the combustion system that could result in exceedances of additional operating limits. We agree with commenters that a ramping down of the waste feedrate could preclude this problem in many cases and in the final rule allow a one-minute ramp down for pumpable wastes. To ensure that your ramp down procedures are bona fide and not simply a one-minute delay ending in an abrupt cutoff, you must document your ramp down procedures in the operating and maintenance plan. The procedures must specify that the ramp down begins immediately upon initiation of automatic waste feed cutoff and provides for a gradual ramp down of the hazardous waste feed. Note that if an emission standard or operating limit is exceeded during the ramp down, you nonetheless have failed to comply with the emission standards or operating requirements. The ramp down is not applicable, however, if the automatic waste feed cutoff is triggered by an exceedance of any of the following operating limits: minimum combustion chamber temperature; maximum hazardous waste feedrate; or any hazardous waste firing system operating limits that may be established for your combustor on a site-specific basis. This is because these operating conditions are fundamental to proper combustion of hazardous waste and an exceedance could quickly result in an exceedance of an emission standard. We restrict the ramp down to pumpable wastes because: (1) Solids are often fed in batches where ramp down is not relevant (*i.e.*, ramp down is only relevant to continuously fed wastes); and (2) incinerators burning solids also generally burn pumpable wastes and ramping down on pumpables only should preclude the combustion perturbations that could occur if all wastes were abruptly cutoff.

Finally, with respect to issue number (1), if you exceed an operating parameter limit while hazardous waste is in the combustion chamber, then you have failed to ensure compliance with the associated emission standard. Accordingly, appropriate enforcement action on the exceedance can be initiated to address the exceedance. This enforcement process is consistent with current RCRA enforcement procedures regarding exceedances of operating parameter limits. However, as commenters note, we acknowledge that an exceedance of an operating parameter limit does not necessarily demonstrate that an associated emissions standard is exceeded. Nevertheless, in general, an exceedance of an operating parameter limit in a permit or otherwise required is an actionable event for enforcement purposes.

Operating parameter limits are developed through performance tests that successfully demonstrate compliance with the standards. If a source exceeds an operating limit set during the performance test to show compliance with the standard, the source can no longer assure compliance with the associated standard. Furthermore, these operating parameter limits appear in enforceable documents, such as your NOC or your title V permit.

F. What Are the Requirements of the Excess Exceedance Report?

In today's rule, we finalize the requirement to report to the Administrator when you incur 10 exceedances of operating parameter limits or emissions standards monitored with a continuous emissions monitoring system within a 60 day period. See § 63.1206(c)(3)(vi). If a source has 10 exceedances within the 60 day period, the 60 day period restarts after the notification of the 10th exceedance. This provision is intended to identify sources that have excess exceedances due to system malfunction or performance irregularities. This notification requirement both highlights the source to regulatory officials and provides an added impetus to the facility to correct the problem(s) that may exist to limit future exceedances. For example, a source that must submit an excess exceedance report may be unable to operate under its current operating limits, which suggests that the source may need to perform a new comprehensive performance test to establish more appropriate operating limits.

We discussed this provision in the April 1996 NPRM. Some commenters may have misunderstood our proposal while others felt that 10 exceedances in sixty days was not a feasible number to set the reporting limit. Other commenters state that an industry wide MACT-like analysis is necessary to identify an achievable or appropriate number of exceedances upon which to set the reporting limit.

We disagree with such comments. A MACT-like analysis is not called for in this case because this requirement is not an emission standard. This is a notification procedure that is a compliance tool to identify sources that cannot operate routinely in compliance with their operating parameter limits and emissions standards monitored with a continuous emissions monitoring system. Ideally, all sources should operate in compliance with all the standards and operating parameter limits at all times. Because, in the past, sources have been able to exceed their operating limits without having to notify the Agency, this does not mean that we condone, expect, or are unconcerned with such activity. In fact, the main reason we require this notification is because such activity exists to the current extent and because the Regions and States have identified it as a problem. We select 10 exceedances in sixty days as the value that triggers reporting after discussions with Regional and State permit writers. Our discussions revealed that many hazardous waste combustion sources are required to notify regulatory officials following a single exceedance of an operating limit, while others don't have any reporting requirements linked to exceedances. Regions and States noted that because there is no current regulatory requirement for exceedance notifications, it is very difficult to require such notifications on a site-specific basis. Following these discussions, we contemplated requiring a notification following a single exceedance, but decided that the such a reporting limit might unnecessarily burden regulatory officials with reports from facilities that have infrequent exceedances. Therefore, our approach of 10 exceedances in a 60 day period is a reasonably implementable limit and is not overly burdensome. Adopting this approach achieves an appropriate balance between burden on facilities and regulators and the need to identify underlying operational problems that may present unacceptable risks to the public and environment.

To reiterate, this provision applies to any 10 exceedances of operating parameter limits or emission standards monitored with a continuous emissions monitoring system.

G. What Are the Requirements for Emergency Safety Vent Openings?

In today's rule, we finalize requirements that govern the operation of emergency safety vents. See § 63.1206(c)(4). These requirements: clarify the regulatory status of emergency safety vent events; require development of an emergency safety vent operating plan that specifies procedures to minimize the frequency and duration of emergency safety vent openings; and specify procedures to follow when an emergency safety vent opening occurs.

Key requirements regarding emergency safety vent openings include:

(1) Treatment of combustion gases—As proposed, you must route combustion system off-gases through the same emission control system used during the comprehensive performance test. Any bypass of the pollution control system is considered an exceedance of operating limits defined in the Documentation of Compliance (DOC) or Notification of Compliance (NOC);

(2) Emergency safety vent operating plan—As proposed, if you use an emergency safety vent in your system design, you must develop and submit with the DOC and NOC an emergency safety vent operating plan that outlines the procedures you will take to minimize the frequency and duration of emergency safety vent openings and details the procedure you will follow during and after an emergency safety vent opening; and

(3) Emergency safety vent reporting requirements—As proposed, if you operate an emergency safety vent, you must submit a report to the appropriate regulatory officials within five days of an emergency safety vent opening. In that report, you must detail the cause of the emergency safety vent opening and provide information regarding corrective measures you will institute to minimize such events in the future.

Commenters on the April 1996 NPRM (61 FR at 17440) state that emergency safety vent openings are safety devices designed to prevent catastrophic failures, safeguard the unit and operating personnel from pressure excursions and protect the air pollution control train from high temperatures and pressures. They suggest that restricting these operations is contrary to common sense. Furthermore, they state that emergency safety vent openings are most often due to local power outages and fluctuations in water flows going to the air pollution equipment. Commenters believe that emergency safety vent openings should not be considered violations and that not every emergency safety vent opening should be reportable for a variety of reasons including:

—Emergency safety vent openings have not been shown to be acutely hazardous. A study finds that they will not have any short-term impact on the health of workers on-site or residents of the nearby off-site community.
—Proper use of emergency safety vent systems minimizes the potential for impacts on operators and the neighboring public.
—Many emergency safety vents are downstream of the secondary combustion chamber and thus have low organic emissions.
—Some facilities have emergency safety vents connected to the air pollution control system and should be considered in compliance as long as the continuous emissions monitoring systems monitoring data does not indicate an exceedance.

Commenters propose several alternatives:

—Recording emergency safety vent openings (including the time, duration and cause of each event) in the operating record, available to the Administrator, or any authorized representative, upon request.
—Making emergency safety vent openings a part of startup, shutdown, malfunction and abatement plans.
—Reporting openings that occurs more frequently than once in any 90 day period, whereupon the Administrator may require corrective measures.
—Reporting only emergency safety vent openings in excess of 10 in a 60 day period.
—Conditions relating to an emergency safety vent operation should be a part of the site-specific permit.
—Rely on the present RCRA permit process which provides the opportunity for permit writers and hazardous waste combustion device owner/operators to review emergency safety vent system designs.

We agree that emergency safety vents are necessary safety devices for some incinerator designs that are intended to safeguard employees and protect the equipment from the dangers associated with system over-pressures or explosions. However, simply because emergency safety vents are necessary safety devices for some incinerator designs in the event of a major malfunction does not mean that their routine use is acceptable. We cannot overlook an event when combustion gases are emitted into the environment prior to proper treatment by the pollution control system. Therefore, an emergency safety vent opening is evidence that compliance is not being achieved. Nonetheless, we expect sources to continue to use safety vents when the alternative could be a catastrophic failure and substantial liability even though opening the vent is evidence of failure to comply with the emission standards.

Today's requirements are based on the fundamental need to ensure protection of human health and the environment against unquantified and uncontrolled hazardous air pollutant emissions. We do not agree that a change in the proposed emergency safety vent reporting requirement is warranted. These events are indicative of serious operational problems, and each event should be reported and investigated to reduce the potential of future similar events. As for including the emergency safety vent operating plan in the source-specific startup, shutdown, and malfunction plan, we see no reason to discourage that practice provided that a combined plan specifically addresses the events preceding and following an emergency safety vent opening.

H. What Are the Requirements for Combustion System Leaks?

You must prevent leaks of gaseous, liquid or solid materials from the combustion system when hazardous waste is being fed to or remains in the combustion chamber. To demonstrate compliance with this requirement you must either: (1) Maintain the combustion system pressure lower than ambient pressure at all times; (2) totally enclose the system; or (3) gain approval from the Administrator to use an alternative approach that provides the same level of control achieved by options 1 and 2.

Currently, these requirements exist for all sources under RCRA regulations. Many commenters question whether they were capable of meeting this requirement for various technical reasons. We acknowledge that certain situations may exist that prevent or limit a source from instantaneously monitoring pressure inside the combustion system, but in such situations, we can approve alternative techniques (under § 63.1209(g)(1)) that allow sources to achieve the objectives of the requirements. Because this requirement is identical to the current RCRA requirements, and because we have specifically provided alternative techniques to demonstrate compliance, modifications to this provision are not warranted.

I. What Are the Requirements for an Operation and Maintenance Plan?

You must prepare and at all times operate according to a operation and maintenance plan that describes in detail procedures for operation, inspection, maintenance, and corrective measures for all components of the combustor, including associated pollution control equipment, that could affect emissions of regulated hazardous air pollutants. The plan must prescribe how you will operate and maintain the combustor in a manner consistent with good air pollution control practices for minimizing emissions at least to the levels achieved during the comprehensive performance test. You must record the plan in the operating record. See § 63.1206(c)(7)(i).

In addition, if you own or operate a hazardous waste incinerator or hazardous waste burning lightweight aggregate kiln equipped with a baghouse, your operation and maintenance plan for the baghouse must include a prescribed inspection schedule for baghouse components and use of a bag leak detection system to identify malfunctions. This baghouse operation and maintenance plan must be submitted to the Administrator with the initial comprehensive performance test for review and approval. See § 63.1206(c)(7)(ii).

We require an operation and maintenance plan to implement the provisions of § 63.6(e). That paragraph requires you to operate and maintain your source in a manner consistent with good air pollution control practices for minimizing emissions. That paragraph, as all Subpart A requirements, applies to all MACT sources unless requirements in the subpart for a source category state otherwise. In addition, § 63.6(e)(2) states that the Administrator will determine whether acceptable operation and maintenance procedures are used by reviewing information including operation and maintenance procedures and records. Thus, paragraph (e)(2) effectively requires you to develop operation and maintenance procedures. Consequently, explicitly requiring you to develop an operation and maintenance plan is a logical outgrowth of the proposed rule.

Similarly, although we did not prescribe baghouse inspection requirements or require a bag leak detection system at proposal for incinerators and lightweight aggregate kilns, this is a logical outgrowth of the proposed rule. Section 63.6(e) requires sources to operate and maintain emission control equipment in a manner consistent with good air pollution control practices for minimizing emissions. Inspection of baghouse components is required to provide adequate maintenance, and a bag leak detection system is a state-of-the-art monitoring system that identifies major baghouse malfunctions. Absent use of a particulate matter CEMS or opacity monitor, use of a bag leak detection system is an essential monitoring approach to ensure that the baghouse continues to operate in a manner consistent with good air pollution control practices. Bag leak detection systems are required under the MACT standards for secondary lead smelters. See § 63.548. We have also proposed to require them as MACT requirements for several other source categories including primary lead smelters (see 63 FR 19200 (April 17, 1998)) and primary copper smelters (see 63 FR 19581 (April 20, 1998)). In addition, we have published a guidance document on the installation and use of bag leak detection systems: USEPA, ''Fabric Filter Bag Leak Detection,'' September 1997, EPA–454/R–98–015. Thus, although not explicitly required at proposal, a requirement to use bag leak detection systems is a logical outgrowth of the (proposed) requirements of § 63.6(e).

We are not prescribing a schedule for inspection of baghouse components or requiring a bag leak detection system for cement kilns because cement kilns must use a continuous opacity monitoring system (COMS) to demonstrate compliance with an opacity standard. A COMS is a better indicator of baghouse performance than a bag leak detection system. We could not use COMS for incinerators and lightweight aggregate kilns, however, because we do not have data to identify an opacity standard that is achievable by MACT sources (i.e., sources using MACT control and achieving the particulate matter standard).

We are not specifying the type of sensor that must be used other than: (1) The system must be certified by the manufacturer to be capable of detecting particulate matter emissions at concentrations of 1.0 milligram per actual cubic meter; and (2) the sensor must provide output of relative particulate matter loadings. Several types of instruments are available to monitor changes in particulate emission rates for the purpose of detecting fabric filter bag leaks or similar failures. The principles of operation of these instruments include electrical charge transfer and light scattering. The guidance document cited above applies to charge transfer monitors that use triboelectricity to detect changes in particle mass loading, but other types of monitors may be used. Specifically, opacity monitors may be used.

The economic impacts of requiring fabric filter bag leak detection systems are minimal. These systems are relatively inexpensive. They cost less than $11,000 to purchase and install. Further, we understand that most hazardous waste burning lightweight aggregate kilns are already equipped with triboelectric sensors. Finally, there are few hazardous waste incinerators that are currently equipped with fabric filters.

II. What Are the Compliance Dates for this Rule?

A. How Are Compliance Dates Determined?

In today's rule, as with other MACT rules, we specify the compliance date and then provide you additional time to demonstrate compliance through performance testing. Generally, you must be in compliance with the emission standards on September 30, 2002 unless you are granted a site-specific extension of the compliance date of up to one year. By September 30, 2002, you must complete modifications to your unit and establish preliminary operating limits, which must be included in the Documentation of Compliance (DOC) and recorded in the operating record. Following the compliance date you have up to 180 days to complete the initial comprehensive performance test and an additional 90 days to submit the results of the performance test in the Notification of Compliance (NOC). In the NOC, you also must certify compliance with applicable emission standards and define the operating limits that ensure continued compliance with the emission standards.

In the April 1996 NPRM, we proposed that sources comply with all the substantive requirements of the rule on the compliance date. This required sources to conduct their performance test as well as submit results in the NOC by the compliance date. The compliance date discussed in the April 1996 NPRM contained a statutory limitation of three years following the effective date of the final rule (*i.e.,* the publication date of the final rule) with the possibility of a site-specific extension of up to one year for the installation of controls to comply with the final standards, or to allow for waste minimization reductions.

In the May 1997 NODA, we acknowledged that the April 1996 NPRM definition of compliance date and our approach to implementation created a number of unforseen difficulties (see 63 FR at 24236). Commenters note that the proposed compliance date definition and the ramifications of noncompliance create the potential for an unnecessarily large number of source shut-downs due to an insufficient period to perform all the required tasks. Commenters recommend we follow the general provisions applicable to all MACT regulated sources, which allow sources to demonstrate compliance through performance testing and submission of emission test results up to 270 days following the compliance date.

In the May 1997 NODA, we outlined an approach that allowed facilities to use the Part 63 general approach, which requires sources to complete performance testing within 180 days of the compliance date and submit test results 90 days after completing the performance test.[178] Today, we adopt this approach to foster consistent implementation of this rule as a CAA regulation.

Your individual dates for: (1) Compliance; (2) comprehensive performance testing; (3) submittal of test results; and (4) submittal of your NOC and title V permit requests depend on whether you were an existing source on April 19, 1996. Compliance dates for existing and new sources are discussed in the following two subsections.

B. What Is the Compliance Date for Sources Affected on April 19, 1996?

The compliance date for all affected sources constructed, or commencing construction or reconstruction before April 19, 1996 is September 30, 2002.

C. What Is the Compliance Date for Sources That Become Affected After April 19, 1996?

If you began construction or reconstruction after April 19, 1996, your compliance date is the latter of September 30, 1999 or the date you commence operations. If today's final emission standards are less stringent or as stringent as the standards proposed on April 19, 1996, you must be in compliance with the 1996 proposed standards upon startup. If today's final standards are more stringent than the proposed standards, you must be in compliance with the more stringent standards by September 30, 2002.

III. What Are the Requirements for the Notification of Intent to Comply?

For the reader's convenience, we summarize here the Notice of Intent to Comply (NIC) requirements finalized in the ''fast-track'' rule of June 19, 1998. (See 63 FR at 33782.)

The NIC requires you to prepare an implementation plan that identifies your intent to comply with the final rule and the basic means by which you intend to do so. That plan must be released to the public in a public forum and formally submitted to the Agency. The notice of intent certifies your intentions—either to comply or not to comply—and identifies milestone dates that measure your progress toward compliance with the final emission standards or your progress toward closure, if you choose not to comply. Prior to submitting the NIC to the regulatory Agency, you must provide notice of a public meeting and conduct an informal public meeting with your community to discuss the draft NIC and your plans for achieving compliance with the new standards.

We have redesignated the existing NIC provisions to meld them into the appropriate sections of subpart EEE. We have also revised the regulatory language to include references to the new provisions promulgated today. See Part Six, Section IX of today's preamble.

IV. What Are the Requirements for Documentation of Compliance?

A. What Is the Purpose of the Documentation of Compliance?

The purpose of the Documentation of Compliance[179] (DOC) is for you to certify by the compliance date that: (1) You have made a good faith effort to establish limits on the operating parameters specified in § 63.1209 that you believe ensure compliance with the emissions standards; (2) required continuous monitoring systems are operational and meet specifications; and (3) you are in compliance with the other operating requirements. See § 63.1211(d). This is necessary because all sources must be in compliance by the compliance date even though they are not required to demonstrate compliance, through performance testing, until 180 days after the compliance date. To fulfill the requirements of the DOC, you must place it in the operating record by the compliance date, September 30, 2002. (See compliance dates in Section II above.) Information that must be in the DOC includes all information necessary to determine your compliance status (e.g., operating parameter limits; functioning automatic waste feed cutoff system). All operating limits identified in the DOC are enforceable limits. However, if these limits are determined, after the initial comprehensive performance test, to have been inadequate to ensure compliance with the MACT standards, you will not be deemed to be out of compliance with the MACT emissions standards, if you complied with the DOC limits.[180]

B. What Is the Rationale for the DOC?

In the May 1997 NODA, we discussed the concept of the precertification of compliance (Pre-COC). The discussion required sources to precertify their compliance status on the compliance date by requiring them to submit a notification to the appropriate regulatory agency. This notification would detail the operating limits under which a source would operate during the period following the compliance date, but before submittal of the initial comprehensive performance test results in the Notification of Compliance.

Commenters question this provision since the Pre-COC operating limits would be effective only for the 270 days following the compliance date. Other commenters support the Pre-COC requirements provided the process is focused, straightforward, and limited to the minimum operating parameters necessary to document compliance. Commenters also stress that the Agency needed to specify the requirements of the prenotification, using appropriate sections of 40 CFR 266.103(b) and Section 63.9 when developing the specific regulatory requirements. In addition, commenters suggest that the Agency clarify the relationship between the Pre-COC and the title V permit, and indicate how or if the Pre-COC operating limits would be placed in the title V permit.

Other commenters state that the rationale underlying the Pre-COC is faulty because sources would remain subject to the RCRA permit conditions until the NOC is submitted or until the title V permit is issued, which was our proposed approach to permitting at that time. Therefore, the Agency's concern that sources could be between regulatory regimes is not relevant. Commenters also state that Pre-COC requirements would be resource intensive and a needless exercise that diverted time and attention from preparing to come into compliance with MACT standards.

The DOC requirements and process adopted today provide the Agency and public a sound measure of assurance

[178] The general provisions of part 63 allow for 180 days after the compliance date to conduct a performance test and 60 days to submit its results to the appropriate regulatory agency. However, as commenters note, dioxin/furan analyses can require 90 days to complete. Therefore, the time allowed for submission of test results should be extended to 90 days, increasing the total time following the compliance date to 270 days. We agree with commenters and increase the time allowed for submission of test results from 60 to 90 days.

[179] We renamed the proposed Precertification of Compliance as the Documentation of Compliance to avoid any confusion with the RCRA requirement of similar name.

[180] Once you determine that you failed to demonstrate compliance during the performance test, all monitoring data is subject to potential case-by-case use as credible evidence to show noncompliance following that determination. Therefore, you could potentially find yourself in noncompliance for the period which the DOC limits were in effect following that determination, but before submission of the NOC.

that, on the compliance date, combustion sources are operated within limits that should ensure compliance with the MACT standards and protection to human health and the environment. We agree that operating limits in the DOC will be in effect only for a short period of time and that affected sources will not be between regulatory regimes at any time. Given the relatively short period of time the DOC conditions will be in effect, however, we chose for the final rule not to specify whether the conditions need to be incorporated into a title V permit and do not require the permitting authority to do so. We provide flexibility for agencies implementing title V programs to determine the appropriate level of detail to include in the permit, thereby allowing them to minimize the potential need for permit revisions. In addition, we do not require that the DOC be submitted to the permitting authority, to avoid burdening the permitting agency with unnecessary paper work during the period that they are reviewing site-specific performance test plans. In today's rule, we better define the period during which the DOC applies by specifying that the DOC is superseded by the NOC upon the postmark date for submittal of the NOC. Once you mail the NOC, its contents become enforceable unless and until superseded by test results submitted within 270 days following subsequent performance testing. This approach provides clarity on when the NOC supersedes the DOC.

C. What Must Be in the DOC?

You must complete your site-specific DOC and place it in your operating record by the compliance date. The DOC must contain all of the information necessary to determine your compliance status during periods of operation including all operating parameter limits. You must identify the DOC operating limits through the use of available data and information. If your unit requires modification or upgrades to achieve compliance with the emission standards, you can base this judgment on results of shakedown tests and/or manufacturers assertions or specifications. If your unit does not require modifications or upgrades to meet the emission standards of today's rule, you can develop the operating limits through analysis of previous performance tests or knowledge of the performance capabilities of your control equipment.

Your limitations on operating parameters must be based on an engineering evaluation prepared under your direction or supervision in accordance with a system designed. This evaluation must ensure that qualified personnel properly gathered and evaluated the information and supporting documentation, and considering at a minimum the design, operation, and maintenance characteristics of the combustor and emissions control equipment, the types, quantities, and characteristics of feedstreams, and available emissions data.

This requirement should not involve a significant effort because your decisions on whether to upgrade and modify your units will be based on the current performance of your control equipment and the performance capabilities of new equipment you purchase. We expect that, by the compliance date, you will have an adequate understanding of your unit's capabilities, given the three years to develop this expertise. Therefore, by the compliance date, you are expected to identify operating limits that are based on technical or engineering judgment that should ensure compliance with the emission standards.

V. What Are the Requirements for MACT Performance Testing?

A. What Are the Compliance Testing Requirements?

Today's final rule requires two types of performance testing to demonstrate compliance with the MACT emission standards: Comprehensive and confirmatory performance testing. See § 63.1207. The purpose of comprehensive performance testing is to demonstrate compliance and establish operating parameter limits. You must conduct your initial comprehensive performance tests by 180 days (i.e., approximately six months) after your compliance date. You must submit results within 90 days (i.e., approximately 3 months) of completing your comprehensive performance test. If you fail a comprehensive performance test, you must stop burning hazardous waste until you can demonstrate compliance with today's MACT standards. Comprehensive performance testing must be repeated at least every five years, but may be required more frequently if you change operations or fail a confirmatory performance test.

The purpose of confirmatory performance tests is to confirm compliance with the dioxin/furan emission standard during normal operations. You must conduct confirmatory performance tests midway between comprehensive performance tests. Confirmatory performance tests may be conducted under normal operating conditions. If you fail a confirmatory performance test, you must stop burning hazardous waste until you demonstrate compliance with the dioxin/furan standard by conducting a comprehensive performance test to establish revised operating parameter limits.

The specific requirements and procedures for these two performance tests are discussed later in this section. In addition, this section discusses the interaction between the RCRA permitting process and the MACT performance test.

1. What Are the Testing and Notification of Compliance Schedules?

Section 63.7 of the CAA regulations contains the general requirements for testing and notification of compliance. In today's rule, we adopt some § 63.7 requirements without change and adopt others with modifications. As summarized earlier, you must commence your initial comprehensive performance test within 180 days after your compliance date, consistent with the general § 63.7 requirements. You must complete testing within 60 days of commencement, unless a time extension is granted. This requirement is necessary because testing and notification of compliance deadlines are based on the date of commencement or completion of testing. Those deadlines could be meaningless if a source had unlimited time to complete testing. Although we propose to require testing to be completed within 30 days of commencement, commenters state that unforeseen events could occur (e.g., system breakdown causing extensive repairs; loss of samples from breakage of equipment or other causes requiring additional test runs) that could extend the testing period beyond normal time frames. We concur, and provide for a 60-day test period as well as a case-by-case time extension that may be granted by permit officials if warranted because of problems beyond our control.

Additionally, you must submit comprehensive performance test results to the Administrator within 90 days of test completion, unless a time extension is granted. We are allowing an additional 30 days for result submittal beyond the §§ 63.7(g) and 63.8(e)(5) 60-day deadlines because the dioxin/furan analyses required in today's rule may take this additional time to complete. We also are including a provision for a case-by-case time extension in the final rule because commenters express concern that the limited laboratory facilities nationwide may be taxed by the need to handle analyses simultaneously for many hazardous waste combustors. The available analytical services may not be able to handle the workload, that could cause some sources to miss the proposed 90-day deadline. We concur with commenters' concerns and have added a provision to allow permit officials to grant a case-by-case time extension, if warranted.

Test results must be submitted as part of the notification of compliance (NOC) submitted to the Administrator under §§ 63.1207(j) and 63.1210(d) documenting compliance with the emission standards and continuous monitoring system requirements, and identifying applicable operating parameter limits. These provisions are similar to §§ 63.7(g) and 63.8(e)(5), except that the NOC must be postmarked by the 90th day following the completion of performance testing and the continuous monitoring system performance evaluation.

Overall, the initial NOC must be postmarked within 270 days (i.e., approximately nine months) after your compliance date. You must initiate subsequent comprehensive performance tests within 60 months (i.e., five years) of initiating your initial comprehensive performance test. You must submit subsequent NOCs, containing test results, within 90 days after the completion of subsequent tests.

The rule allows you to initiate subsequent tests any time up to 30 days after the deadline for the subsequent performance test. Thus, you can modify the combustor or add new emission control equipment at any time and conduct new performance testing to document compliance with the emission standards. In addition, this testing window allows you to plan to commence testing well in advance of the deadline to address unforseen events that could delay testing.[181] This testing window applies to both comprehensive performance tests and confirmatory performance tests. For example, if the deadline for your second comprehensive performance test is January 10, 2008, you may commence the test at any time after completing the initial comprehensive performance test but not later than February 10, 2008. The deadline for subsequent comprehensive and confirmatory performance tests are based on the commencement date of the previous comprehensive performance test.

[181] We note that a case-by-case time extension for commencement of subsequent performance testing is also provided under § 63.1207(i).

2. What Are the Procedures for Review and Approval of Test Plans and Requirements for Notification of Testing?

In the April 1996 NPRM, we proposed in § 63.7(b)(1) to require submittal of a ''notification of performance test'' to the Administrator 60 days prior to the planned test date. This notification included the site-specific test plan itself for review and approval by the Administrator (§ 63.8(e)(3)). In the May 1997 NODA, to ensure coordination of destruction removal efficiency (DRE) and MACT performance testing, we considered requiring you to submit the test plan one year rather than 60 days prior to the scheduled test date to allow the regulatory official additional time to consider DRE testing in context with MACT comprehensive performance testing. This one-year test review period would only have applied to sources required to perform a DRE test.

In today's final rule, we maintain the requirement for you to submit the test plan one year prior to the scheduled test date, but apply that requirement to all sources, not just those performing a DRE test. After consideration of comments (described below), we determined that this one-year period is needed to provide regulatory officials sufficient time (i.e., nine months) to review and approve or notify you of intent to disapprove the plan. Nine months is needed for the review for all sources given the amount of technical information that would be included in the test plan, and would also allow time to assess whether a source is required to perform a DRE test (see Part IV, Section IV, for discussion of DRE testing requirements; see also § 63.1206(b)(8)). During this nine-month period, the regulatory officials will review your test plan and determine if it is adequate to demonstrate compliance with the emission standards and establish operating requirements.

After submittal of the test plan, review and approval or notification of intent to deny approval of the test plan will follow the requirements of § 63.7(c)(3). That section provides procedures for you to provide additional information before final action on the plan. It also requires you to comply with the testing schedule even if permit officials have not approved your test plan. The only exception to this requirement is if you proposed to use alternative test methods to those specified in the rule. In that case, you may not conduct the performance test until the test plan is approved, and you have 60 days after approval to conduct the test.

Several commenters suggest that it would be difficult for permit officials to review and approve test plans within the nine-month window given that many test plans may be submitted at about the same time. They cite experiences under RCRA trial burn plan approvals where permit officials have taken much longer than nine months to approve a plan, and have requested that the final rule allow for a longer review period. Commenters are concerned with the consequences of being required to conduct the performance test even though permit officials may not have had time to approve the test plan. They recite various concerns that permit officials may at a later date determine that the performance test was inadequate and require retesting. Commenters suggest that the rule establish the date for the initial comprehensive performance test as 60 days following approval of the test plan, whenever that may occur, thus extending the deadline for the performance test indefinitely from the current requirement of six months after the compliance date.

We maintain that the nine-month review period is appropriate for several reasons. First, we are unwilling to build into the regulations an indefinite period for review. This would have the potential to delay implementation of the MACT emission standards without any clear and compelling reason to do so.

Second, the RCRA experience with protracted approval schedules, sometimes over a decade ago, is not applicable or analogous to the MACT situation. Under the RCRA regulatory regime, particularly at the early stages, there were few incentives for either permit officials or owners or operators to expeditiously negotiate acceptable test plans. No statutory deadlines existed for a compliance date, and existing facilities operated under interim status (a type of grand fathering tantamount to a permit). This interim status scheme placed at least some controls on hazardous waste combustors during the permit application and trial burn test plan review periods. As a result, regulatory officials could take significant amounts of time to address what was then a new type of approval, that for trial burn testing to meet RCRA final permit standards.

Under MACT, the situation today is quite different. In light of the statutory compliance date of 3 years and the existing regulatory framework, sources know as of today's final rule that they need to respond promptly and effectively to permit officials' concerns about the test plan because the performance test must be conducted within six months after the compliance date whether or not the test plan is approved. And they have at least two years to prepare and submit these plans, and to work with regulatory officials even before doing so. For their part, permit officials recognize that they have the responsibility to review and approve the plan or notify the source of their intent to deny approval within the nine-month window given that the source must proceed with expensive testing on a fixed deadline whether or not the plan is approved. To the extent regulatory officials anticipate that many test plans will be submitted at about the same time, the agencies have at least two years to figure out ways to accommodate this scenario from a resource and a prioritization standpoint. If permit officials nevertheless fail to act within the nine-month review and approval period, a source could argue that this failure is tacit approval of the plan and that later ''second-guessing'' is not allowable. This should be a very strong incentive for regulatory officials to act within the nine months, especially with a two-year lead time to avoid this type of situation

In addition, the RCRA experience is not a particularly good harbinger of the future MACT test plan approval, as commenters suggest, because most sources will have already completed trial burn testing under RCRA. Thus, both the regulatory agencies and the facilities have been through one round of test plan submittal, review, and approval for their combustion units. Given that MACT testing is very similar to RCRA testing, approved RCRA test protocols can likely be modified as necessary to accommodate any changes required under the MACT rule. Although some of these changes may be significant, we expect that many will not be. For example, RCRA trial burn testing always included DRE testing. Under the MACT rule, DRE testing will not be required for most sources. And for sources where DRE testing is required under MACT, most will have already been through a RCRA approval of the DRE test protocol, which should substantially simplify the process under MACT.

The third reason that we maintain the nine-month review and approval window is appropriate is that discussions with several states leads us to conclude that they are prepared to meet their obligations under this provision. This is a highly significant indicator that the nine-month review and approval period is a reasonable period of time, particularly since all permitting agencies have at least two years to plan for submittal of test plans from the existing facilities in their jurisdictions.

In summary, sound reasons exist to expect that today's final rule provides sufficient time for the submittal, review, and approval of test plans. Furthermore, clear incentives exist for both owners and operators and permit officials to work together expeditiously to ensure that an approval or notice of intent to disapprove the test plan can be provided within the nine-months allotted.

On a separate issue, we also retain, in today's final rule, the 60-day time frame and requirements of § 63.7(b)(1) for submittal of the notification of performance test. Additionally, the final rule continues to provide an opportunity for, but does not require, the regulatory agency to review and oversee testing.

3. What Is the Provision for Time Extensions for Subsequent Performance Tests?

The Administrator may grant up to a one year time extension for any performance test subsequent to the initial comprehensive performance test. This enables you to consolidate MACT performance testing and any other emission testing required for issuance or reissuance of Federal/State permits.[182]

At the time of proposal, we were concerned about how to allow coordination of MACT performance tests and RCRA trial burns. As discussed elsewhere, the RCRA trial burn is superseded by MACT performance testing. However, a one-year time extension may still be necessary for you to coordinate performance of a RCRA risk burn. In addition, commenters state that there may be additional reasons to grant extension requests (*e.g.* some TSCA-regulated hazardous waste combustors may be required to perform stack tests beyond those required by MACT). Furthermore, some sources may have to comply with state programs requiring RCRA trial burn testing. To address these situations, to promote coordinated testing, and to avoid unnecessary source costs, the final rule allows up to a one-year time extension for the performance test.

When performance tests and other emission tests are consolidated, the deadline dates for subsequent comprehensive performance tests are adjusted correspondingly. For example, if the deadline for your confirmatory performance test is January 1 and your state-required trial burn is scheduled for September 1 of the same year, you can apply to adjust the deadline for the confirmatory performance test to September 1. If granted, this also would delay by a corresponding time period the deadline dates for subsequent comprehensive performance tests.

The procedures for granting or denying a time extension for subsequent performance tests are the same as those found in § 63.6(i), which allow the Administrator to grant sources up to one additional year to comply with standards.[183] These are also the same procedures apply to a request for a time extension for the initial NOC.

4. What Are the Provisions for Waiving Operating Parameter Limits During Subsequent Performance Tests?

Operating parameter limits are automatically waived during subsequent comprehensive performance tests under an approved performance test plan. See § 63.1207(h). This waiver applies only for the duration of the comprehensive performance test and during pretesting for an aggregate period up to 720 hours of operation. You are still required to be in compliance with MACT emissions standards at all times during these tests, however.

In the April 1996 NPRM, we proposed to allow the burning of hazardous waste only under the operating limits established during the previous comprehensive performance test (to ensure compliance with emission standards not monitored with a continuous emissions monitoring system). Two types of waivers from this requirement would have been provided during subsequent comprehensive performance tests: (1) An automatic waiver to exceed current operating limits up to 5 percent; and (2) a waiver that the Administrator may grant if warranted to allow the source to exceed the current operating limits without restriction. We proposed an automatic waiver because, without the waiver, the operating limits would become more and more stringent with subsequent comprehensive performance tests. This is because sources would be required to operate within the more stringent conditions to ensure that they did not exceed a current operating limit. This would result in a shrinking operating envelope over time.

A number of commenters question the comprehensive performance test's 5%

[182] In addition, this provision also may assist you when unforseen events beyond your control (*e.g.*, power outage, natural disaster) prevent you from meeting the testing deadline.

[183] Note, however, that § 63.6(i) applies to an entirely different situation: extension of time for initial compliance with the standards, not subsequent performance testing.

limit over existing permit conditions. Some commenters state that the EPA should not limit a facility's operating envelope from test to test based on operating conditions established during the previous test. The operator should be free to set any conditions for the comprehensive performance test, short of what the regulator deems to pose a short-term environmental or health threat or inadequate to ensure compliance with an emission standard. Commenters also state that the requirement that the facility accept the more stringent of the existing 5% limit or the test result will inevitably result in the ratcheting down of limits over time. Since certain conditions have much greater variation than 5% over a limit, sufficient variability must be allowed so the operator can run a test under the conditions it wishes to use as the basis for worst case operation.

We agree that a waiver is necessary to avoid ratcheting down the operating limits in subsequent tests. Further, in view of the natural variability in hazardous waste combustor operations, a 5% waiver may be insufficient. Because you are required to comply with the emission standards, there does not appear to be any reason to establish national restrictions on operations during subsequent performance tests. Therefore, the final rule allows a waiver from previously established operating parameter limits, as long as you comply with MACT emission standards and are operating under an approved comprehensive performance test plan. Operating parameter limits will be reset based on the new tests. Furthermore, the permitting authority will review and has the opportunity to disapprove any proposed test conditions which may result in an exceedance of an emission standard.

B. What Is the Purpose of Comprehensive Performance Testing?

The purposes of the comprehensive performance test are to: (1) Demonstrate compliance with the continuous emissions monitoring systems-monitored emission standards for carbon monoxide and hydrocarbons; (2) conduct manual stack sampling to demonstrate compliance with the emission standards for pollutants that are not monitored with a continuous emissions monitoring system (e.g., dioxin/furan, particulate matter, DRE, mercury, semivolatile metal, low volatile metal, hydrochloric acid/chlorine gas); (3) establish limits on the operating parameters required by § 63.1209 (Monitoring Requirements) to ensure compliance is maintained with those emission standards for which a continuous emissions monitoring system is not used for compliance monitoring; and (4) demonstrate that performance of each continuous monitoring system is consistent with applicable requirements and the quality assurance plan. In general, the comprehensive performance test is similar in purpose to the RCRA trial burn and BIF interim status compliance test, but with relatively less Agency oversight and a higher degree of self-implementation, as discussed below.

The basic framework for comprehensive performance testing is set forth in the existing general requirements of subpart A, part 63. Therefore, for convenience of the reader, we will review key elements of those regulations and highlight any modifications made specifically for hazardous waste combustors.

1. What Is the Rationale for the Five Year Testing Frequency?

As discussed earlier, you must perform comprehensive performance testing every five years. We require periodic comprehensive performance testing because we are concerned that long-term stress to the critical components of a source (e.g., firing systems, emission control equipment) could adversely affect emissions.

In the April 1996 NPRM, we proposed that large sources (i.e., those with a stack gas flow rate greater than 23,127 acfm) and sources that accept off-site wastes would be required to perform comprehensive performance testing every three years. We also proposed that small, on-site sources perform comprehensive performance testing every five years unless the Administrator determined otherwise on a case-specific basis. Commenters suggest that the proposed three year testing frequency is too restrictive. They said that test plan approval time, bad weather, mechanical failure, and the testing itself combine to make the proposed test frequency too tight for tests of this magnitude.

We agree that, due to the magnitude of the comprehensive performance test, a more appropriate testing schedule is required. Therefore, we adopt a comprehensive performance testing frequency of every five years for small and large sources. In addition, this comprehensive performance testing schedule should correspond to the renewal of the title V permit. More frequent comprehensive performance testing is required, however, if there is a change in design, operation, or maintenance that may adversely affect compliance. See § 63.1206(b)(6).

2. What Operations Are Allowed During a Comprehensive Performance Test?

Because day-to-day limits are established for operating parameters during the comprehensive performance test, we allow operation during the performance test as necessary provided the unit complies with the emission standards. Accordingly, you can spike feedstreams with metals or chlorine, for example, to ensure that the feedrate limits are sufficient to accommodate normal operations while allowing some flexibility to feed higher rates. See Part Four, Section I. B. above for further discussion of normal operations. We note that this differs from § 63.7(e) which requires performance testing under ''normal'' operating conditions. See § 63.1207(g).

Most commenters agree that the comprehensive performance test should be conducted under extreme conditions at the edge of the operating envelope. Commenters point out that they needed to operate in this mode to establish operating parameter limits to cover all possible normal operating emissions values. Commenters also state that feedstreams may need to be spiked with metals or chlorine to ensure limits high enough to allow operational flexibility. We agree that these modes of operation are needed to establish operating parameter limits that cover all possible normal operating emissions values.[184] There is precedent for this approach in current rules regulating hazardous waste combustors (e.g., the RCRA incinerator and BIF rules).

In addition, two or more modes of operation may be identified, for which separate performance tests must be conducted and separate limits on operating conditions must be established. If you identify two modes of operation for your source, you must note in the operating record which mode you are operating under at all times. For example, two modes of operation must be identified for a cement kiln that routes kiln off-gas through the raw meal mill to help dry the raw meal. When the raw meal mill is not operating (perhaps 15% of the time), the kiln gas bypasses the raw meal mill. Emissions of particulate matter and other hazardous air

[184] Allowing sources to operate during MACT comprehensive performance testing under the worst-case conditions, as allowed during RCRA compliance testing, rather than under normal conditions as provided by § 63.7(e) for other MACT sources, ensures that the emissions standards do not restrict hazardous waste combustors using MACT control to operations resulting in emissions that are lower than normal. Therefore, allowing performance testing on a worst-case basis provides that the MACT emission standards are achievable in practice by sources using MACT control.

pollutants or surrogates may vary substantially depending on whether the kiln gas bypasses the raw meal mill.

As discussed below for confirmatory testing, when conducting the comprehensive performance test, you also must operate under representative conditions for specified parameters that may affect dioxin/furan emissions. These conditions must ensure that emissions are representative of normal operating conditions. Also, when demonstrating compliance with the particulate matter, semivolatile metal, and low volatile metal emission standards, when using manual stack sampling, and when demonstrating compliance with the dioxin/furan and mercury emission standards using carbon injection or carbon bed, you must operate under representative conditions for the cleaning cycle of the particulate matter control device. This is because particulate matter emissions increase momentarily during cleaning cycles and can affect emissions of these pollutants.

3. What Is the Consequence of Failing a Comprehensive Performance Test?

If you determine that you failed any emission standard during the performance test based on: (1) Continuous emissions monitoring systems recordings; (2) results of analysis of samples taken during manual stack sampling; or (3) results of the continuous emissions monitoring systems performance evaluation, you must immediately stop burning hazardous waste. However, if you conduct the comprehensive performance test under two or more modes of operation, and you meet the emission standards when operating under one or more modes of operation, you are allowed to continue burning under the mode of operation for which the standards were met.

If you fail one or more emission standards during all modes of operation tested, you may burn hazardous waste only for a total of 720 hours and only for the purposes of pretesting (i.e., informal testing to determine if the combustor can meet the standards operating under modified conditions) or comprehensive performance testing under modified conditions. The same standards apply for the retest as applied for the original test. These conditions apply when you fail the initial or subsequent comprehensive performance test.

A number of commenters suggest that the 720 operating hours allowed after a failed performance test should be renewable, as they are under existing incinerator and BIF rules. We are persuaded by the commenters' rationale and will adopt this practice in today's rule. The final rule allows the 720 hours of operation following a failed performance test to be renewed as often as the Administrator deems reasonable. We note that hazardous waste combustors are currently subject to virtually these same requirements under RCRA rules.

If you fail a comprehensive performance test, you must still submit a NOC as required indicating the failure. We want to ensure that the regulatory authorities are fully aware of a failure and the need for the facility to initiate retesting.

We do not specifically address other consequences of failing the comprehensive performance test in the regulatory language. We will instead rely on the regulating agency's enforcement policy to govern the type of enforcement response at a facility that exceeds an emission standard, fails to ensure compliance with the standards, or fails to meet a compliance deadline.

C. What Is the Rationale for Confirmatory Performance Testing?

Confirmatory performance testing for dioxin/furan is required midway between the cycle required for comprehensive performance testing to ensure continued compliance with the emission standard. We require such testing only for dioxin/furan given: (1) The health risks potentially posed by dioxin/furan emissions; (2) the lack of a continuous emissions monitoring system for dioxin/furan; (3) the lack of a material that directly and unambiguously relates to dioxin/furan emissions which could be monitored continuously by means of feedrate control (as opposed to, for example, metals feedrates, which directly relate to metals emissions); and (4) wear and tear on the equipment, including any emission control equipment, which over time could result in an increase in dioxin/furan emissions even though the source stays in compliance with applicable operating limits.

Although emissions of dioxins/furans appear to be primarily a function of whether particulate matter is retained in post-combustion regions of the combustor (e.g., in an electrostatic precipitator or fabric filter, or on boiler tubes) in the temperature range that enhances dioxin/furan formation, the factors that affect dioxin/furan formation are imperfectly understood. Certain materials seem to inhibit formation while others seem to enhance formation. Some materials seem to be precursors (e.g., PCBs). Changes in the residence time of particulate matter in a control device may affect the degree of chlorination of dioxins/furans, and thus the toxicity equivalents of the dioxins/furans. Given these uncertainties, the health risks posed by dioxins/furans, and the relatively low cost of dioxin/furan testing, it appears prudent to require confirmatory testing to determine if changes in feedstocks or operations that are not limited by the MACT rule may have increased dioxin/furan emissions to levels exceeding the standard. We also note that confirmatory dioxin/furan testing is required for municipal waste combustors (60 FR at 65402 (December 19, 1995)).

Confirmatory testing differs from comprehensive testing, however, in that you are required to operate under normal, representative conditions during confirmatory testing. This will reduce the cost of the test, while providing the essential information, because you will not have to establish new operating limits based on the confirmatory test.

1. Do the Comprehensive Testing Requirements Apply to Confirmatory Testing?

The following comprehensive performance testing requirements discussed above also apply to confirmatory testing: Agency oversight, notification of performance test, notification of compliance, time extensions, and failure to submit a timely notice of compliance. However, we modify some of the comprehensive test requirement for confirmatory tests, as discussed below.

2. What Is the Testing Frequency for Confirmatory Testing?

You are required to conduct confirmatory performance testing 30 months (i.e., 2.5 years) after the previous comprehensive performance test. The same two-month testing window, applicable for comprehensive tests, also applies to confirmatory tests.

Several commenters state that the proposed schedule for confirmatory tests is too frequent. The April 1996 NPRM would have required large and off-site sources to conduct confirmatory performance testing 18 months after the previous comprehensive performance test. Small, on-site sources would have been required to conduct the testing 30 months after the previous comprehensive performance test. One commenter suggests that the frequency should be at multiples of 12 months to avoid seasonal weather problems in many locations. Other commenters state that EPA's justification for confirmatory tests is not supported by evidence showing increased emissions due to equipment aging and that the performance of combustion practice parameters is already assured through continuous monitoring systems.

We agree that due to the magnitude and expense of the test, a more appropriate testing schedule would be every 2.5 years, mid-way between the comprehensive performance test cycle. In addition, we agree that testing in certain locations at certain times of the year (e.g., northern states in the winter) can be undesirable. Although possible, it would add to the difficulty and expense of the testing. As previously discussed, sources can request a time extension to allow for a more appropriate testing season. However, the regulatory date for confirmatory testing remains midcycle to the comprehensive performance testing.

3. What Operations Are Allowed During Confirmatory Performance Testing?

As proposed, you are required to operate under normal conditions during confirmatory performance testing. Normal operating conditions are defined as operations during which: (1) The continuous emissions monitoring systems that measure parameters that could relate to dioxin/furan emissions—carbon monoxide or hydrocarbons—are recording emission levels within the range of the average value for each continuous emissions monitoring system (the sum of all one-minute averages, divided by the number of one minute averages) over the previous 12 months to the maximum allowed; (2) each operating parameter limit established to maintain compliance with the dioxin/furan emission standard (see discussion in Part Five, Section VI.D.1 below and § 63.1209(k)) is held within the range of the average values over the previous 12 months and the maximum or minimums, as appropriate, that are allowed; (3) chlorine feedrates are set at normal or greater; and (4) when using carbon injection or carbon bed, the test is conducted under representative conditions for the cleaning cycle of the particulate matter control device. See § 63.1207(g)(2).

We define normal operating conditions in this manner because, otherwise, sources could elect to limit levels of the regulated dioxin/furan operating parameters (e.g., hazardous waste feedrate, combustion chamber temperature, temperature at the inlet to the dry particulate matter control device) to ensure minimum emissions. Thus, without specifying what constitutes normal conditions, the confirmatory test could be meaningless. On the other hand, the definition of normal conditions is broad enough to allow adequate flexibility in operations during the test. The confirmatory test confirms that your under day-to-day operations are meeting the dioxin/furan standard. Thus, the confirmatory test differs from the comprehensive performance test in which you may choose to extend to the edge of the operating envelope to establish operating parameters.

The April 1996 NPRM would have required normal operating conditions for particulate matter continuous emissions monitoring systems. For the final rule, particulate matter levels are limited during confirmatory testing to ensure normal operations only when your source is equipped with carbon injection or carbon bed for dioxin/furan emissions control (see dioxin/furan operating limits discussion below).

The April 1996 NPRM also would have required you to operate under representative conditions for types of organic compounds in the waste (e.g., aromatics, aliphatics, nitrogen content, halogen/carbon ratio, oxygen/carbon ratio) and volatility of wastes when demonstrating compliance with the dioxin/furan emission standard. Several commenters object to this requirement. We agree that restrictions on these organic compounds in the waste are redundant and not necessary to assure good combustion. In addition, the requirement would be impracticable because in most cases measured data would not be available on these parameters. Therefore, the final rule does not require ''representative'' wastes with regard to these organic compounds for confirmatory testing.

It is prudent to require that chlorine be fed at normal levels or greater during the dioxin/furan confirmatory performance test. Although most studies show poor statistical correlation between dioxin/furan emissions and chlorine feedrate, some practical considerations are important. Chlorinated dioxin/furan obviously contain chlorine and some level of chlorine is necessary for its formation. During the confirmatory testing for dioxin/furan, we want you to operate your combustor under normal conditions relative to factors that can affect emissions of dioxin/furan. Therefore, you must feed chlorine at normal or greater levels given the potential for chlorine feedrates to affect dioxin/furan emissions. For the confirmatory performance test, normal is defined as the average chlorine fed over the previous 12 months. If you have established a maximum chlorine value for metals or total chlorine compliance in your previous comprehensive performance test, then that value can be used in the confirmatory test.

Several commenters suggest that when defining normal operation, a provision should be made to exclude inappropriate data, such as those occurring during instrument malfunction, at unit down time, or during instrument zero/calibration adjustment. The April 1996 NPRM did not allow for any data to be excluded. To define ''normal'' operation, we agree it is reasonable to exclude inappropriate data. For the final rule, calibration data, malfunction data, and data obtained when not burning hazardous waste do not fall into the definition of ''normal'' operation.

4. What Are the Consequences of Failing a Confirmatory Performance Test?

If you determine that you failed the dioxin/furan emission standard based on results of analysis of samples taken during manual stack sampling, you must immediately stop burning hazardous waste. You must then modify the design or operation of the unit, conduct a new comprehensive performance test to demonstrate compliance with the dioxin/furan emission standard (and other standards if the changes could adversely affect compliance with those standards), and establish new operating parameter limits. Further, prior to submitting a NOC based on the new comprehensive performance test, you can burn hazardous waste only for a total of 720 hours (renewable based on the discretion of the Administrator) and only for purposes of pretesting or comprehensive performance testing. These conditions apply when you fail the initial or any periodic confirmatory performance test.

However, if you conduct the comprehensive performance test under two or more modes of operation, and meet the dioxin/furan emission standards during confirmatory testing when operating under one or more modes of operation, you may continue burning under the modes of operation for which you meet the standards.

Other than stopping burning of hazardous waste, we do not specifically address the consequences of failing the confirmatory performance test in the regulatory language but will instead rely on the regulating agency's enforcement policy to govern the type of enforcement response at a facility that exceeds an emission standard, fails to ensure compliance with the standards, or fails to meet a compliance deadline. This approach is consistent with the way other MACT standards are implemented.

Some commenters suggest that the requirement to stop burning waste after a failed confirmatory test is overly harsh. They suggest that temporarily restricted burning should be allowed, conservative enough to insure compliance, while a permanent solution is developed. We continue to believe that a source should stop burning hazardous waste until it reestablishes operating parameter limits that ensure compliance with the dioxin/furan emission standard. We note that hazardous waste combustors are currently subject to virtually these same requirements under RCRA rules.

D. What Is the Relationship Between the Risk Burn and Comprehensive Performance Test?

1. Is Coordinated Testing Allowed?

Traditionally, a RCRA trial burn serves three primary functions: (1) Demonstration of compliance with performance standards such as destruction and removal efficiency; (2) determination of operating conditions that assure the hazardous waste combustor can meet applicable performance standards; and (3) collection of emissions data for incorporation into a SSRA that, subsequently, is used to establish risk-based permit conditions where necessary.[185] Today's rulemaking transfers the first two functions of a RCRA trial burn from the RCRA program to the CAA program. The responsibility for collecting emissions data needed to perform a SSRA is not transferred because SSRAs are exclusively a RCRA matter.

Generally speaking, the type of emissions data needed to conduct a SSRA includes concentration and gas flow rate data for dioxin/furans, nondioxin/furan organics, metals, hydrogen chloride, and chlorine gas. Additionally, particle-size distribution data are normally needed for the air modeling component of the SSRA. We have recently published guidance on risk burns and the data to be collected. See USEPA, ''Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities'' External Peer Review Draft, EPA–530–D–98–001A, B & C and USEPA, ''Guidance on Collection of Emissions Data to Support Site-Specific Risk Assessments at Hazardous Waste Combustion Facilities,'' EPA 530–D–98–002, August 1998.

A large number of hazardous waste combustors subject to today's rule will have completed a RCRA trial burn and SSRA emissions testing prior to the date of the MACT comprehensive performance test. There may exist, however, some facilities for which this is not the case. For these facilities, the Agency proposed, in both the April 1996 NPRM and the May 1997 NODA, an option of coordinating SSRA emissions data collection with MACT performance testing. Facilities choosing to perform coordinated testing would be expected to factor SSRA data collection requirements into the MACT performance test plan. Commenters support this approach, emphasizing that coordinated testing would conserve the resources of both the regulatory authority and regulated source. The Agency agrees with the commenters and continues to support coordinated testing. There is no need, however, for today's final rule to include regulatory language for coordinated testing since it is simply matter of submitting and implementing a test plan which accomplishes the objectives of both a risk burn and MACT performance test.

Coordinated testing may not be possible for all hazardous waste combustors subject to today's MACT standards. Some sources may not be able to test under one set of conditions that addresses all data needs for both MACT implementation and SSRAs. SSRA emissions testing traditionally is performed under worst-case conditions, but may be obtained under normal testing conditions when necessary.[186] As noted in the April 1996 NPRM, as well as in this preamble, we generally anticipate sources will conduct MACT performance testing under conditions that are at the edge of the operating envelope or the worst-case to ensure operating flexibility. Regardless of which test conditions are used to collect SSRA emissions data, under the coordinated testing scenario, those conditions should be consistent with the MACT performance test to the extent possible.

Similarly, a source may experience difficulty integrating MACT performance testing with SSRA emissions testing due to conflicting goals in establishing enforceable operating parameters, i.e., a parameter cannot be maximized for purposes of the SSRA data collection while at the same time be properly maximized or minimized for purposes of performance testing. It is additionally important to ensure that the feed material used during the performance testing is appropriate for SSRA emissions testing. When collecting emissions data for a SSRA, testing with actual worst-case waste is preferred to ensure that the testing material is representative of the toxic, persistence and bioaccumulative characteristics of the waste that ultimately will be burned. However, even if multiple tests need to be performed to accomplish all of the objectives, it is still advantageous to conduct these tests in the same general time frame to minimize mobilization and sampling costs.

The timing of the required tests may cause difficulty for some sources wishing to use coordinated testing. As we discussed in the May 1997 NODA, if the timing of the SSRA data collection does not coincide with the MACT performance test requirement, the performance test should not be unduly delayed. Commenters agree with this approach.

2. What Is Required for Risk Burn Testing?

We expect that sources for which coordinated testing is not possible will need to obtain SSRA emissions data through a separate risk burn. Similar to a traditional RCRA trial burn, risk burn testing should be conducted pursuant to a test plan that is reviewed and approved by the RCRA permitting authority. 40 CFR 270.10(k) provides that the permitting authority may require the submittal of information to establish permit conditions to ensure a facility's operations will be protective of human health and the environment. This regulatory requirement provides for the collection of emissions data, as appropriate, for incorporation into a SSRA as well as for the performance of the SSRA itself. We clarify in amendments to §§ 270.19, 270.22, 270.62 and 270.66 that the Director may apply provisions from those sections, on a case-by-case basis, to establish a regulatory framework for conducting the risk burn under § 270.10(k) and imposing risk-based conditions under § 270.32(b)(2) (omnibus provisions). This clarifying language is intended to prevent any confusion from other language added to §§ 270.19, 270.22, 270.62 and 270.66 today stating that

[185] Under 40 CFR 270.10(k), which is the RCRA Part B information requirement that supports implementation of the RCRA omnibus permitting authority, a regulatory authority may require a RCRA permittee or an applicant to submit information to establish permit conditions as necessary to protect human health and the environment. Under this authority, risk burns and SSRAs may be required.

[186] Criteria for determining the circumstances under which SSRA emissions data should be collected using normal versus worst-case testing conditions are provided in EPA's Guidance on Collection of Emissions Data to Support Site-Specific Risk Assessments at Hazardous Waste Combustion Facilities (EPA 530–D–98–002, August 1998).

these provisions otherwise no longer apply once a source has demonstrated compliance with the MACT standards and limitations of 40 CFR part 63, subpart EEE. (See Part Five, Section XI.B.3 for further discussion.) Facilities and regulatory authorities may consult existing EPA guidance documents for information regarding the elements of risk burn testing.[187]

E. What Is a Change in Design, Operation, and Maintenance? (See § 63.1206(b)(6).)

The April 1996 NPRM noted that sources may change their design, operation, or maintenance practices in a manner that may adversely affect their ability to comply with the emission standards. These sources would be required to conduct a new comprehensive performance test to demonstrate compliance with the affected emission standards and would be required to re-establish operating limits on the affected parameters specified in § 63.1209. (See 61 at FR 17518.) The proposal stated that until a complete and accurate revised NOC is submitted to the Administrator, sources would be permitted to burn hazardous waste following such changes for time a period not to exceed 720 hours and only for the purposes of pretesting or comprehensive performance testing. The approach in the April 1996 NPRM remains appropriate, and we are adopting it in today's final rule with minor modifications.

For changes made after submittal of your NOC that may adversely affect compliance with any emission standard, as defined later in this section, today's rule requires you to notify the Administrator at least 60 days prior to the change unless you document circumstances that dictate that such prior notice is not reasonably feasible. The notification must include a description of the changes and which emission standards may be affected. The notification must also include a comprehensive performance test schedule and test plan that will document compliance with the affected emission standard(s). You must conduct a comprehensive performance test to document compliance with the affected emission standard(s) and establish operating parameter limits as required and submit a revised NOC to the Administrator. You also must not burn hazardous waste for more than a total of 720 hours after the change and prior to submitting your NOC, and you must burn hazardous waste during this time period only for the purposes of pretesting or comprehensive performance testing.

Some commenters are uncomfortable with the proposed regulatory language, stating that it was too generic and that the Agency could require a comprehensive performance test even after minor changes in maintenance practices. One commenter suggests that EPA incorporate a list of changes significant enough to affect compliance, similar to what is currently done in the RCRA permit modification classification scheme in Appendix I of § 270.42.

We intentionally proposed an approach that provides some degree of flexibility to permit authorities. Individual facilities will need to consult with these permit authorities who will make the decision on the site-specific facts. We do not intend to require a comprehensive performance test after minor modifications to system design, or after implementing minor changes to operating or maintenance practices. We considered incorporating sections of Appendix I of § 270.42 to further clarify when comprehensive performance tests would be required.[188] However, it is impossible to envision all scenarios in which changes in design, operation, or maintenance practices may or may not trigger the requirement of a complete, or even partial, comprehensive performance test. Discussion of specific scenarios is more suitable in an Agency guidance document as opposed to regulatory provisions, and implemented on a site-specific basis. Thus, the April 1996 NPRM set out the regulatory approach as well as can be done, and we are adopting it today with minor modifications.

In the April 1996 NPRM, we did not address what must be done when you change design, operation, or maintenance practices during the time period between the compliance date and when you submit your NOC. If you make a change during this time period, today's rule requires you to revise your DOC, which is maintained on-site, to incorporate any revised limits necessary to comply with the standards. For purposes of this provision, today's rule defines "change" as any change in reported design, operation, or maintenance practices you previously documented to the Administrator in your comprehensive performance test plan, NOC, DOC, or startup, shutdown, and malfunction plan.

Commenters point out that the proposal did not discuss recordkeeping requirements necessary for the Administrator to determine if you are adequately concluding that changes in design, operation, or maintenance practices do not trigger a comprehensive performance test requirement[189]. As a result, today's rule requires you to document in your operating record whenever you make a change (as defined above) in design, operation, or maintenance practices, regardless of whether the change may adversely affect your ability to comply with the emission standards. See § 63.1206(b)(6)(ii). You are also required to maintain on site an updated comprehensive performance test plan, NOC, and startup, shutdown, and malfunction plan that reflect these changes. See § 63.1211(c).

F. What Are the Data In Lieu Allowances?

You are allowed to submit data from previous emissions tests in lieu of performing a MACT performance test to set operating limits. See § 63.1207(c)(2). To use previous emissions test data, the data must have been collected less than 5 years before the date you intend to submit your notification of compliance. The data must also have been collected as part of a test that was for the purpose of demonstrating compliance with RCRA or CAA requirements. Additionally, you must submit your request to use previous test data in your comprehensive performance test plan which is submitted 1 year in advance of the MACT performance test. Finally, you must schedule your subsequent MACT performance test and MACT confirmatory test 5 years and 2.5 years respectively following the date the emissions test data your submitting was collected.

We developed this allowance in response to comments that suggested we should allow previous RCRA testing to be used in lieu of performing a new MACT performance test if the data could be used to demonstrate compliance and establish operating limits to ensure compliance with the MACT emissions standards. Commenters reasoned, and we agreed, that such an allowance was reasonable and necessary for those sources that

[187] USEPA. "Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities" External Peer Review Draft. EPA–530–D–98–001A,B&C. Date.; USEPA, "Guidance on Collection of Emissions Data to Support Site-Specific Risk Assessments at Hazardous Waste Combustion Facilities" EPA 530–D–98–002. August 1998.

[188] One approach would be to require performance tests for modifications covered by the class 2 and class 3 permit modifications associated with combustion source design and operating parameter changes.

[189] We cannot determine if a source has accurately concluded that a change does not adversely affect its ability to comply with the emission standards if we are never aware that changes were made to the source.

must perform emissions tests to satisfy other state or federal requirements. As we developed this allowance, we decided that it is necessary to limit the age of the data and specify the date of the following performance test because we need to be consistent with the MACT performance test requirements with respect to testing frequency. We can further justify the time and testing limitations of the data in lieu of allowance by acknowledging that we don't want some sources gaining an advantage over others by extending the date between performance tests. However, we also weighed the fact that some sources may be required to perform RCRA testing fairly close to the compliance date or promulgation date of today's rule and we didn't want to penalize them by forcing them to perform a new performance test before five years had elapsed since their previous test. So we settled on an approach that allows the use of previous emissions test data and effectively sets the same testing frequency as is applied to test data collected via a MACT performance test following the compliance date. This approach doesn't penalize or favor any source over another and it allows each source to take advantage of this provision when it makes sense. For instance, a source may be granted approval to use data from a RCRA trial burn performed 1 year before today's date, thus not requiring the source to perform a comprehensive performance test 270 days following the compliance date. Instead, the source must schedule its next MACT performance test five years after the date the test was performed. However, the source must perform a confirmatory test 270 days following the compliance date because the test schedule for the confirmatory test is also linked to the date of the performance test. So in this situation the source must determine if its better to run the comprehensive performance test on a normal schedule after the compliance date or delay the comprehensive test and perform a confirmatory test instead.

VI. What Is the Notification of Compliance?

A. What Are the Requirements for the Notification of Compliance?

You must submit to the Administrator the results of the comprehensive performance test in a notification of compliance (NOC) no later than three months after the conclusion of the performance test. You must submit the initial NOC later than nine months following the compliance date.

B. What Is Required in the NOC?

You must include the following information in the NOC:

—Results of the comprehensive performance test, continuous monitoring system performance evaluation, and any other monitoring procedures or methods that you conducted;
—Test methods used to determine the emission concentrations and feedstream concentrations, as well as a description of any other monitoring procedures or methods that you conducted;
—Limits for the operating parameters;
—Procedures used to identify the operating parameter limits specified in § 63.1209;
—Other information documenting compliance with the operating requirements, including but not limited to automatic waste feed cutoff system operability and operator training;
—A description of the air pollution control equipment and the associated hazardous air pollutant that each device is designed to control; and
—A statement from you or your company's responsible official that the facility is in compliance with the standards and requirements of this rule.

C. What Are the Consequences of Not Submitting a NOC?

The normal CAA enforcement procedures apply if you fail to submit a timely notification of compliance. We do not adopt our proposed approach that would have required you to immediately stop burning hazardous waste if you failed to submit a timely NOC.

We proposed regulatory language stating that failure to submit a notification of compliance by the required date would result in the source being required to immediately stop burning hazardous waste. This proposal was similar to requirements applied to BIFs certifying compliance under RCRA. Under the proposal, if you wanted to burn hazardous waste in the future, you would be required to comply with the standards and permit requirements for new MACT and RCRA sources.

In the 1997 NODA, however, we proposed to rely on the regulating agency's policy regarding enforcement response to govern the type of enforcement response at a facility that fails to submit a notification of compliance. Based on NODA comments and review of this enforcement process, we are not including in the final rule regulatory language addressing the consequences of failure to submit a timely or complete NOC. Instead, we rely on the regulating agency's policy regarding enforcement response to govern the type of enforcement response at a facility that fails to meet a compliance deadline. This approach is more practical to implementing today's MACT standards and is more consistent with the way other MACT standards are implemented.

D. What Are the Consequences of an Incomplete Notification of Compliance?

In response to our April 1996 NPRM, commenters state that we were unclear as to the consequences of an incomplete NOC. Furthermore, commenters state that it was important that we specify what is needed and the consequences if an NOC is incomplete or more information is needed. Additionally, commenters recommend that if the NOC contains emission information, the certification statement, and a signature, we should judge the NOC to be administratively complete and an acceptable submission. In addition, commenters suggest that if the regulatory official reviewing the NOC determines that additional information is required, the source should be given ample time to submit that information.

Our enforcement approach to incomplete submissions, under RCRA or the CAA, is generally determined on a site-specific basis. We will not attempt to foresee and develop enforcement responses to all the possible levels of incompleteness for the NOC. This is beyond the scope of our national rulemaking. Furthermore, defining what constitutes an incomplete submission requires us to specifically prescribe a complete submission, which is not possible for all situations or all source designs. Some sources may require more detail than others in defining the parameters necessary to determine compliance on a continuous basis. Therefore, we instead define the minimum information necessary in the submission and allow the implementing agency to determine if more information is necessary in a facility's site-specific NOC.

In response to comments advocating that facilities be given ample time to submit additional information required by the regulatory official, we prefer to allow the implementing agency to determine the time periods that will be granted to submit additional information because some information requests may require widely varying degrees of time and effort to develop. Many potential problems associated with incomplete submissions can be prevented through interaction between the source and the regulatory agency during the test plan review and approval process. We do not want our rules to act as disincentive to those discussions by providing a complete shield, regardless of the severity of the omission.

E. Is There a Finding of Compliance?

We adopt the requirement we proposed for the regulatory agencies to make a finding of compliance based on performance test results (see § 63.1206(b)(3)). This provision specifies that the regulatory agency must determine whether an affected source is in compliance with the emissions standards and other requirements of subpart EEE, as provided by the general provisions governing findings of compliance in § 63.6(f)(3). Thus, the regulatory agency is obligated to make this finding upon obtaining all the compliance information required by the standards, including the written reports of performance test results, monitoring results, and other applicable information. This includes, but may not be limited to, the information submitted by the source in its NOC.

VII. What Are the Monitoring Requirements?

In this section, we discuss the following topics: (1) The compliance monitoring hierarchy that places a preference on compliance with a CEMS; (2) how limits on operating parameters are established from comprehensive performance test data; (3) status and use of CEMS other than carbon monoxide, hydrocarbon, and oxygen CEMS; and (4) final compliance monitoring requirements for each emission standard.

A. What Is the Compliance Monitoring Hierarchy?

We proposed the following three-tiered compliance monitoring hierarchy in descending order of preference to ensure compliance with the emission standards: (1) Use of a continuous emission monitoring system (CEMS) for a hazardous air pollutant; (2) absent a CEMS for that hazardous air pollutant, use of a CEMS for a surrogate of that hazardous air pollutant and, when necessary, setting limits on operating parameters to account for the limitations of using surrogates; and (3) lacking a CEMS for either, requiring periodic emissions testing and site-specific limits on operating parameters. Accordingly, we proposed to require the use of carbon monoxide, hydrocarbon, oxygen, particulate matter, and total mercury CEMS. We also proposed performance specifications for multimetal, hydrochloric acid, and chlorine gas CEMS to give sources the option of using a CEMS for compliance with the semivolatile and low volatile metal emissions standards, and the hydrochloric acid/chlorine gas emission standard.

Commenters question the availability and reliability of CEMS other than those for carbon monoxide, hydrocarbon, and oxygen. We concur with some of the commenters' concerns and are not requiring use of a total mercury CEMS in the final rule or specifying the installation deadline and performance specifications for particulate matter CEMS. In addition, we have not promulgated performance specifications for these CEMS or multimetal, hydrochloric acid, and chlorine gas CEMS. We nonetheless continue to encourage sources to evaluate the feasibility of using these CEMS to determine the performance specifications, correlation acceptance criteria, and detector availability that can be achieved. Sources may request approval from permitting officials under § 63.8(f) to use CEMS to document compliance with the emission standards in lieu of periodic performance testing and compliance with limits on operating parameters. See discussion in Section VII.C below on these issues.

B. How Are Comprehensive Performance Test Data Used To Establish Operating Limits?

In this section, we discuss: (1) The definitions of terms related to monitoring and averaging periods; (2) the rationale for the averaging periods for operating parameter limits, (3) how comprehensive performance test data are averaged to calculate operating parameter limits; (4) how the various types of operating parameters are monitored/established; (5) how nondetect performance test feedstream data are handled; and (6) how rolling averages are calculated initially, upon intermittent operations, and when the hazardous waste feed is cut off.

1. What Are the Definitions of Terms Related to Monitoring and Averaging Periods?

In the April 1996 NPRM, we proposed definitions for several terms that relate to monitoring and averaging periods. For the reasons discussed below, we conclude that the proposed definitions are appropriate and are adopting them in today's rule. We also finalize definitions for ''average run average'' and ''average highest or lowest rolling average'' which were not proposed. We conclude these new definitions are necessary to clarify the meaning and intent of regulatory provisions associated with the monitoring requirements that are discussed in Part 5, Section VII.D. of this preamble.

We promulgate the following definitions in today's rule (see § 63.1201).

''Average highest or lowest rolling average'' means the average of each run's highest or lowest rolling average run within the test condition for the applicable averaging period.

''Average run average'' means the average of each run's average of all associated one minute values.

''Continuous monitor'' means a device that: (1) Continuously samples a regulated parameter without interruption; (2) evaluates the detector response at least once every 15 seconds; and (3) computes and records the average value at least every 60 seconds, except during allowable periods of calibration and as defined otherwise by the CEMS Performance Specifications in appendix B of part 60.

''Feedrate operating limits'' means limits on the feedrate of materials (e.g., metals, chlorine) to the combustor that are established based on comprehensive performance testing. The limits are established and monitored by knowing the concentration of the limited material (e.g., chlorine) in each feedstream and the flow rate of each feedstream.

''Feedstream'' means any material fed into a hazardous waste combustor, including, but not limited to, any pumpable or nonpumpable solid, liquid, or gas.

''Flowrate'' means the rate at which a feedstream is fed into a hazardous waste combustor.

''Instantaneous monitoring'' means continuously sampling, detecting, and recording the regulated parameter without use of an averaging period.

''One-minute average'' means the average of detector responses calculated at least every 60 seconds from responses obtained at least each 15 seconds.

''Rolling average'' means the average of all one-minute averages over the averaging period.

One commenter opposes the requirement to take instrument readings every 15 seconds. This commenter contends that such an approach is simply impractical, unnecessary, and imposes a harsh burden upon members of the regulated community. Another commenter maintains that the CEMS Data Acquisition System should be capable of sampling the analyzer outputs at least every 15 seconds. With today's processing power and speed, the commenter states that this can easily be achieved. We agree with the second commenter and are requiring instrument readings at least every 15 seconds because this is currently required in the Boilers and Industrial Furnace rulemaking. (See § 266.102(e)(6))

Another commenter states that the Agency's definition of ''instantaneous monitoring'' of combustion chamber pressure to control combustion system leaks is not clear.[190] The commenter states that, although an instantaneous limit cannot be exceeded at any time, continuous monitoring systems are required to detect parameter values only once every 15 seconds. We note that the final rule requires instantaneous monitoring only for the combustion chamber pressure limit to control combustion system leaks. The rule requires an automatic waste feed cutoff if the combustion chamber pressure at any time (i.e., instantaneously) exceeds ambient pressure (see § 63.1209(p)). The definition of a continuous monitoring system is that it must record instrument readings at least every 15 seconds. For instantaneous monitoring of pressure, the detector must clearly record a response more frequently than every 15 seconds.[191] It must detect and record pressure constantly without interruption and without any averaging period.

2. What Is the Rationale for the Averaging Periods for the Operating Parameter Limits?

The final rule establishes the following averaging periods: (1) No averaging period (i.e., instantaneous monitoring) for maximum combustion chamber pressure to control combustion system leaks; (2) 12-hour rolling averages for maximum feedrate of mercury, semivolatile metals, low volatile metals, chlorine, and ash (for incinerators); and, (3) one-hour averaging periods for all other operating parameters. As discussed later in this section, we conclude that the proposed ten-minute averaging periods are not necessary, on a national basis, to better ensure compliance with the emission standards at hazardous waste combustors, and have not adopted these averaging periods in this rulemaking.

a. When Is an Instantaneous Limit Used? An instantaneous limit is required only for maximum combustion chamber pressure to control combustion system leaks. This is because any perturbation above the limit may result in uncontrolled emissions exceeding the standards.

b. When Is an Hourly Rolling Average Limit Used? An hourly rolling average limit is required for all parameters that are based on operating data from the comprehensive performance test, except combustion chamber pressure and feedrate limits. Hourly rolling averages are required for these parameters rather than averaging periods based on the duration of the performance test because we are concerned that there may be a nonlinear relationship between operating parameter levels and emission levels of hazardous air pollutants.

c. Why Has the Agency Decided Not to Adopt Ten-Minute Averaging Periods? Dual ten-minute and hourly rolling averages were proposed for most parameters for which limits are based on the comprehensive performance test. See 61 FR at 17417. We proposed ten-minute rolling averages in addition to hourly rolling averages for these parameters because short term excursions of the parameter can result in a disproportionately large excursion of the hazardous air pollutant being controlled.

Commenters claim that the Agency's concerns with emission excursions due to short term perturbations of these operating parameters were not supported with data and are therefore unjustified, and claim that averaging periods shorter than those required in the existing BIF regulations would provide no environmental benefit.

We acknowledge that the Agency does not have extensive short-term emission data that show operating parameter excursions can result in disproportionately large excursions of hazardous air pollutants being emitted. These short-term data cannot be obtained without the use of continuous emission monitors that measure dioxin/furans, metals, and chlorine on a real-time basis. Such monitors, for the most part, are not currently used for compliance purposes at hazardous waste combustors. However, known relationships between operating parameters and hazardous air pollutant emissions indicate that a nonlinear relationship exists between operating parameter levels and emissions. This nonlinear relationship can result in source emissions that exceed levels demonstrated in the performance test if the operating parameters are not properly controlled. An explanation of these nonlinear relationships, including examples that explain why this relationship can result in daily emissions that exceed levels demonstrated in the performance test, are included in the Final Technical Support Document.[192] Thus, at least in theory, an environmental benefit can result from shorter averaging periods, including ten-minute rolling averages and perhaps instantaneous readings in certain situations.

We also acknowledge, however, that the Agency's ability to assess this potential benefit in practice for all hazardous waste combustors affected by this final rule is limited significantly by the paucity of short-term, minute-by-minute, operating parameter data. Without this data we cannot effectively evaluate whether operating parameter excursions occur to an extent that warrant national ten-minute averaging period requirements for all hazardous waste combustors. We therefore conclude that averaging period requirements shorter than those required by existing BIF regulations are not now appropriate for adoption on a national level, and do not adopt ten-minute averaging period requirements in this rulemaking.

We maintain, however, that there may be site-specific circumstances that warrant averaging periods shorter than one hour in duration, including possibly instantaneous measurements. Regulatory officials may determine, on a site-specific basis, that shorter averaging periods are necessary to better assure compliance with the emission standards. The provisions in § 63.1209(g)(2) authorize the regulatory official to make such a determination. Factors that may be considered when determining whether shorter averaging periods are appropriate include (1) the ability of a source to effectively control operating parameter excursions to levels achieved during the performance test; (2) the source's previous compliance history regarding operating parameter limit exceedances; and (3) the difference between the source's performance test emission levels and the relevant emission standard. For additional information, see the Final Technical Support Document, Volume 4, Chapter 2.

d. What Is the Basis for 12-Hour Rolling Averages for Feedrates? The rule requires 12-hour averages for the feedrate of mercury, semivolatile metals, low volatile metals, chlorine, and ash (for incinerators) because feedrate and emissions are, for the most part, linearly

[190] ''Combustion system leaks'' is the term used in today's rule to refer to leaks that are called fugitive emissions under current RCRA regulations. We use the term combustion system leaks to refer to those emissions because the term fugitive emissions has other meanings under part 63.

[191] Typical pressure transducers in use today are capable of responding to pressure changes once every fifty milliseconds. See USEPA, ''Final Technical Support Document for Hazardous Waste Combustor MACT Standards, Volume IV: Compliance with the Hazardous Waste Combustor Standard,'' July 1999.

[192] See USEPA, ''Final Technical Support Document for Hazardous Waste Combustor MACT Standards, Volume IV: Compliance With the Hazardous Waste Combustor Standards, July 1999, Chapters 2 and 3.

related. A 12-hour averaging period for feedrates is appropriate because it is the upper end of the range of time required to perform three runs of a comprehensive performance test. Thus, a 12-hour averaging period will ensure (if all other factors affecting emissions are constant) that emissions will not exceed performance test levels during any interval of time equivalent to the time required to conduct a performance test. A 12-hour averaging period is also achievable and appropriate from a compliance perspective because the emission standards are based on emissions data obtained over (roughly) these sampling periods.[193]

e. Has the Agency Over-Specified Compliance Requirements? Some commenters state that the Agency is over-specifying compliance requirements by requiring limits on many operating parameters, requiring dual ten-minute and hourly rolling average limits on many parameters, and requiring that sources interlock the operating parameter limits with the automatic waste feed cutoff system. These commenters wrote that this compliance regime may lead to system over-control and instability, and an unreasonable and unnecessary increase in automatic waste feed cutoffs, a result that is contrary to good process control principles. They propose that we work with industry to develop a process control system and performance specification regulatory approach to establish minimum system standards. These would include: (1) Minimum process instrument sampling time; (2) maximum calculation capability for output signals; (3) minimum standard for process control sequences; and (4) minimum requirements for incorporating automatic waste feed cutoffs into the control scheme. The specifications would be incorporated into guidance, rather than regulation. Commenters suggest that the rule should only specify general goals, similar to the guidance approach we took for hazardous waste incinerators in the 1981 RCRA regulations.[194]

We evaluated these comments carefully, balancing the need to provide industry with operational flexibility with the need for compliance assurance. As previously discussed, we are not adopting ten-minute averaging period requirements in this rulemaking, although it can be imposed on a site-specific basis under appropriate circumstances. This addresses commenter's concerns that relate to the complexity of the proposed dual averaging period requirements. We acknowledge, however, that today's rule requires that more operating parameter limits be interlocked to the automatic waste feed cutoff system than is currently required by RCRA regulations. Nonetheless, we conclude that the compliance regime of today's final rule is necessary to ensure compliance with the emission standards and will not overly constrain process control systems for the following reasons.

Automatic waste feed cutoffs are (by definition) automatic, and the control systems used to avoid automatic waste feed cutoffs require adequate response time and are primarily site-specific in design. The closer a source pushes the edge of the operating envelope, the better that control system must perform to ensure that an operating parameter limit (and emission standard) is not exceeded. Therefore, a source has extensive control over the impact of these requirements.

Under the compliance regime of today's rule, sources will continue to perform comprehensive performance testing under ''worst case'' conditions as they currently do under RCRA requirements to establish limits on operating parameters that are well beyond normal levels. This cushion between normal operating levels and operating parameter limits enables the source to take corrective measures well before a limit is about to be exceeded, thus avoiding an automatic waste feed cutoff.

Regulatory officials do not have the extensive resources that would be required to develop and implement industry-specific control guidelines and we are not confident that this approach would provide adequate compliance assurance. Although specifying only emissions standards and leaving the compliance method primarily up to the source and the permit writer (aided by guidance) would provide flexibility, it would place a burden on the permit writers and the source during the development and approval of the performance test plan and the finding of compliance subsequent to Notification of Compliance. In addition, this level of interaction between permitting officials and the source is contrary to our policy of structuring the MACT standards to be as self-implementing as possible.[195] The Agency therefore maintains its position that the compliance scheme adopted in today's rule, is appropriate.

f. Why Isn't Risk Considered in Determining Averaging Periods? Several commenters state that long averaging periods (e.g., monthly metal feedrate rolling averages) for the operating parameter limits and CEMS-monitored emission standards would be appropriate. These commenters believe that long averaging periods would be appropriate given that the Agency has performed a risk assessment and concluded that the emission standards would be protective over long periods of exposure. They state that long averaging periods would ensure that emissions are safe and reduce compliance costs.

Consideration of risk is not an appropriate basis for determining averaging periods to ensure compliance with the technology-based MACT emission standards.[196] As previously stated, we must establish averaging periods that ensure compliance with the emission standard for time durations equivalent to the emission sampling periods used to demonstrate compliance. Longer averaging periods would not ensure compliance with the emission standard because many of the operating parameters do not relate to emissions linearly.

In addition, a longer averaging period is not warranted even for those operating parameters than may relate linearly to emissions because this would allow a source to emit hazardous air pollutants in excess of the emission standard for times periods equivalent to the stack emission sampling periods used to demonstrate compliance. For example, a monthly averaging period for metal feedrates could result in a source emitting metals at a level three times the regulatory standard continuously for a one week period.[197] This would not be consistent with the level of control that was achieved by the best performing sources in our data base. Modifying the results of the MACT process based on risk considerations is thus contrary to Congressional intent that MACT

[193] See *Chemical Waste Management* v. *EPA,* 976 F.2d, 2, 34 (D.C. Cir. 1992) (It is inherently reasonable to base compliance on the same type of data used to establish the requirement).

[194] The incinerator regulations promulgated in 1981, at the outset of the RCRA regulatory program, used such a general guidance approach. However, sources have had over 15 years since then to gain experience with process control techniques associated with the combustion of hazardous waste.

[195] The time that would be associated with this type of review and negotiation between permit writer and source would be better spent on developing, reviewing, and approving the comprehensive performance test plan under today's compliance regime.

[196] We note, however, that within eight years of promulgating MACT standards for a source category, we must consider risk in determining under section 112(f) whether standards more stringent than MACT are necessary to provide an ample margin of safety to protect public health and the environment.

[197] For this to occur, the source would have to emit metals far below the standard for time periods before and after this one-week period.

standards, at a minimum, must represent the level of control being achieved by the average of the best performing 12 percent of the sources. We therefore conclude that we must limit averaging times at least to time durations equivalent to the emission sampling periods used to demonstrate compliance.

g. Will Relaxing Feedrate Averaging Times Increase Environmental Loading? One commenter questions whether relaxing the averaging time for the feedrate of metals and chlorine from an hourly rolling average under current RCRA regulations to the 12-hour rolling average of today's rule would increase total environmental loading of pollutants and be counter to the Agency's pollution prevention objectives. Contrary to the commenter's concern, we conclude that today's rule will decrease environmental loading of hazardous air pollutants because the emission standards are generally more stringent than current RCRA standards. Today's standards more than offset any difference in environmental loading associated with longer averaging times. As previously discussed, the averaging periods in today's rule were chosen to ensure compliance with the emission standard for intervals of time equivalent to the time required to conduct a performance test.

Although current RCRA standards generally establish hourly rolling averages for the feedrate of metals, sources are actually allowed to establish up to 24-hour rolling averages for arsenic, beryllium, chromium, cadmium, and lead, provided they restrict the feedrate of these metals at any time to ten times what would be normally allowed under an hourly rolling average basis. For these reasons, the commenter's concern is not persuasive.

3. How Are Performance Test Data Averaged To Calculate Operating Parameter Limits?

The rule specifies which of two techniques you must use to average data from the comprehensive performance test to calculate limits on operating parameters: (1) Calculate the limit as the average of the maximum (or minimum, as specified) rolling averages for each run of the test; or (2) calculate the limit as the average of the test run averages for each run of the test.

Hourly rolling averages for two parameters—combustion gas flowrate (or kiln production rate as a surrogate) and hazardous waste feedrate—are based on the average of the maximum hourly rolling averages for each run. Hourly rolling average and 12-hour rolling average limits for all other parameters, however, are based on the average level occurring during the comprehensive performance test. We determined that this more conservative approach is appropriate for these parameters because they can have a greater effect on emissions, and because it is consistent with how manual method emissions results are determined.[198]

These are examples of how the averages work. The hourly rolling average hazardous waste feedrate limit for a source is calculated using the first technique. If the highest hourly rolling averages for each run of the comprehensive performance test were 200 lbs/hour, 210 lbs/hr, 220 lbs/hr, the hourly rolling average feedrate limit would be 210 lbs/hr.

The second approach uses the average of the test run averages for a given test condition to calculate the limit. Each test run average is calculated by summing all the one-minute readings within the test run and dividing that sum by the number of one-minute readings. For example, if: (1) The sum of all the one-minute semivolatile metal feedrate readings for each run within a test condition is 2,400 lbs/hour, 2,500 lbs/hour, and 2,600 lbs/hour; and (2) there are 240, 250, and 200 one-minute readings in each run, respectively; then (3) the average feedrate for each of these three runs is 10 lbs/hour, 10 lbs/hour, and 13 lbs/hour, respectively. The 12-hour rolling average semivolatile metal feed rate limit for this example is the average of these three values: 11 lbs/hour. This averaging methodology is not equivalent to an approach where the limit is calculated by taking the time-weighted average over all three runs within the test condition, because, as noted by the example, sampling times may be different for each run. The time-weighted average feedrate over all three test runs for the previous example is equivalent to 10.9 lbs/hr.[199] Although the two averaging techniques may not result in averages that are significantly different, we conclude that basing the limits on the average of the test run averages is more appropriate, because this approach is identical to how we determine compliance with the emission standards.

These averaging techniques are the same as we proposed (see 61 FR at 17418).[200] A number of commenters object to the more conservative second technique of basing the limits on the average levels that occur during the test. The commenters claim that this approach ensures a source would not comply with the limits 50% of the time when operating under the same conditions as the performance test. Further, they are concerned that this approach would establish operating parameter limits that would ''ratchet'' emissions to levels well below the standards, and further ratcheting would occur with each subsequent performance test (i.e., because the current operating limits could not be exceeded during subsequent performance testing). Some commenters prefer the approach of setting the limit as the average of the highest (or lowest) rolling average from each run, technique one above, which is the same approach used in the BIF rule.

Notwithstanding the conservatism of the promulgated approach (technique two above) for many operating parameter limits, we maintain that the approach results in achievable limits and is necessary to ensure compliance with the emission standards. Comprehensive performance tests are designed to demonstrate compliance with the emission standards and establish corresponding operating parameter limits. Thus, sources will operate under ''worst-case'' conditions during the comprehensive performance tests, just as they do currently for RCRA trial burns. Given that the source can readily control (during the performance test and thereafter) the parameters for which limits are established based on the average of the test run averages during performance testing (i.e., rather than on the average of the highest (or lowest) hourly rolling averages), and that these parameters will be at their extreme levels during the performance test, the limits are readily achievable.

There may be situations, however, where a source cannot simultaneously demonstrate worst-case operating conditions for all the regulated operating parameters. An example of this may be minimum combustion chamber temperature and maximum temperature at the inlet to the dry particulate matter control device because when the combustion chamber temperature is minimized, the inlet temperature to the control device may also be minimized. Sources should consult permitting officials to resolve

[198] Manual method emission test results for each run represents average emissions over the entire run.

[199] This time weighted average is calculated by summing all the one-minute feedrate values in the test condition and dividing that sum by the number of one minute readings in the test condition.

[200] Except that average hourly rolling average limits are calculated as the average of the test run averages rather than simply the average over all runs as proposed.

compliance difficulties associated with conflicting operating parameters. Potential solutions to conflicting parameters could be to conduct the performance test under two different modes of operation to set these conflicting operating parameter limits, or for the Administrator to use the discretionary authority provided by § 63.1209(g)(2) to set alternative operating parameter limits.

We address commenters' concern that subsequent performance tests would result in a further ratcheting down of operating parameter limits by waiving the operating limits during subsequent comprehensive performance tests (see § 63.1207(h)). The final rule also waives operating limits for pretesting prior to comprehensive performance testing for a total operating time not to exceed 720 hours. See discussion in Part Five, Section VI for more information on this provision.

Some commenters suggest that we use a statistical analysis to determine rolling average limits, such that the limits are calculated as the mean plus or minus three standard deviations of all rolling averages for all runs. Commenters state that this would ensure that the operating parameter limits are achievable. If such an approach were adopted, there would be no guarantee that a source is maintaining compliance with the emission standards for the time durations of the manual stack sampling method used to demonstrate compliance during the comprehensive performance test. Such an approach could conceivably encourage a source to intentionally vary operating parameter levels during the comprehensive performance test to such an extent that the statistically-derived rolling average limits would be significantly higher than the true average of the test condition. This could also result in widely varying statistical correction factors from one source to another, which is undesirable for reasons of consistency and fairness.

Such a statistical approach prevents us from establishing the minimum emission standards that Congress generally envisioned under MACT because we would not be assured that the sources are achieving the emission standard. We would also have difficulty estimating environmental benefits if this statistical approach were used because we would not know what level of emission control each source achieves. Again, the methodology promulgated for averaging performance test data to calculate operating parameter limits results in limits that are achievable and necessary to ensure compliance with the emission standards for time durations equivalent to emission sampling periods.

Several commenters oppose the compliance regime whereby limits on operating parameters are established during performance testing. They are concerned that this approach encourages sources to operate under worst-case conditions during testing. One commenter states that this approach effectively punishes sources for demonstrating emissions during their performance test that are lower than the standards (i.e., by establishing limits on operating parameters that would be well below those needed to comply with the standards).

We understand these concerns, but absent the availability of continuous emissions monitoring systems, we are unaware of another compliance assurance approach that effectively addresses the (perhaps unique) problem posed by hazardous waste combustors. The Agency is using this same approach to implement the RCRA regulations for these sources. Compliance assurance for hazardous waste combustors cannot be maintained using the general provisions of Subpart A in Part 63—procedures that apply to all MACT sources unless we promulgate superseding provisions for a particular source category. Those procedures require performance testing under normal operating conditions, but operating limits are not established based on performance test operations. This approach is appropriate for most industrial processes because process constraints and product quality typically limit ''normal'' operations to a fairly narrow range that is easily defined.

Hazardous waste combustors may be somewhat unique MACT sources, however, in that the characteristics of the hazardous waste feed (e.g., metals concentration, heating value) can vary over a wide range and have a substantial effect on emissions of hazardous air pollutants. In addition, system design, operating, and maintenance features can substantially affect pollutant emissions. This is not the same situation for many other MACT source categories where feedstream characteristics and system design, operation, and maintenance features must be confined to a finite range so that the source can continue to produce a product. Hazardous waste incinerators do not have such inherent controls (i.e., because they provide a waste treatment service rather than produce a product), and cement and lightweight aggregate kilns can vary substantially hazardous waste characteristics in the fuel, as well as system design, operation, and maintenance features and still produce marketable product.

To address commenters' concerns at least in part, however, we have included a metals feedrate extrapolation provision in the final rule. This will reduce the incentive to spike metals in feedstreams during performance testing (and thus reduce the cost of testing, the hazard to test crews, and the environmental loading) by explicitly allowing sources to request approval to establish metal feedrate limits based on extrapolating upward from levels fed during performance testing. See discussion in Section VII.D.4 below, and §§ 63.1209(l)(1) and 63.1209(n)(2)(ii).

4. How Are the Various Types of Operating Parameters Monitored or Established?

The operating parameters for which you must establish limits can be categorized according to how they are monitored or established as follows: (1) Operating parameters monitored directly with a continuous monitoring system; (2) feedrate limits; and (3) miscellaneous operating parameters. (Each of these parameters is discussed in Section VII.D below.)

a. What Operating Parameters Are Monitored Directly with a Continuous Monitoring System? Operating parameters that are monitored directly with a continuous monitoring system include: Combustion gas temperature in the combustion chamber and at the inlet to a dry particulate matter control device; baghouse pressure drop; for wet scrubbers, pressure drop across a high energy wet scrubber (*e.g.*, venturi, calvert), liquid feed pressure, pH, liquid-to-gas ratio, blowdown rate (coupled with either a minimum recharge rate or a minimum scrubber water tank volume or level), and scrubber water solids content; minimum power input to each field of an electrostatic precipitator; flue gas flowrate or kiln production rate; hazardous waste flowrate; and adsorber carrier stream flowrate. These operating parameters are monitored and recorded on a continuous basis during the comprehensive performance test and during normal operations. The continuous monitoring system also transforms and equates the data to its associated averaging period during the performance test so that operating parameter limits can be established. The continuous monitoring system must operate in conformance with § 63.1209(b).

b. How Are Feedrate Limits Monitored? Feedrate limits are monitored by knowing the concentration of the regulated parameter in each feedstream and continuously monitoring the flowrate of each feedstream. See § 63.1209(c)(4). You must establish limits on the feedrate parameters specified in § 63.1209, including: semivolatile metals, low volatile metals, mercury; chlorine, ash (for incinerators), activated carbon, dioxin inhibitor, and dry scrubber sorbent. The flowrate continuous monitoring system must operate in conformance with § 63.1209(b).

c. How Are the Miscellaneous Operating Parameters Monitored/Established? Other operating parameters specified in § 63.1209 include: Specifications for activated carbon, acid gas sorbent, catalyst for catalytic oxidizers, and dioxin inhibitor; and maximum age of carbon in a carbon bed. Because each of these operating parameters may be unique to your source, you are expected to characterize the parameter (*e.g.*, using manufacturer specifications) and determine how it will be monitored and recorded. This information must be included in the comprehensive performance test plan that will be reviewed and approved by permitting officials.

5. How Are Rolling Averages Calculated Initially, Upon Intermittent Operations, and When the Hazardous Waste Feed Is Cut Off?

a. How Are Rolling Averages Calculated Initially? You must begin complying with the limits on operating parameters specified in the Documentation of Compliance on the compliance date.[201] See § 63.1209(b)(5)(i). Given that the one-hour, and 12-hour rolling averages for limits on various parameters must be updated each minute, this raises the question of how rolling averages are to be calculated upon initial startup of the rolling average requirements. We have determined that an operating parameter limit will not become effective on the compliance date until you have recorded enough monitoring data to calculate the rolling average for the limit. For example, the hourly rolling average limit on the temperature at the inlet to an electrostatic precipitator does not become effective until you have recorded 60 one-minute average temperature values on the compliance date. Given that compliance with the standards begins nominally at 12:01 am on the compliance date, the hourly rolling average temperature limit does not become effective as a practical matter until 1:01 am on the compliance date. Similarly, the 12-hour rolling average limit on the feedrate of mercury does not become effective until you have recorded 12 hours of one-minute average feedrate values after the compliance date. Thus, the 12-hour rolling average feedrate limits become effective as a practical matter at 12:01 pm on the compliance date.

Although we did not specifically address this issue at proposal, commenters raised the question in the context of CEMS. Given that the same issue applies to all continuous monitoring systems, we adopt the same approach for all continuous monitoring systems, including CEMS. See discussion below in Section VII.C.5.b. We adopt the approach discussed here because a rolling average limit on an operating parameter does not exist until enough one-minute average values have been obtained to calculate the rolling average.

b. How Are Rolling Averages Calculated upon Intermittent Operations? We have determined that you are to ignore periods of time when one-minute average values for a parameter are not recorded for any reason (*e.g.*, source shutdown) when calculating rolling averages. See § 63.1209(b)(5)(ii). For example, consider how the hourly rolling average for a parameter would be calculated if a source shuts down for yearly maintenance for a three week period. The first one-minute average value recorded for the parameter for the first minute of renewed operations is added to the last 59 one-minute averages before the source shutdown for maintenance to calculate the hourly rolling average.

We adopt this approach for all continuous monitoring systems, including CEMS (see discussion below in Section VII.C.5.b) because it is simple and reasonable. If, alternatively, we were to allow the ‘‘clock to be restarted’’ after an interruption in recording parameter values, a source may be tempted to ‘‘clean the slate’’ of high values by interrupting the recording of the parameter values (*e.g.*, by taking the monitor off-line for a span or drift check). Not only would this mean that operating limits would not be effective again until an averaging period’s worth of values were recorded, but it would be contrary to our policy of penalizing a source for operating parameter limit exceedances by not allowing hazardous waste burning to resume until the parameter is within the limit. Not being able to burn hazardous waste during the time that the parameter exceeds its limit is intended to be an immediate economic incentive to minimize the frequency, duration, and intensity of exceedances.

c. How Are Rolling Averages Calculated when the Hazardous Waste Feed Is Cut Off? Even though the hazardous waste feed is cut off, you must continue to monitor operating parameters and calculate rolling averages for operating limits. See § 63.1209(b)(5)(iii). This is because the emission standards and operating parameter limits continue to apply even though hazardous waste is not being burned. See, however, the discussion in Part Five, Sections I.C and I.D above for exceptions (*i.e.*, when a hazardous waste combustor is not burning hazardous waste, the emission standards and operating requirements do not apply: (1) During startup, shutdown, and malfunctions; or (2) if you document compliance with other applicable CAA section 112 or 129 standards).

6. How Are Nondetect Performance Test Feedstream Data Handled?

You must establish separate feedrate limits for semivolatile metal, low volatile metal, mercury, total chlorine, and/or ash for each feedstream for which the comprehensive performance test feedstream analysis determines that these parameters are not present at detectable levels. The feedrate limit must be defined as nondetect at the full detection limit achieved during the performance test. See § 63.1207(n).

You will not be deemed to be exceeding this feedrate limit when detectable levels of the constituent are measured, provided that: (1) Your total system constituent feedrate, considering the detectable levels in the feedstream (whether above or below the detection limit achieved during the performance test) that is limited to nondetect levels, is below your total system constituent feedrate limit; or (2) except for ash, your uncontrolled constituent emission rate for all feedstreams, calculated in accordance with the procedures outlined in the performance test waiver provisions (see § 63.1207(m)) are below the applicable emission standards.

We did not address in the April 1996 NPRM how you must handle nondetect compliance test feedstream results when determining feedrate limits, nor did commenters suggest an approach. After careful consideration, we conclude that the approach presented above is reasonable and appropriate.

The LWAK industry has expressed concern about excessive costs with compliance activities that would be needed for the mercury standard. They

[201] The operating parameters for which you must specify limits are provided in § 63.1209. You must include these limits in the Documentation of Compliance, and you must record the Documentation of Compliance in the operating record.

claim that the increased costs associated with achieving lower mercury detection limits are large, and does not result in significant environmental benefits.

The final rule includes four different methods an LWAK can use to comply with the mercury emission standard in order to provide maximum flexibility. The basic compliance approach (described below) does not require an LWAK to achieve specified minimum mercury detection limits for mercury standard compliance purposes.[202] Under this approach, analytical procedures that achieve given detection limits are evaluated on a site-specific basis as part of the waste analysis plan review and approval process, which is submitted as part of the performance test plan. An LWAK can make the case to the regulatory official that the increased costs associated with achieving a very low mercury detection limit is not warranted. We therefore do not believe that the LWAK industry will incur significant additional analytical costs over current practices for daily mercury compliance activities. We acknowledge, however, that site-specific circumstances may lead a regulatory official to conclude that lower detection limits are warranted. To better understand this concept, the following paragraphs summarize this basic mercury emission standard compliance scheme and discusses why a regulatory official may determine, on a site-specific basis, that lower detection limits are needed to better assure compliance with the emission standard.

Under this basic approach, the source conducts a performance test and samples the emissions for mercury to demonstrate compliance with the emission standard. To ensure compliance with the emission standard during day-to-day operations, the source must comply with mercury feedrate limits that are based on levels achieved during the performance test. A source must establish separate mercury feedrate limits for each feed location. As previously discussed in this section, for feedstreams where mercury is not present at detectable levels, the feedrate limit must be defined as ''nondetect at the full detection limit''.

There is no regulatory requirement for a source to achieve a given detection limit under this approach. We acknowledge, however, that feedstream detection limits can be high enough such that a mercury feedrate limit that is based on nondetect performance test results may not completely ensure compliance with the emission standard during day-to-day operations. For example, the LWAK industry has indicated that a hazardous waste mercury detection limit of 2 ppm is reasonably achievable at an on-site laboratory. If we assume that mercury is present in the hazardous waste at a concentration of 1.99 ppm (just below the detection limit), the expected mercury emission concentration would be approximately 80 µg/dscm, which is above the standard.[203] (Note also that this does not consider mercury emission contributions from the raw material.) This is not to say that this LWAK will be exceeding the mercury emission standard during day-to-day operations. However, their inability to achieve low mercury detection limits results in less assurance that the source is continuously complying with the emission standard.

The regulatory official should consider such emission standard compliance assurance concerns when reviewing the waste analysis plan to determine if lower detection limits are appropriate (if, in fact such lower detection limits are reasonably achievable). Factors that should be considered in this review should include: (1) The costs associated with achieving lower detection limits; and (2) the estimated maximum mercury concentrations that can occur if the source's feedstreams contain mercury just below the detection limit (as described above).

C. Which Continuous Emissions Monitoring Systems Are Required in the Rule?

Although the final rule does not require you to use continuous emissions monitoring systems (CEMS) for parameters other than carbon monoxide, hydrocarbon, oxygen, and particulate matter[204] we have a strong preference for CEMS because they: (1) Are a direct measure of the hazardous air pollutant or surrogate for which we have established emission standards; (2) lead to a high degree of certainty regarding compliance assurance; and (3) allow the public to be better informed of what a source's emissions are at any time. Additionally, from a facility standpoint, CEMs provide you with real time feedback on your combustion operations and give you a greater degree of process control. Therefore, we encourage you to use CEMS for other parameters such as total mercury, multimetals, hydrochloric acid, and chlorine gas. You may use the alternative monitoring provision of § 63.8(f) to petition the Administrator (i.e., permitting officials) to use CEMS to document compliance with the emission standards in lieu of emissions testing and the operating parameter limits specified in § 63.1209. You may submit the petition at any time, such as with the comprehensive performance test plan. See Section VII.C.5.c below for a discussion of the incentives for using CEMS.

In this section, we discuss the status of development of particular CEMS and provide guidance on issues that pertain to case-by-case approval of CEMS in lieu of compliance using operating parameter limits and periodic emissions testing. Key issues include appropriate CEMS performance specifications, reference methods for determining the performance of CEMS, averaging periods, and temporary waiver of emission standards if necessary to enable sources to correlate particulate matter CEMS to the reference method.

1. What Are the Requirements and Deferred Actions for Particulate Matter CEMS?

In the April 1996 NPRM, we proposed the use of particulate matter CEMS to document compliance with the particulate matter emission standards. Particulate matter CEMS are used for compliance overseas[205], but are not yet a regulatory compliance tool in the U.S. Concurrent with this proposal, we undertook a demonstration of particulate matter CEMS at a hazardous waste incinerator to determine if these CEMS were feasible in U.S. applications. We selected the test incinerator as representative of a worst-case application for a particulate matter CEMS at any hazardous waste

[202] The other three approaches are (1) performance test waiver provisions (see preamble, part 5, section X.B); (2) alternative standards when raw materials cause an exceedance of the emission standard (see preamble, part 5, section X.A); and, (3) alternative mercury standards for kilns that have non-detect levels of mercury in the raw material (see preamble, part 5, section X.A). These mercury standard compliance alternatives require a source to achieve feedstream detection limits that either ensure compliance with an emission standard or ensure compliance with a hazardous waste feedrate limit that is used in lieu of a numerical emission standard. See previous referenced preamble for further discussion.

[203] This assumes that all the mercury fed to the unit is emitted, and is based on typical LWAK gas emission rates.

[204] The final rule requires that particulate matter CEMS be installed, but defers the effective date of the requirement to install, calibrate, maintain, and operate PM CEMS until these actions can be completed.

[205] The EU guidelines for hazardous waste combustion state that particulate matter is a parameter for which compliance must be documented continuously. In addition, proposals from vendors that we received in response to our February 27, 1996 NODA (see 61 FR 7262) indicate that there are many installations elsewhere overseas where particulate matter CEMS are used for compliance assurance.

combustor. It was important to document feasibility of the CEMS at a worst-case application to minimize time and resources needed to determine whether the CEMS were suitable for compliance assurance at all hazardous waste combustors.

We published preliminary results of our CEMS testing and sought comment on our approach to demonstrating particulate matter CEMS in the March 1997 NODA. We then revised our approach and sought comment on the final report in the December 1997 NODA. The December 1997 NODA also clarified several issues that came to light during the demonstration test pertaining to the manual reference method, particulate matter CEMS, and general quality assurance issues. These clarifications were embodied in a new manual method, Method 5–I (Method 5i), a revision to the proposed Performance Specification 11 for particulate matter CEMS, and a new quality assurance procedure, Procedure 2.

We believe that our tests adequately demonstrate that particulate matter CEMS are a feasible, accurate, and reliable technology that can and should be used for compliance assurance. In addition, preliminary analyses of the cost of PM CEMS applied to hazardous waste combustors suggest that these costs are reasonable. Accordingly, the final rule contains a requirement to install PM CEMS. However, we agree with comments that indicate a need to develop source-specific performance requirements for particulate matter CEMS and to resolve other outstanding technical issues. These issues include all questions related to implementation of the particulate matter CEMS requirement (i.e. relation to all other testing, monitoring, notification, and recordkeeping), relation of the particulate matter CEMS requirement to the PM emission standard, as well as technical issues involving performance, maintenance and correlation of the particulate matter CEMS itself. These issues will be addressed in a subsequent rulemaking. Therefore, we defer the effective date of this requirement pending further testing and additional rulemaking.

As a result, in today's final rule, we require that particulate matter CEMS be installed at all hazardous waste burning incinerators, cement kilns, and lightweight aggregate kilns. However, since we have not finalized the performance specifications for the use of these instruments or resolved some of the technical issues noted above, we are deferring the effective date of the requirement to install, calibrate, maintain and operate particulate matter CEMS until these actions can be completed. The particulate matter CEMS installation deadline will be established through future rulemaking, along with other pertinent requirements, such as final Performance Specification 11, Appendix F Procedure 2. Finally, it should be noted that EPA has a concurrent rulemaking process underway for nonhazardous waste burning cement kilns and plans to adopt the same approach in that rule.

2. What Are the Test Methods, Specifications, and Procedures for Particulate Matter CEMS?

a. What Is Method 5i? We promulgate in the final rule a new manual method for measuring particulate matter, Method 5i. See appendix A to part 60. We first published this new method in the December 1997 NODA. One outgrowth of these particulate matter CEMS demonstration tests is that we made significant improvements in making low concentration Method 5 particulate measurements. We first discussed these improvements in the preliminary report released in the March 1997 NODA, and commenters to that NODA ask that these improvements be documented. We documented these improvements by creating Method 5i.

We incorporated the following changes to Method 5 into Method 5i: Improved sample collection; minimization of possible contamination; Improved sample analysis; and an overall emphasis on elimination of systemic errors in measurement. These improvement achieved significant improvements in method accuracy and precision at low particulate matter concentrations, relative to Method 5.

We are promulgating Method 5i today, in advance of any particulate matter CEMS requirement, for several reasons. We expect this new method will be preferred in all cases where low concentration (i.e., below 45 mg/dscm (~0.02 gr/dscf)[206]) measurements are required for compliance with the standard. Given that all incinerators, nearly all lightweight aggregate kilns, and some cement kilns are likely to have emissions lower than 45 mg/dscm, we expect that Method 5i will become the particulate method of choice for most hazardous waste combustors. In addition, we expect that Method 5i will be used to correlate manual method results to particulate matter CEMS outputs for those sources that elect to petition the Administrator to use a CEMS in lieu of operating parameter limits for compliance assurance with the particulate matter standard.[207] This is because, unlike the worst-case particulate matter measurements normally used to verify compliance with the standard, low (or lower than normal) concentration particulate matter data are required to develop a good correlation between the CEMS output and the manual, reference method.

Many of the issues commenters raise relate to how Method 5i should be used to correlate particulate matter CEMS outputs to manual method measurements. Even though we are deferring a CEMS requirement, we address several key issues here given that sources may elect to petition the Administrator under § 63.8(f) to use a CEMS. This discussion may provide a better understanding on our thinking on particulate matter CEMS issues. In addition, certain comments are specific to how Method 5i is performed. These comments and our responses are relevant even if you use Method 5i only as a stack particulate method and not to correlate a particulate matter CEMS to the reference method.

i. Why Didn't EPA Validate Method 5i Against Method 5? Several commenters recommend that we perform a full Method 301 validation to confirm that Method 5i is equivalent to Method 5. We determined that a full Method 301 validation is not necessary because the differences in the two methods do not constitute a major change in the way particulate samples are collected from an operational or an analytical standpoint. We validated the filter extraction and weighting process—the only modification from Method 5 (see ''Particulate Matter CEMS Demonstration Test Final Report,'' Appendix A, in the Technical Support Document[208]) '' and documented that Method 5i gives nearly identical results as Method 5. Therefore, we disagree with the commenters' underlying concern and conclude that Method 5i has been validated.

ii. When Are Paired Trains Required? We have included in Method 5i a requirement that paired trains must be

[206] As noted later in the text, the filter and assembly used for Method 5i is smaller than the one used for Method 5. This means that the Method 5i filter plugs more easily than the one used for Method 5. This issue becomes important at particulate matter concentrations above 45 mg/dscm, or 0.02 gr/dscf.

[207] As alluded to previously, sources may elect to use a CEMS to comply with the numerical value of the particulate matter emission standard on a six-hour rolling average in lieu of complying with operating parameter limits specified by § 63.1209(m).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

3. What Is the Status of Total Mercury CEMS?

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

D. What Are the Compliance Monitoring Requirements?

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

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

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

BILLING CODE 6560–50–P

Summary of Dioxin/Furan Monitoring Requirements

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

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

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

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

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

BILLING CODE 6560–50–C

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2. What Are the Operating Parameter Limits for Mercury?

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

Summary of Mercury Monitoring Requirements

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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Summary of Semivolatile and Low Volatile Metals Monitoring Requirements

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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Summary of Hydrochloric Acid/Chlorine Gas Monitoring Requirements

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

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

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

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

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

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

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

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

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

We did not receive adverse comment on this compliance parameter.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Summary of Particulate Matter Monitoring Requirements

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

A. Manual Stack Sampling Test Methods

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

B. Sampling and Analysis of Feedstreams

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

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

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

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

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

IX. What Are the Reporting and Recordkeeping Requirements?

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

A. What Are the Reporting Requirements?

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

SUMMARY OF NOTIFICATIONS THAT YOU MUST SUBMIT TO THE ADMINISTRATOR

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

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

SUMMARY OF REPORTS THAT YOU MUST SUBMIT TO THE ADMINISTRATOR

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

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

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

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

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

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

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

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

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

B. What Are the Recordkeeping Requirements?

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

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

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

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

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

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

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

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

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

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

RECOMMENDED FLUCTUATION AND DATA COMPRESSION LIMITS

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

RECOMMENDED FLUCTUATION AND DATA COMPRESSION LIMITS—Continued

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

[255] As explained earlier, the emission standards for metals and chlorine reflect the performance of MACT control, which includes control of metals and chlorine in the hazardous waste feed materials. As further explained, sources are not required to adopt MACT control. Sources must, however, achieve the level of performance which MACT control achieves. Therefore, sources are not required to control metals and chlorine hazardous waste feedrates to the same levels as MACT control in order to comply with the standards for metals and chlorine. Rather, the source can elect to achieve the emission standard by any means, which may or may not involve hazardous waste feedrate control

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

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

[258] The nonhazardous waste Portland Cement Kiln MACT rulemaking likewise controls semivolatile metal and low volatile metal emissions by limiting particulate matter emissions, and did not adopt beyond-the-floor standards based on raw material metal and chlorine feedrate control—see 64 FR 31898.

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

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

CEMENT KILN AND LIGHTWEIGHT AGGREGATE KILN EMISSION STANDARD ACHIEVABILITY RESULTS

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

*Number after slash denotes total number of test conditions.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

See § 63.1206(b)(10) and (11).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1. How Is This Waiver Implemented?

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

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

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

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

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

2. How Are Detection Limits Handled Under This Provision?

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

See § 63.1204(d).

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

Emission averaging for in line raw mills will not be allowed when they demonstrate compliance with the hydrocarbon/carbon monoxide standard

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

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

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

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

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

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

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

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

Where:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Where:

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

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

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

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

Q_{bypass} = volumetric flowrate of bypass effluent gas

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

3. What Considerations Were Made for Ease of Implementation?

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

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

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

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

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

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

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

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

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

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

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

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

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

sources under the CAA to title V permitting is discussed in a separate section.

1. How Are the Title V Permitting Requirements Applicable?

We intend, by placing the new standards only in 40 CFR part 63 and not cross-referencing them in RCRA regulations, to rely on existing air programs to implement the new requirements, including operating permits programs developed under title V. All hazardous waste combustors subject to the MACT standards promulgated in this rule will thus be subject to title V permitting requirements for air emissions and related operating requirements (this includes hazardous waste combustors that are considered area sources under the CAA, as discussed in more detail below). In this rule, we are not amending any of the existing air permitting procedures. The procedures of 40 CFR part 71 for federal operating permits, or a State title V program approved under part 70, will remain applicable. Thus, all current CAA requirements governing permit applications, permit content, permit issuance, renewal, reopenings and revisions will apply to air emissions from hazardous waste combustors pursuant to promulgation of the hazardous waste combustor MACT standards.[293]

The public participation requirements for title V permits in parts 70 and 71, such as allowing an opportunity for public hearing and public comments on draft permits, also apply (see 40 CFR 70.7(h) and 71.11). We are committed to enhancing public participation in all of our programs. In 1996, we published a guidance manual on public involvement in the RCRA program intended to improve cooperation and communication among all participants in the RCRA permitting process (*RCRA Public Participation Manual*, EPA530–R–96–007, September 1996). Although the Manual is written in the context of the RCRA program, the principles are common to all program areas. For example, the Manual encourages early and meaningful involvement for communities and open access to information. It also acknowledges the important role of public participation in addressing environmental justice concerns. Since these principles are applicable in all situations, we encourage air programs and sources subject to the hazardous waste combustor MACT standards to refer to the RCRA manual for additional guidance on implementing effective public participation activities.

2. What Is the Relationship Between the Notification of Compliance and the Title V Permit?

The hazardous waste combustor MACT standards promulgated in this final rule include emissions limitations for several hazardous air pollutants, as well as detailed compliance, testing, monitoring, and notification requirements. Under these provisions, you not only demonstrate compliance with the emissions limitations, but also demonstrate that you have established operating requirements and monitoring methods that ensure continuous compliance with those limits. These demonstrations are made during a comprehensive performance test and subsequently documented in an NOC.

We are requiring, in § 63.1210(f), that you comply with the general provisions governing the NOC codified in § 63.9(h). Those provisions specify that in addition to describing the air pollution control equipment (or method) for each emission point for each hazardous air pollutant, the NOC also must include information such as: methods that were used to demonstrate compliance; performance test results; and methods for determining continuous compliance (including descriptions of monitoring and reporting requirements and test methods). We also are requiring in § 63.1207(j) that you comply with the all of the operating requirements specified in the NOC upon submittal to the Administrator.

Although these requirements are self-implementing, in that you must comply in accordance with the time frames set forth in today's rule, the requirements are ultimately implemented through title V operating permits (see 40 CFR parts 70 and 71). Section 63.1206(c)(1) specifies that: (1) You can only operate under the operating requirements specified in the DOC or NOC (with some exceptions as laid out in the regulations); (2) the DOC and NOC must contain operating requirements including, but not limited to, those in § 63.1206 (compliance with the standards and general requirements) and § 63.1209 (monitoring requirements); (3) operating requirements in the NOC are applicable requirements for the purposes of 40 CFR parts 70 and 71; and, (4) operating requirements in the NOC must be incorporated into the title V permit. In addition, because title V permits can only be issued if, among other conditions, ''the conditions of the permit provide for compliance with all applicable requirements'' (see §§ 70.7(a)(1)(iv) and 71.7(a)(1(iv)), parts 70 and 71 are clear that title V permits must contain the operating requirements documented in the NOC.

As mentioned above, you must comply with all operating requirements specified in the NOC as of the postmark date when the NOC is submitted to the Administrator. Operating requirements documented in the NOC must be included in your title V permit—either through initial issuance if you do not yet have a title V permit, or through a permit revision if you already have a permit. Including information from the initial NOC in title V permits should not create the potential for any compliance conflicts. Because it is the first time the NOC operating requirements are incorporated into the permit, there would be no requirements already on permit with which the NOC would conflict.

However, the potential for compliance conflicts could be created when a subsequent NOC is submitted. For example, you are required to conduct periodic comprehensive performance testing (see § 63.1207(d)(1)). Subsequent to each test, you must submit another NOC to the Administrator. Because of the dynamics of the testing and permitting cycles, it is possible that once you have information from the initial NOC in the permit, you could find yourself, after subsequent testing, in a situation where there might be potentially conflicting requirements with which you must comply (i.e., requirements in the title V permit and requirements in the most recently submitted NOC). This might occur, for example, if any of the operating requirements changed from the previous test.[294] The potential for compliance conflicts that might arise from this situation can be avoided, however, by following the guidance presented below.

The requirements in parts 70 and 71 govern the timing and procedures for permit issuance, revisions, and renewals, and you should refer to those requirements when obtaining or maintaining your permit. For today's rule, we provide guidance on what we recommend as to how operating requirements in the NOC should be incorporated into title V permits.[295]

[293] Requirements of other CAA permitting programs, such as construction permits, will continue to apply, as appropriate, to the HWC's sources subject to today's rule.

[294] On the other hand, if the limits did not change, there would be no conflict between the NOC and the permit.

[295] We are recommending this approach as guidance in the preamble, but not including any associated regulatory provisions. This guidance is

Continued

For incorporating information from an initial NOC into a title V permit, when you have an existing title V permit, we recommend that you and your permitting agency follow the procedures for significant modifications. The primary rationale for using these procedures is to afford the public an opportunity to review all of the information pertinent to your compliance obligations. We want to ensure a level of public involvement when including operating requirements in title V permits that is commensurate with that under RCRA. In RCRA, operating parameters are initially developed pursuant to trial burns and incorporated into permits either through initial issuance (in the case of facilities operating under RCRA interim status) or through a RCRA class 2 or 3 permit modification (in the case of new facilities). In either situation, significant opportunities exist for public review and input parallel to those under initial title V permit issuance or significant permit modification procedures.

With regard to a subsequent NOC developed pursuant to periodic performance tests, we prefer an implementation scheme for this rule that avoids unnecessary permit revisions. Thus, we recommend that you coordinate your five-year comprehensive performance testing schedule with your five-year permit term to the extent possible. This would allow changes in the NOC to be incorporated into the permit at renewal rather than through separate permit revisions. This also helps to minimize the number of permit revisions, as well as, the likelihood of having two sets of requirements with which to comply.

We recognize, however, that such coordination may not always be possible or feasible. At times, it may be necessary to include information from the most recent NOC through a permit revision. We expect that this will be accomplished using, at most, the minor permit modification procedures in § 70.7(e)(2) or § 71.7(e)(1). Keeping in mind that the information from the initial NOC was included either as part of the initial permit issuance or as a significant revision, the information was already subject to review by both the regulatory agency and the public. Thus, the public should have a clear understanding of your compliance obligations. The obligation to comply with the emissions limitations in §§ 63.1203, 63.1204, or § 63.1205 does not change even if any of the associated compliance information, such as operating limits, is revised pursuant to subsequent performance tests. Given our experience in regulating (under RCRA) the types of sources subject to today's MACT standards, we do not expect the information in a NOC to change significantly over time. We have been regulating these sources for almost twenty years; the testing and monitoring requirements we are promulgating in this rule reflect the ''lessons learned'' over time. Thus, the initial set of compliance parameters are likely to need primarily minor changes over time. You and your regulatory agency also are experienced in setting operating parameter limits and monitoring systems to ensure compliance with performance standards. Again, this expertise and experience suggests that primarily minor adjustments will need to be made. In light these factors, we are confident that changes in the NOC may be appropriately incorporated into title V permits using the minor permit revisions procedures. Furthermore, regulatory agencies are obligated under § 63.1206(b)(3) to make a finding of compliance based on performance test results. This requirement provides an additional administrative safeguard to ensure that you are setting the proper operating limits.

The minor permit modification process will allow you to meet your compliance obligations under § 63.1207(j) and begin to comply with the conditions in the NOC upon submittal (i.e., post-mark). Under §§ 70.7(e)(2)(v) and 71.7(e)(1)(v), you may make the change proposed in the minor permit modification application immediately after filing such application. Following this, you must comply with both the applicable requirements governing the change and the proposed permit terms and conditions (i.e., the information from the NOC that you are incorporating into your permit). The provisions in this section also ensure that you will not be in the position of having to choose between compliance with the NOC or compliance with your permit because this section also specifies that during this time period, you need not comply with the existing permit terms and conditions you seek to modify.[296] Since the NOC is submitted to the Administrator once you have a title V permit (see § 63.9(h)(3)), we expect that you will submit the NOC together with a minor permit modification application. Any modifications added to the permit through this process can be reviewed by the public at the time of permit renewal.

We encourage permitting authorities to develop permits in a way that minimizes the need for future permit revisions and is consistent with the requirements in parts 70 and 71. For example, you may request that your permitting authority develop a permit that contains alternative operating scenarios. This would allow you to alternate among various approved operating scenarios while concurrently noting the change in your operating record.

3. Which RCRA Permitting Requirements Are Applicable?

The RCRA permitting requirements particular to incinerators and boilers and industrial furnaces are found in 40 CFR 270.19, 270.22, 270.62, and 270.66. These permitting requirements apply to new facilities, to those operating under interim status while they pursue a permit, and to sources seeking to renew their permits. In today's final rule, we amend the introductory text in each of these sections to reflect that RCRA permitting requirements for hazardous waste combustor air emissions and related operating parameters will not apply once you demonstrate compliance with the requirements of the new MACT standards by completing a comprehensive performance test and submitting a NOC to the Administrator.[297] The timing for the deferral of the RCRA permitting requirements is consistent with the timing in today's rule for the deferral of applicable standards in 40 CFR parts 264 and 265.

Even though we rely on the title V permitting program to address air emissions from hazardous waste combustors, we still need RCRA permits at these sources to address: (1) Other RCRA regulations applicable to all types of RCRA units, including hazardous waste combustors, that are not duplicated under the CAA; (2) any risk-based emissions limits and operating parameters, as appropriate; and (3) other RCRA units at the facility. Also, new facilities (including new hazardous waste combustor units) must obtain RCRA permits prior to starting construction. Thus, the remaining RCRA permitting requirements in 40 CFR part 270 governing permit applications and permit content continue to apply. These

essentially an interpretation of the current part 70 and 71 rules.

[296] If, however, the source fails to comply with its proposed permit terms and conditions during this time period, the existing terms and conditions it seeks to modify may be enforced against it (§§ 70.7(e)(2)(v) and 71.7(e)(1)(v)).

[297] The final rule language in these sections differs from that in the NPRM to reflect placement of the standards only in part 63 and deferral of RCRA controls to the air program.

include the provisions in §§ 270.10(k) and 270.32(b)(2), which together provide authority to require a facility owner or operator to submit information necessary to establish permit conditions and to impose site-specific conditions, including risk-based conditions, through the RCRA permit.

Even though you will still have two permits, the scope and subject matter of each are distinguishable. The title V permit will focus on the operation of the combustion unit (e.g., air emissions and related parameters) while the RCRA permit will continue to focus on the other basic aspects of hazardous waste management. The RCRA permit would thus include conditions to ensure compliance with relevant requirements in 40 CFR part 264, including: General facility standards; preparedness and prevention; contingency planning and emergency procedures; manifesting; recordkeeping and reporting; releases from solid waste management units; closure; post-closure; financial responsibility; corrective action; storage; materials handling; and air emissions standards for process vents and equipment leaks from tanks and containers.

The only time we foresee that conditions in both RCRA and title V permits may govern the same hazardous waste combustor operating parameters and limits is when there is a need to impose more stringent or more extensive risk-based conditions, e.g., under RCRA omnibus authority, to ensure protection of public health and the environment. This situation is discussed in greater detail in Part Three, Section IV (RCRA Site Specific Risk Assessment Decision Process).

4. What Is the Relationship of Permit Revisions to RCRA Combustion Permitting Procedures?

In June, 1994, we published a proposed rule for RCRA Expanded Public Participation and Revisions to Combustion Permitting Procedures (59 FR 28680, June 2, 1994). The proposal contained amended procedures for interim status combustion facilities during the trial burn period that were intended to make the procedures for interim status facilities more like those governing permitted facilities. We finalized the expanded public participation requirements (see section immediately below), but did not finalize the proposed permitting revisions. At the time we began to finalize the proposal, we were already committed to issuing comprehensive air emissions standards under MACT. It was anticipated that there would be overlap between the emissions standards in the proposed MACT rule and the combustion permitting procedures in the June 1994 proposed rule. It did not make sense to finalize provisions in one rulemaking effort only to propose changing them yet again in another rulemaking effort. Now, given the approach being adopted in today's final rule to permit hazardous waste combustor air emissions under title V of the CAA, there is no longer as strong a need to pursue the amended procedures for RCRA permitting in the June 1994 proposal. We do not, therefore, intend at this time to finalize these proposed permitting amendments.

5. What Is the Relationship to the RCRA Preapplication Meeting Requirements?

In 1995, we finalized the expanded RCRA public participation requirements (60 FR 63417, December 11, 1995). These included requirements for a facility to advertise and conduct an informal meeting with the neighboring community to discuss anticipated operations prior to submitting a RCRA Part B permit application. Since hazardous waste combustors subject to the new MACT standards (and title V permitting) still need RCRA permits for other hazardous waste management activities, you are still subject to the RCRA preapplication meeting requirements in 40 CFR 124.31. Even though operations and emissions associated with the combustor unit are now to be addressed primarily under CAA requirements, we anticipate that the public will continue to exhibit a great deal of interest in combustor activities at RCRA meetings. They may not always be familiar with our administrative ''boundaries'' dictated by the various environmental statutes. Given this potential lack of familiarity, and because combustor units and emissions are already discussed at these meetings, we strongly encourage you to continue including combustor unit operations in discussions during RCRA preapplication meetings. Furthermore, conditions for hazardous waste combustor activities may sometimes be imposed under RCRA, for example, in cases where the results of a site-specific risk assessment indicate a need for conditions more stringent or more extensive than those imposed under MACT. You should be prepared to discuss the site-specific risk assessment process and how it may result in additional conditions being included to their RCRA permits.

All other public participation requirements in 40 CFR part 124 associated with the RCRA permitting process continue to apply. These include requirements for public notice at application submittal, public notice of the draft permit, opportunity for public comments on the draft permit, and opportunity for public hearings. These requirements also are explained in the *RCRA Public Participation Manual* (EPA530–R–96–007, September 1996), which provides guidance on how to implement RCRA public participation requirements, as well as, recommendations on how to tailor public involvement activities to the situation at hand. For example, if the community around a facility does not speak English as a primary language, the manual encourages use of multilingual fact sheets. As mentioned previously, we encourage you and States to apply the principles contained in the RCRA manual to hazardous waste combustor MACT compliance and title V activities as well.

C. Is Title V Permitting Applicable to Area Sources?

Under today's rule, hazardous waste combustors meeting the definition of an area source will be subject to today's MACT standards (see discussion in Part One, Section III.B). As discussed in the May 1997 NODA, under § 63.1(c)(2), area sources subject to MACT are subject to title V permitting as well, unless the standards for that source category (e.g., subpart EEE for hazardous waste combustors) specify that: (1) States will have the option to exclude area sources from title V permit requirements; or (2) States will have the option to defer permitting of area sources. We received several comments on our NODA discussion (see 62 FR 24215) on the issue of subjecting area sources to title V permitting. The comments were fairly evenly split—several supported requiring area sources to obtain title V permits, while several were against it. After considering the comments, we have chosen not to provide the option to the States to exclude hazardous waste combustor area sources from title V permitting requirements or to defer permitting of these sources.

Commenters that support the Agency's position affirm that title V permits serve an important role to incorporate all requirements applicable to a source in one enforceable permitting document. They maintain that the compliance certifications and opportunities for public involvement inherent in the title V program will serve a useful and valuable public service. Other supporters note that requiring all hazardous waste combustors to obtain title V permits will help to ensure that the permits are both consistent and adequate. The idea of consistency being a desirable end result is echoed by others as well. One commenter points out that area sources in several other source categories are not exempt from title V permitting requirements, and recommends that hazardous waste combustor area sources also be subject to title V to maintain consistency with the rest of the MACT program. Finally, some commenters state that if the Agency were not to pursue title V permitting for hazardous waste combustor area sources, then the Agency would have to strengthen the nontitle V permitting programs with respect to public involvement and agency approval of modifications relating to facility emissions.

We agree with these points. Title V permits clarify your regulatory obligation, thereby making it easier for you to keep track of your many compliance obligations across several air programs. Clarifying the regulatory obligations improves compliance in many cases; we have seen an increase in compliance among air sources with the advent of the title V permitting program. For example, through the process of applying for and issuing title V permits, applicable requirements of which a source is unaware or with which it is found to be out of compliance are identified. Once these requirements are included in a title V permit, the source must certify compliance with these requirements both initially and then on an annual basis.

We concur with commenters about the benefits of the public involvement opportunities afforded by the title V permit program. Our experience in the RCRA combustion program has shown that many of the sources that would fall into the area source classification (e.g., some commercial incinerators and cement kilns burning hazardous waste as fuel) are the ones in which the public is generally most interested. Subjecting hazardous waste combustor area sources to title V permitting will ensure that the public will continue to be involved in permit decisions under the CAA, as they have been under RCRA. For example, the public will have an opportunity to comment on and request a public hearing for a draft title V permit. They have access to State or Federal court to challenge title V permits, depending upon whether the permit is a part 70 or part 71 permit. Title V also provides greater access to information about sources in many cases. Under title V, States and EPA cannot deny basic information about sources to citizens unless it is protected as confidential business information. Conversely, there could be disparity in what information citizens might be able to obtain under State non-title V operating permits.

Consistency is a key objective as well. Part 70 sets out the minimum criteria that a State program must meet. If a State fails to develop and implement a program that meets these minimum criteria, then a part 71 federal operating permits program is put into place. These minimum criteria provide for consistency across State and Federal title V permitting programs, which might not occur under other State air permitting programs. Consistency within CAA programs is not the only concern. We also are, as part of our approach to integrating regulation of these sources under RCRA and the CAA, striving to maintain consistency with how sources have been regulated under RCRA. Under RCRA, all of the sources that would fall into an area source classification are currently treated the same as the sources that are classified as major under the CAA. It is appropriate to continue treating all hazardous waste combustor sources in the same manner (i.e., to apply the same permitting requirements to all of these sources) under the CAA.

Commenters that do not support applying title V requirements to area sources generally base their position on three arguments. First, they argue that Congress had consciously differentiated between area and major sources when developing the CAA, so that there would be a strong incentive for facilities to limit emissions and thus avoid the additional requirements imposed on major sources. These commenters maintain that subjecting area sources to title V requirements would create a disincentive for these sources to minimize emissions. Secondly, they suggest that other CAA permitting mechanisms, such as federally enforceable state operating permits, might be more appropriate for the hazardous waste combustor area sources. One commenter notes that some sources have already invested a lot of time and effort working with permitting authorities to develop federally enforceable state operating permits that limit their potential to emit below major source levels, and that the Agency's action subjecting these sources to title V permits would render this work meaningless. Finally, they assert that this would be the first time the Agency did not provide the option to the States to either defer title V permitting for area sources or exempt them entirely, and they express concern about the precedent that would be set if the Agency were to start requiring area sources to obtain title V permits in this rule.

After careful consideration, we are not persuaded by these counter-arguments. Although the CAA does differentiate in some provisions between area and major sources, it did not specify that area sources should be exempt from the title V permitting program. On the contrary, it provides discretionary authority in section 502(a) for the Administrator to decide whether to exempt a source category, in whole or in part, from title V permitting requirements. Furthermore, the implementing regulations in 40 CFR 70.3(b)(2), 71.3(b)(2), and 63.1(c)(2) specify that the Administrator will determine whether to exempt any or all area sources from the requirement to obtain a title V permit at the time new MACT standards are promulgated. Clearly, the decision to subject area sources to title V permitting is intended to be made in the context of both the source category and the applicable standards. The exemption from title V may only be provided if compliance with the requirements would be ''impracticable, infeasible, or unnecessarily burdensome.'' CAA section 502(a). Given that the hazardous waste combustors subject to today's rule, including those that may meet the definition of area sources, have all been subject to common permitting regulations under RCRA, subjecting these sources to title V permitting is not impracticable, infeasible, or unnecessarily burdensome. Furthermore, if we exempt area sources from title V permitting requirements, we would most likely have continued to apply RCRA permit requirements for stack emissions to these sources. Thus, the area sources would have been subject to dual permitting regimes (e.g., federally enforceable state operating permits under the CAA and RCRA permits) and the resulting burden associated with duplicative regulation. This would be contrary to a major goal of today's rule. In conclusion, we decided that it is appropriate to subject all hazardous waste combustor sources subject to today's MACT standards to title V permitting requirements. As noted earlier in this preamble, this is also consistent with the Congressional scheme under RCRA that mandates regulation of all hazardous waste combustors for all pollutants of concern.

Although we provided the option to defer title V permitting for some area sources subject to other MACT standards, this rule is not the first time we have not allowed States to defer area sources from title V requirements. See, e.g., 64 FR 31898, 31925 (June 14, 1999) (NESHAP for Portland Cement Manufacturing Industry to be codified at

40 CFR part 63, subpart LLL). Moreover, EPA regulations governing other categories of solid waste combustors under CAA section 129 do not differentiate between major and minor sources in imposing title V permitting requirements. See, e.g., CAA section 129(e); 40 CFR 70.3(a) and 70.3(b)(1), and 40 CFR 60.32e(i). Given that the decision to apply title V requirements is made in a specific context, we do not share commenters' concern about the precedent our approach might set for other situations. We will continue to evaluate each situation on its own merit. Finally, we do not agree with commenters that this approach will provide a disincentive to limit emissions because sources will still be ''capped'' by the emissions limits being promulgated in today's rule. Neither would progress already achieved in developing federally enforceable state operating permits be rendered meaningless, as suggested by some commenters. We anticipate that a source will likely be able to use the information gathered during the process of developing a federally enforceable state operating permit (e.g., information about its emissions and applicable requirements) in completing a title V application. Commenters appear to think that sources will have to start totally anew and without an ability to use past experience and results. This is neither a realistic nor practical view of how sources are likely to act.

Commenters opposed to subjecting hazardous waste combustor area sources to title V had also noted that these sources would be receiving RCRA permits for the air emissions as well. This argument would have merit if we choose to promulgate the new standards in both CAA and RCRA regulations. Since we are promulgating the MACT standards only in the CAA regulations, however, requirements on air emissions from hazardous waste combustor area sources would not be included in RCRA permits.[298] Commenters also discount our position in the NODA about difficulties that would arise if an area source were to move from one permitting program to another as they make modifications to their emissions levels that could change their major/area source determination. They point to our ''once in, always in'' approach to MACT standards that is stringently applied. Under this approach, once a MACT standard goes into effect, a major source will always be regulated under that standard, even if it later decreases its emissions to below major source levels. This ensures that sources cannot routinely ''flip'' between being regulated or unregulated, which in turn means that sources would not be moving in and out of the title V permitting universe. The commenter was correct in raising this to our attention. We are not relying on this argument to support our decision to subject hazardous waste combustor area sources to the standards or to title V.

D. How will Sources Transfer from RCRA to MACT Compliance and Title V Permitting?

1. In General, How Will this Work?

As discussed in Section A (Placement of Standards and Approach to Permitting), we are deferring RCRA controls on hazardous waste combustor air emissions to the part 63 hazardous waste combustor MACT standards, which are ultimately incorporated into title V permits issued under the CAA. Promulgation of the new hazardous waste combustor MACT standards under the CAA does not, however, by itself implement this deferral or eliminate the need to continue complying with applicable RCRA requirements—either those in a source's RCRA permit or in RCRA interim status performance standards. These requirements include obligations for RCRA permitting (for example, interim status facilities will continue to be subject to RCRA permitting requirements, including trial burn planning and testing).

Therefore, today's rule adopts specific provisions that address the transition from RCRA permitting to the CAA regulatory scheme. As discussed in Section B.3 (Applicability of RCRA permitting requirements), the requirements in §§ 270.19, 270.22, 270.62, and 270.66 do not apply once a source demonstrates compliance with the standards in part 63 subpart EEE by conducting a comprehensive performance test and submitting an NOC to the regulatory agency.[299] In this section, we discuss how regulators can implement the deferral from RCRA to hazardous waste combustor MACT compliance and title V permitting.

a. What Requirements Apply Prior to Compliance Date? You have three years following promulgation of the MACT standards to achieve compliance with the emissions standards. However, the rule is effective shortly after promulgation. During the approximately three years between the effective date and the compliance date, you will be subject to applicable requirements for hazardous waste combustor MACT compliance and title V permitting. For example, there are compliance-related requirements in 40 CFR part 63 subpart EEE that are separate from the actual standards for emissions levels, such as those in §§ 63.1210(b) and 63.1211(b) for submitting a Notice of Intent to Comply and a progress report, respectively. Requirements in 40 CFR parts 70 and 71 for operating permit programs developed under title V will also apply. These include requirements governing timing for submitting initial applications, reopenings to include the standards, and revisions to incorporate applicable requirements into title V permits. The interface between an NOC and the title V permit has already been discussed. Consequently, our discussion on implementing the deferral of RCRA controls focuses on the transition away from RCRA permits and permit processing once a facility demonstrates compliance with the standards through a comprehensive performance test and submits a NOC to the regulatory agency.

Many of the activities undertaken during the three year compliance period play a role in implementing the transition of RCRA controls to MACT compliance and title V. For example, some of you may have to make changes to their design or operations to come into compliance with the new standards. If you have a RCRA permit, you may need to modify the RCRA permit to reflect any of these changes before they are actually made. This may be necessary to remain in compliance with the RCRA permit while setting the stage for demonstrating compliance with CAA MACT requirements. We urge you (the source) to seek guidance from your RCRA permitting authorities as early as possible in this process. As part of our ''fast track rule'' (see 63 FR 33781, June 19, 1998), we promulgated a streamlined process in 40 CFR 270.42(j) for modifying the RCRA permit, so that you can make these necessary changes and begin operating in accordance with the new limits before the compliance date arrives. To take advantage of the streamlined process, however, you must first comply with the Notice of Intent to Comply requirements in § 63.1210. The Notice of Intent to Comply requirements obligate you to advertise and conduct an informal meeting with the neighboring community to discuss plans to comply with the new standards, and to subsequently provide information about

[298] The exception would be, as discussed earlier, cases where States, at their own choosing, have incorporated the HWC MACT standards into their State RCRA programs.

[299] If, however, there is a need to collect information under § 270.10(k) then the permitting authority may require, on a case-by-case basis, that facilities use the provisions found in these sections.

these plans to the regulatory agency.[300] We anticipate discussion at this meeting will include modifications to the RCRA permit that must be processed before you can start upgrading equipment to meet the emissions limits set by MACT. The goal of these activities is to ensure that by the end of the three-year compliance period, you will be in compliance with both the MACT standards and their RCRA permits or interim status requirements.

b. What Requirements Apply After Compliance Date? After the compliance date, a transition period exists during which there will be, in effect, two sets of standards concerning emissions from hazardous waste combustors: (1) The MACT standards in 40 CFR part 63; and (2) the performance standards that are still in the RCRA permit or in the 40 CFR part 265 interim status regulations. During this period, in cases where operating parameters and limits are addressed by both programs (MACT and RCRA), you must comply with all applicable parameters and limits; those which are more stringent will govern. We anticipate that the MACT standards will be compatible with the RCRA performance standards, although in some cases the DOC is likely to set narrower or different operating conditions. Thus, in complying with the MACT standards, you also will comply with corresponding conditions in the RCRA permit or in the RCRA interim status regulations. However, at some sites, certain RCRA permit conditions may be more stringent than the corresponding MACT standards or may establish independent operating requirements. Some potential reasons why such a situation would occur are discussed in the May 2, 1997 Notice of Data Availability (62 FR 21249, 5/2/97). In these situations, you must comply with the more stringent or more extensive conditions in the RCRA permit.

We also note that there may be situations where it is not clear whether a RCRA compliance requirement is less stringent than a MACT requirement. This can occur, for example, when the two compliance requirements have different averaging periods and different numerical limits. In this situation, we recommend that the source coordinate with permitting officials early in the MACT process, perhaps when the source submits RCRA permit modification pursuant to the fast-track rulemaking, in order to determine which requirement is more stringent. We believe the permitting officials should give sources an appropriate level of flexibility when making this determination.

Our approach of placing the MACT air emission standards for hazardous waste combustors in 40 CFR part 63 subpart EEE and not including them, even by reference, in the RCRA regulations means that the air emissions must ultimately be incorporated into title V permits issued under the CAA. To completely implement the deferral of RCRA controls, conditions governing air emissions and related operating parameters should also be ultimately removed from RCRA permits. (For the special case of risk-based conditions derived from RCRA omnibus authority, see earlier discussions.) Similarly, hazardous waste combustors that are in the process of obtaining RCRA permits will likely need to have the combustor air emissions and related parameters transitioned to MACT compliance and title V permits at some point.

We intend to avoid duplication between the CAA and RCRA programs. We encourage you and regulators to work together to defer permit conditions governing air emissions and related operating parameters from RCRA to MACT compliance and title V, and to eliminate any RCRA provisions that are no longer needed from those permits. As discussed below, we are adopting a provision in today's final rule to help permitting authorities accomplish this task in the most streamlined way possible. The RCRA permits will, of course, retain conditions governing all other aspects of the hazardous waste combustor unit and the rest of the facility that continue to be regulated under RCRA (e.g., general facility standards, corrective action, financial responsibility, closure, and other hazardous waste management units). Furthermore, if any risk-based site-specific conditions have been previously included in the RCRA permit, based either on the BIF metals and/or hydrochloric acid/chlorine requirements[301] or the omnibus authority, the regulatory authority will need to evaluate those conditions vis-a-vis the MACT standards and the operating parameters identified in the NOC. If the MACT-based counterparts do not adequately address the risk in question, those conditions would need to be retained in the RCRA permit or included within an appropriate air mechanism. In those limited cases, sources and permitting agencies may instead agree to identify the RCRA limit in the title V permit. Since one goal of the title V program is to clarify a source's compliance obligations, it will be beneficial, and convenient, to acknowledge the existence of more stringent limits or operating conditions derived from RCRA authority for the source in the title V permit, even though the requirements would not reflect CAA requirements. We strongly encourage Regional, State, and local permitting authorities to take advantage of this beneficial option.

2. How Will I Make the Transition to CAA Permits?

In the May 1997 NODA, we expressed our intent to rely on the title V permitting program for implementation of the new standards, and asked for comments on how and when the transition from RCRA should occur (see 62 FR 24250, May 2, 1997). We are amending the regulations in 40 CFR part 270 to specify the point at which the RCRA regulatory requirements for permitting would cease to apply. However, once you have a permit, you must comply with the conditions in that permit until they are either removed or they expire. Many commenters expressed an interest in what happens to conditions in a RCRA permit once the new standards are published. We received a variety of suggestions, but a common thread was a request for EPA to lay out a clear path through the permit transition process. While we recognize the desirability of having a uniformly defined route for getting from one permit to another, it is important to provide flexibility to allow a plan that makes the most sense for the situation at hand. There is not a ''one size fits all'' approach that would be appropriate in all cases. Thus, we are not prescribing a transition process via regulation, but providing guidance in the following discussion which we hope will assist regulatory agencies in determining a route that makes the most sense in a given situation. Given the level of interest expressed, we will, in the ensuing discussion, map out a process for implementing the deferral of air emissions controls from RCRA to MACT compliance and title V permitting. We address key considerations that should factor into the decision of how and when to implement the deferral of permit conditions.[302]

[300] The requirements for providing notice of and conducting the public meeting as part of the Notice of Intent to Comply provisions are based on the RCRA preapplication meeting requirements in 40 CFR 124.31.

[301] The BIF limits for metals under RCRA are based on different level of site-specific testing and risk analysis (Tier I through Tier III). It is possible that, if it were based on the more stringent analysis, a RCRA BIF limit could be more stringent than the corresponding MACT standard.

[302] Although we are not mandating an approach to transition by regulation, we are, as discussed in Section 2. How Should RCRA Permit Be Modified?

In identifying key aspects of the transition, we seek the optimal balance of three basic considerations raised by commenters and other stakeholders. The considerations are to: (1) Address public perception issues associated with taking conditions out of a RCRA permit; (2) minimize the amount of time a source might be potentially subject to overlapping requirements of RCRA and the CAA (and thus subject to enforcement under both RCRA and the CAA for the same violation); and (3) provide flexibility to do what makes the most sense in a given situation. The first two considerations are primarily factors of time—when should conditions be removed from the RCRA permit? The third consideration is more a factor of how—what mechanism should be used for removing RCRA conditions?

Why do these particular considerations carry such importance? As for the first, one of the points emphasized in our National Hazardous Waste Minimization and Combustion Strategy is the importance of bringing hazardous waste combustors under permits as quickly as possible. The Strategy has been driving EPA Regions and authorized States to place their top permitting priority on the hazardous waste combustor universe. Consequently, the Strategy may have created a certain perception on behalf of the public about the importance of the actual permit document. The actual issue we are trying to address here is more of a concern about a potential break in regulatory coverage of a source as it transitions from RCRA permitting requirements to the CAA regulatory scheme.

While it might appear that we are altering the policy expressed in the Strategy if we allow removal of conditions from a RCRA permit before the title V permit is in place, it is not the actual permit document that is of paramount importance. Rather, our focus is and has been on maintaining a complete and enforceable set of operating conditions and standards. One of the underlying tenets of the position taken on permitting in the Combustion Strategy was a commitment to bring hazardous waste combustors under enforceable controls that demonstrate compliance with performance standards. Under RCRA, the permit was the available vehicle to achieve better enforcement of tighter conditions than exist in interim status.

We remain committed to this underlying tenet. However, the mechanism for achieving this objective under the CAA is not necessarily the title V permit. In RCRA, the permitting process provides the vehicle for the regulatory agency to approve testing protocols (including estimated operating parameters), to ensure completion of the testing, and to develop final operating parameters proven to achieve performance standards. The final RCRA permit is the culmination of these activities. Under MACT, these activities do not culminate in a permit, but in a NOC. The development of the NOC is separate from the development of the title V permit. The title V permitting process is primarily a vehicle for consolidating in one document all of the requirements applicable to the source. Conversely, it is the NOC that contains enforceable operating conditions demonstrated through the comprehensive performance test to achieve compliance with the hazardous waste combustor MACT standards (which are generally more stringent than the RCRA combustion performance standards). Thus, the NOC captures the intent of the Strategy with regard to ensuring enforceable controls demonstrated to achieve compliance with relevant standards are in place.

Another basis for our position on permitting in the Combustion Strategy is the level of oversight by the regulatory agency during the permitting process, which is typically greater than that which occurs during interim status. For example, although BIFs operating under interim status are required to conduct compliance testing and subsequently operate under conditions they identify in a certification of compliance, there are no requirements for the regulatory agency to review and approve compliance test plans or results. On the other hand, oversight by the regulatory agency is more intensive during the permitting process, *e.g.*, through the trial burn planning (including regulatory approval of the trial burn plan), testing, and development of permit conditions. Although the process required for interim status BIFs under RCRA may, at first, seem analogous to the CAA MACT process, *i.e.*, sources being required to conduct comprehensive performance tests and subsequently operate under conditions in an NOC, there is a significant difference. The difference is the level of oversight that occurs in the MACT process. According to the MACT requirements in 40 CFR 63.1207(e) and 63.1206(b)(3), the regulatory agency must review and approve the performance test protocol and must make a finding of compliance based on the test results that are reported in the NOC. The NOC consequently represents a level of agency oversight that is actually more analogous to the RCRA permit process than to interim status procedures.

An additional reason for the importance, under the Combustion Strategy, of bringing hazardous waste combustors under permits was to allow for the imposition of additional permit conditions where necessary to protect human health and the environment. In general, these conditions are established based on the results of a site-specific risk assessment and imposed under the RCRA omnibus authority. This objective will continue to be met even though we are deferring regulation of hazardous waste combustor air emissions, in general, to the CAA. Coming into compliance with the more stringent and more encompassing MACT standards will accomplish part of the Combustion Strategy's goal of improved protection. For any cases where the protection afforded by the MACT standards is not sufficient, the RCRA omnibus authority and RCRA permitting process will continue to be used to impose additional conditions in the RCRA permit (or, as discussed earlier, in a title V permit).

With regard to the remaining considerations, we seek here to reduce duplicative requirements across environmental media programs (*i.e.*, air emissions under the CAA and RCRA). This objective to reduce duplication is behind our goal of minimizing the amount of time a source might be potentially subject to dual permitting and enforcement scenarios. In order to allow for common sense in implementing environmental regulations, we need to provide flexibility here to do what makes sense in a given situation. We have provided this flexibility in today's rule by not prescribing only one process for transitioning from RCRA to the CAA.

3. When Should RCRA Permits Be Modified?

We identified two options in the May, 1997, NODA for when conditions should be ultimately removed from RCRA permits (see 62 FR 24250). Our preferred option at the time is to wait until the source had completed its comprehensive performance test and the standards had been included in its title V permit. The alternative option we identified would be to modify the RCRA permit once the facility submits the results of its comprehensive performance test.

below, providing a tool in the RCRA permit modification table in 40 CFR 270.42, Appendix I, that may be used to assist regulators and sources in effecting the transition.

Of the comments that spoke to the timing issue, some advocate waiting for the title V permit, but most opposed this position. The majority of commenters favor effecting the transition either on the compliance date, since we had said in the NODA that the pre-NOC would be due to the regulatory agency on that date[303] and would contain enforceable conditions, or upon submittal of the NOC, since it contains enforceable operating conditions demonstrated to achieve compliance with the standards. All three of these approaches are identified in the time line shown in Figure 1. Readers will note that the time line shows two potential points for the title V permit to be issued (options 1A and 1B). Option 1A is based on the statutory time frames for issuing title V permits. Under this option, the title V permit may be issued prior to the compliance date for the new standards, but it might only include the standards themselves and a schedule of compliance. Under option 1B, the operating requirements in the NOC that actually have been demonstrated to achieve compliance would be included in the permit.

We evaluated each of the options in terms of the two timing-related considerations listed above: addressing the perception issue that stems from removing conditions from the RCRA permit (which, as discussed above, is really a concern about a break in regulatory coverage—*i.e.*, that there might be a period of time when the source would not have enforceable controls demonstrated to achieve compliance with stack emissions standards), and minimizing the amount of time sources would potentially be subject to the same requirement(s) under both RCRA and CAA. These considerations may not always be compatible. For example, one way to address the perception of creating a break in regulatory coverage would be to continue to place emphasis on the permit, rather than on the tenet behind the permit (of having enforceable controls that demonstrate compliance with performance standards). This would mean waiting to remove conditions from a RCRA permit until a source has demonstrated compliance with the MACT standards and incorporated the appropriate combustion operating requirements in its NOC into the title V permit (*i.e.*, option 1B). However, this approach would maximize the amount of time the source potentially would be subject to overlapping requirements under RCRA and the CAA. On the other hand, one way to address the overlapping requirements consideration would be to allow removal of conditions from the RCRA permit at the time the standards are promulgated. But, this would create a time period during which the source would not have enforceable controls proven to achieve compliance, which would not address the concern about avoiding a break in regulatory coverage. Clearly neither of these extremes can provide a good balance between the two timing-related considerations.

[303] We are adopting a DOC (previously the pre-NOC) requirement in today's final rule, but it is amended from how we presented it in the NODA (as discussed in Part Five, Section IV). Rather than submitting the DOC to the regulatory agency, a source must maintain it in their operating record. We encourage source owners and operators to set up the operating record in an unrestricted location that is reasonably accessible by the public.

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FIGURE 1:

HAZARDOUS WASTE COMBUSTOR MACT IMPLEMENTATION TIME LINE: OPTIONS FOR TIMING OF PERMIT TRANSITION

				Option 1A	*Option 2*			*Option 3* *Option 1B*	
HWC MACT rule published	NIC due to regulatory agency		Progress report due to regulatory agency	Performance test plans due	DOC in operating record [3]	Notification of test plan approval or intent to deny	Performance tests completed	NOC, including test results, due to regulatory agency	
Year 0 EFFECTIVE DATE	**Year 1**	**Year 1.5**	**Year 2**	**Year 2.5**	**Year 3** COMPLIANCE DATE	**Year 3.25**	**Year 3.5**	**Year 3.75**	**Year 4.5** [4]
	Title V permit applications due to permitting authority [1]	Reopenings complete for sources with 3 or more years left in permit term		Title V permit decisions made [2]				Revise title V permit to include NOC	

Notes:

1/ Sources newly subject to title V as a result of the hazardous waste combustor (HWC) MACT rule have 12 months to submit applications. Sources that have title V permits with a remaining permit term of 3 or more years when the HWC MACT rule is promulgated must reopen the permit to address HWC MACT. Such a reopening must be completed within 18 months of rule promulgation. Sources with title V permits with less than 3 years remaining in the permit term do not have to reopen; they can wait until renewal to address HWC MACT. However, in the interim, sources must meet the HWC MACT requirements.

2/ By statute, permitting authorities have 18 months to act on title V applications, if they are submitted after the first full year of a title V permit program. This means that decisions on title V applications or reopening requests submitted at Year 1 would be made by Year 2.5 -- still a year before sources conduct the performance test (which

(1) provides operating parameters for the unit, (2) demonstrates compliance with the standards, and (3) provides data for the notification of compliance (NOC)). However, permitting authorities are behind schedule in issuing title V permits; thus, we cannot assume that permits will have been issued by this point. We also cannot assume they will not be issued, because the permitting authorities may "catch up" with their schedule.

3/ Although the source is subject to enforceable *requirements* from the time of MACT promulgation (e.g., requirements for the Notice of Intent to Comply (NIC), the progress report, performance tests, and so on), this is the first point at which the source is subject to enforceable *operating conditions* (those contained in the DOC maintained in the source's operating record); however, these conditions have not yet been demonstrated to actually achieve the standards.

4/ It could take up to nine months to incorporate significant permit revisions (see 40 CFR 70.7(e)(4)(ii) and 71.7(e)(3)(ii)).

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We evaluated each option to determine which most effectively balances the relevant issues. Options 1A and 1B focus primarily on tying the transition timing to title V permitting. Option 2 links the timing for transition to the DOC (previously called the pre-NOC). Option 3, which we are recommending be followed, ties transition to submittal of the NOC.

a. Option 1A. This option is a variation of an option discussed in the May, 1997, NODA. There we stated, ''The Agency's current thinking is that the RCRA permit should continue to apply until a facility completes its comprehensive performance testing and its title V permit is issued (or its existing title V permit is modified) to include the MACT standards. The RCRA permit would then be modified to remove the air emissions limitations which are covered in the title V permit.'' (see 62 FR 24250). Although this description basically applies to option 1B, the discussion in the NODA might also have been interpreted to mean that once the standards are in a title V permit, the corresponding emissions limits should be removed from the RCRA permit. When reviewing the implementation time line in terms of the statutory and regulatory time frames governing the title V process, we found that sources might well have title V permits issued or modified to include the new standards a year before they ever conduct performance testing. Although the permit would likely include the standards and a schedule for complying with the new limits, it would not include any of the key combustion operating requirements demonstrated in the performance test. Thus, even though option 1A would seem to address the concern about a break in coverage because the title V permit would have been issued, in actuality, the underlying tenet of the Combustion Strategy—that the source have enforceable operating parameters proven to achieve the new standards—is not fully addressed.

b. Option 1B. This option calls for the NOC to be incorporated into title V permits before any conditions could be removed from RCRA permits. As discussed earlier, this approach would not be consistent with our goal of minimizing duplication across permitting programs, even though it was identified as our current thinking in the NODA. As discussed in the NOC/title V Interface Section, the initial NOC must be incorporated into the title V permit as a significant permit modification, which could add another nine months to the transition period. Moreover, commenters express concern over impacts that existing delays in title V permitting activities might have. Commenters wrote that given the tremendous volume of permits to be issued (hazardous waste combustors being just one small subset) there would be no way to predict how long it might take regulatory agencies to initially issue or modify title V permits to include the standards, or to modify permits to include NOCs, despite time frames set forth in the title V regulations. We agree that delaying removal of air emissions and related parameters from RCRA permits until this occurs would unnecessarily extend the amount of time sources might be subject to overlapping requirements. As pointed out by commenters, having overlapping requirements may present technical and administrative difficulties. Examples of technical difficulties include, but are not limited to, the potential for conflicting requirements with regard to testing, monitoring, and compliance certifications. Examples of administrative difficulties include, but are not limited to, permit maintenance issues stemming from different permit modification procedures and appeals procedures.

c. Option 2. Option 2 reflects the time frame suggested by some commenters for effecting the transition upon submittal of the DOC, which, under the NODA discussion, would have been due to the regulatory agency on the compliance date (note: commenters appear to use the terms ''compliance date'' and ''effective date'' interchangeably, but they are quite different). Basing transition on the DOC was still a viable option to consider, even with our amended approach of having the source maintain the DOC in its operating record. The DOC contains enforceable operating conditions for key combustion parameters that the source anticipates will achieve compliance with the new standards. Although the source would have had to comply with other enforceable part 63 requirements by this point (*e.g.,* requirements for the Notice of Intent to Comply, the progress report, and the performance test plan), this would be the first point where a source might have overlapping requirements governing air emissions and related operating parameters—those in the DOC and those in the RCRA permit. Recommending removal of RCRA permit conditions at this point would thus minimize the potential for duplicative requirements. However, we conclude that it would still not address the perception issue adequately. Specifically, even though the source is subject to enforceable operating requirements, the source has not actually demonstrated compliance with the new standards.

d. Option 3. This option reflects the alternative approach we suggested in the May, 1997, NODA, as well as the preferred option of the majority of those who submitted comments on the timing issue. Under this recommended option, a source might well have a title V permit that addresses the new standards to some extent, even if just by including the standards themselves and a schedule for compliance. More importantly, the source will have conducted its comprehensive performance test, and submitted an NOC containing key operating parameters demonstrated to actually achieve compliance (and which are enforceable). Although there would be some time during which a source might have overlapping requirements (those in its NOC and those in its RCRA permit), this would be a finite and predictable amount of time. After considering all the comments, we conclude that option 3 best meets the dual challenges of ensuring the source is continuously subject to enforceable controls demonstrated to achieve compliance while minimizing the time you would be subject to permitting requirements for, and enforcement of, operating parameters and limits under both RCRA and the CAA. Therefore, today's rule adopts option 3.

We acknowledge that this approach does not completely eliminate concerns expressed by some commenters about the potential for facilities to be subject to dual enforcement mechanisms. Although this potential may exist during the brief transition period when a source has enforceable conditions under both CAA and RCRA, we will exercise enforcement discretion to avoid any duplicative inspections or actions, and we encourage States to do so as well. If any inspections are scheduled to occur during the brief transition period (which may be unlikely given how short this period is), the regulatory agency could conduct joint inspections by RCRA and CAA enforcement staff. Joint inspections might help to alleviate some of the potential for any duplicative efforts, either in terms of individual inspections targeting the same areas, or enforcement actions being taken under both RCRA and CAA authorities.

Under Option 3, you would most likely have a title V permit that addresses the hazardous waste combustor MACT standards to some extent. We expect that if the permit were issued prior to the comprehensive performance test and the submittal of the NOC, it would contain the standards themselves, and related requirements in part 63 subpart EEE, such as the requirements to develop and public notice performance test protocols, to develop and maintain in its operating record the DOC with anticipated (and enforceable) operating limits, to conduct the comprehensive performance test and periodic confirmatory tests, and to submit the NOC, including the test results, to the regulatory agency.

The public would have had an opportunity to comment on the requirements in the title V permit as part of the normal CAA administrative process for issuing permits. Furthermore, the public would have had other opportunities to be involved in your compliance planning. For example, under the requirements for the Notice of Intent to Comply in § 63.1210(b), you would have had to conduct an informal meeting with the community to discuss how you intend to come into compliance with the new standards. You also are required in § 63.1207(e) to provide public notice of the performance test plan, so the public would have the opportunity to review the detailed testing protocol that describes how the operating parameters will achieve compliance.

4. How Should RCRA Permits Be Modified?

Once you have been issued a RCRA permit, you must comply with the conditions of that permit. Unless the conditions have been written into the permit with sunset (*i.e.*, automatic expiration) clauses governing their applicability, conditions remain in effect until the permit is either modified to remove them or the permit is terminated or expires. Promulgation of final MACT standards for hazardous waste combustors does not in itself eliminate your obligation to comply with your RCRA permit. In the May 1997 NODA, we stated that the RCRA permit would be modified to remove air emission limitations that are covered under MACT, but did not elaborate on what modification procedures would be followed. We solicited comments on how the transition should occur.

Of the commenters that addressed this issue, the recurring theme in the comments is for EPA to provide a mechanism that would impose minimal burden on sources and permit writers to process the modifications. Some express a desire to see the RCRA conditions removed in some automatic fashion once the MACT standards became effective. A mechanism for accomplishing this, suggests one commenter, would be to include a requirement in the final rule that would effect removal of conditions from all RCRA permits. One commenter suggests adding a new line item to Appendix I in § 270.42, designated as class 1, to address the transition to MACT. Another suggests a new line item designated as class 1 requiring prior agency approval. A third suggests a new line item designated as class 2.

We do not agree with eliminating conditions from all RCRA permits as part of a national rulemaking effort (*i.e.*, we do not agree with an ''automatic'' removal), particularly given the existence of authorized sate programs and state-issued permits. Permits may contain site-specific conditions developed to address particular situations, *e.g.*, conditions based on the results of a site-specific risk assessment. To ensure that the regulatory agency continues to meet its RCRA obligation to ensure protection of human health and the environment, these conditions may need to be evaluated on a case-by-case basis vis-a-vis the MACT standards before they are removed. If the RCRA risk-based conditions are more stringent or more extensive than the corresponding MACT requirements, the conditions must remain in the RCRA permit.

We do agree with commenters that there should be a streamlined approach to removing conditions from a RCRA permit that are covered by the hazardous waste combustor MACT regulations at the time an NOC demonstrating compliance is submitted to the regulatory agency. All other conditions would, of course, remain in the RCRA permit. Once you demonstrate compliance with MACT, we consider the transition from RCRA to be primarily an administrative matter since you will not only be subject to comparable enforceable requirements under CAA authority, but also will continue to be subject to any site-specific conditions under RCRA that are more stringent than MACT. Our intent is not to impose an additional burden on you or permit writers for a largely administrative requirement. To this end, we are adding a new line item to the permit modification table in 40 CFR 270.42, Appendix I, to specifically address the transition from RCRA to the CAA.

The approach of adding a new line item to the permit modification table is consistent with the comments we received pursuant to the May 1997 NODA. We agree with the commenter who suggests the new item be designated as a class 1 modification requiring prior Agency approval. This classification effectively balances the need to retain some regulatory oversight of the changes with the goal of minimizing the amount of time a source will be subject to regulation under both RCRA and the CAA for essentially the same requirements. A class 1 modification without prior approval, suggests one commenter, would not be sufficient to accomplish the transition with adequate confidence in proper regulatory coverage. Even though we consider the deferral to be an administrative matter, it is important to retain some level of regulatory oversight prior to effecting the change to provide the opportunity to address any differences between the two programs. On the other hand, the administrative exercise of transitioning from RCRA to the CAA does not warrant the extra measures (and attendant time commitment) of a class 2 modification procedure.

We are designating the new line item (A.8.) in the Appendix I table as class 1 requiring prior Agency approval. Thus, the administrative procedures associated with this mechanism will not be overly burdensome, yet RCRA permit writers will have an opportunity to confer with their counterparts in the air program prior to approving the request to eliminate conditions from the RCRA permit. This allows the RCRA permit writer to verify that you have completed the comprehensive performance test and submitted your NOC. In the few situations where site-specific, risk-based conditions have been incorporated into RCRA permits, it also provides the RCRA permit writer with the opportunity to review such conditions vis-a-vis the MACT standards to ensure any conditions that are more stringent or extensive than those applicable under MACT are retained in the RCRA permit. The public also would be informed that the transition from RCRA was being effected because the modification procedures require a notice to the facility mailing list. We recommend that the public notice for the RCRA permit modification also briefly mention that you have completed performance testing under the CAA, and are operating under enforceable conditions that are at least as stringent as those being removed from your RCRA permit.

One commenter offered suggestions for preparing the RCRA modification requests. We found some of these suggestions helpful and recommend that, to facilitate processing of the RCRA modification requests, you (1) identify in your modification requests which RCRA conditions should be removed, and (2) attach your NOC to the requests.

From another perspective, today's approach for removing conditions from the RCRA permit also may encourage you to work closely with the air program to expeditiously resolve any potential or actual disagreements on the results of the comprehensive performance test and conditions in the NOC. The RCRA permit writer is not likely to approve the modification request until he or she has received confirmation that their air program counterpart is satisfied with your compliance demonstration under MACT (*i.e.*, that they have made the finding of compliance based on the test results documented in the NOC, as discussed in the following paragraph). Thus, you should continue to be subject to requirements under both RCRA and the CAA until the differences, if any, are resolved.

We are not including a requirement in either part 63 subpart EEE or part 270 specifically for the regulatory agency to approve the NOC before approving the RCRA modification request. We have incorporated the general provision for making a finding of compliance (see § 63.6(f)(3)) into the requirements of subpart EEE at § 63.1206(b)(3). According to these provisions, the regulatory agency has an obligation to make a finding of compliance with applicable emissions standards upon obtaining all of the compliance information, including the written reports of performance test results. Because of this obligation, air program staff currently review stack test results that are submitted in NOCs subsequent to performance testing, and routinely transmit an official letter to you indicating the acceptability of the test results. Furthermore, if you fail the comprehensive performance test, there are requirements in part 63 subpart EEE specifying what you must then do. Given this combination of regulatory obligations and current practices, we see no need to impose additional requirements governing review of performance test results. This approach is also consistent with the timing for when permit requirements are deferred to CAA (see the amended rule language for 40 CFR 270.19, 270.22, 270.62, and 270.66)).

5. How Should Sources in the Process of Obtaining RCRA Permits Be Switched Over to Title V?

In the initial NPRM and the May, 1997, NODA, we did not specifically describe, or solicit comment on, permit process issues for facilities operating under RCRA interim status, or facilities seeking to renew their RCRA permits (which can occur even after the nominal permit term has expired). In the above sections, we focused on implementing the deferral of RCRA controls by determining how and when to move conditions out of existing RCRA permits. For facilities that do not yet have RCRA permits, or that need to renew their RCRA permits, the focus of the discussion shifts to how and when to move nonrisk-based air emissions considerations out of the RCRA permitting process. As indicated earlier, RCRA interim status facilities will continue to be subject to RCRA permitting requirements for air emissions standards and related operating parameters, including trial burn planning and testing, until they have demonstrated compliance with the new standards by conducting a comprehensive performance test and submitting an NOC to the agency. Facilities in the process of renewing their RCRA permits will also continue to be subject to RCRA permitting requirements until the same point.

Again, there is no single approach for moving these two categories of facilities out of the RCRA permitting process (*i.e.*, for stack air emissions requirements). The most appropriate route to follow in each case depends on a host of factors, including, for example: (1) The status of the facility in the RCRA permitting process at the time this rule is published; (2) the priorities and schedule of the regulatory agency; (3) the level of environmental concern at a given site; and (4) the number of similar facilities in the permitting queue. The regulatory agency (presumably in coordination with the facility) will balance all of these factors. In mapping out a site-specific approach, we are encouraging permitting agencies to give weight to two key factors. First, we should minimize to the extent practicable the amount of time a facility would be subject to duplicative requirements between RCRA and CAA programs. Second, as indicated in Part Five, Section V.B (Risk Burn/ Comprehensive Performance Testing), testing under one program should not be unnecessarily delayed in order to coordinate with testing under the other. For example, if a facility is planning to conduct a RCRA trial burn within a fairly short amount of time after the rule is promulgated, they generally should not be allowed to delay the trial burn to coordinate with comprehensive performance testing under MACT that may not occur for three more years.[304]

Even though we cannot prescribe a single national approach for the transition from RCRA permitting for air emissions, we can provide some other recommendations to help permitting authorities and facility owners or operators determine a sound approach. In this section, we walk through some examples, intended as guidance, for transitioning facilities that are in the process of obtaining or renewing a RCRA permit. We hope that these examples will also enhance consistency among the various regulatory agencies.

a. Example 1. Facility has submitted a RCRA permit renewal application. Some sources, particularly hazardous waste incinerators, have RCRA permits that are close to expiring. These sources may already have initiated the renewal process by the time this rule is promulgated. In these situations, we anticipate the source might need to modify its current permit to accommodate any upgrades necessary to comply with the new standards. Facilities may modify RCRA permits that have been continued under § 270.51 pending final disposition of the renewal application. Thus, facilities will be able to use the streamlined permit modification procedures that were promulgated in § 270.42(j) to effect the necessary changes pending resolution of their renewal application. Depending on where they are in the renewal process, the permitting authority may, alternatively, elect to fold the modifications into the actual renewal process, thereby streamlining some of the administrative requirements.

Issuance of RCRA hazardous waste combustor permits often takes several years. If the source and the permitting authority are in the early stages of renewal, the schedule of permitting activities may not call for a trial burn to be conducted until sometime close to when the source would be required to conduct comprehensive performance testing under MACT. If so, the source may be able to either coordinate the testing requirements of the two programs, *e.g.*, if a RCRA risk burn is necessary, or to perform just the comprehensive performance test under MACT. If, on the other hand, they are further along in the renewal process, the trial burn might be scheduled for the near future. In this case, the approach outlined in Example 2 below might be more appropriate to follow.

Regardless of the approach followed to transition the air emissions and related operating parameters for the combustion unit to the Air program, the

[304] There may be a short delay allowed for the purpose of combining RCRA trial burn and MACT performance test plans. Of course, even if the timing for the two tests is such that they may be coordinated, that does not mean that one can simply replace the other, particularly because test conditions for one may not be applicable to the other (refer to Section V.B for additional discussion on this topic).

RCRA permit must still be renewed for all other aspects of hazardous waste management at the facility.

b. Example 2. Permitting authority has approved, or is close to approving, the RCRA trial burn plan at the time the final MACT standards are promulgated. Both interim status facilities and those seeking permit renewal are subject to requirements in §§ 270.62 and 270.66 to develop and obtain approval for trial burn plans. Requirements in these sections also call for permitting authorities to provide public notice of approved (or tentatively approved) trial burn plans and projected schedules for conducting the burns. We anticipate that many of the hazardous waste combustors seeking permits who are subject to this rulemaking will have already had their trial burn plans approved, or close to being approved, by the time this rule is promulgated. In such situations, we expect the facility to continue with the trial burn as planned.

If the burn is successful, we anticipate the permitting authority will issue a final RCRA permit that covers both the operations of the hazardous waste combustor unit as well as all other hazardous waste management activities at the site. We recommend that the permit be worded flexibly to facilitate transition to title V once the source subsequently demonstrates compliance with the MACT standards. For example, conditions in the RCRA permit that would ultimately be covered under title V might have associated sunset provisions indicating that the conditions will cease to apply once the combustor unit demonstrates compliance with the MACT standards. This would ensure that the amount of time the source might be subject to emissions limits and operating parameters under both RCRA and the CAA would be minimized. It would also eliminate the need to engage in a separate permit modification action to remove the conditions after the MACT compliance demonstration.

Facilities in this scenario may determine they need to make some changes to their equipment or operations to meet the new emissions limits. These facilities will be able to use the streamlined permit modification procedures that were promulgated in § 270.42(i).

If the trial burn is not successful, we expect permitting authorities to refer to the RCRA trial burn failure policy (see Memorandum on Trial Burns, EPA530–F–94–023, July 1994). This policy includes discussion in the following areas: (1) Taking immediate steps to restrict operations; (2) initiating procedures for permit denial (which would be appropriate for interim status or renewal candidates); (3) initiating proceedings to terminate the permit (which would be appropriate for proposed new facilities); and (4) authorizing trial burn retesting after the facility investigates reasons for the failure and makes changes to address them.

c. Example 3. The permitting authority does not anticipate approving the trial burn plan, or the trial burn is not scheduled to occur until after the Notice of Intent to Comply is submitted. As suggested in the previous example, if a facility is ready to proceed with a trial burn at the time the final hazardous waste combustor MACT rule is promulgated, we expect that activities will proceed as planned. Once the Notice of Intent to Comply is submitted, however, the regulatory authority will have a better understanding of how and when the facility intends to comply with the emissions standards, and how the trial burn would fit in with the MACT compliance demonstration. Thus, we expect the regulatory authority may wish to decide whether to separately continue with the trial burn schedule laid out in the RCRA permitting process or, conversely, coordinate with MACT comprehensive performance testing, based on a number of considerations, including, for example: (1) The facility's schedule and planned modifications for MACT compliance; (2) progress on completing and approving the RCRA trial burn plan; (3) whether the risk testing that may be necessary under RCRA is likely to fit in with the MACT performance test schedule; and (4) whether the facility wants to combine risk testing under RCRA with the MACT performance test.

Even after a source conducts its comprehensive performance test and subsequently submits the NOC to the regulatory agency, separate risk testing might be necessary. For example, if the comprehensive performance test did not generate sufficient data for a site-specific risk assessment, a RCRA ''risk burn'' might be required (see discussion in Part Five, Section V.B.).

E. What Is Meant by Certain Definitions?

When we considered incorporating MACT standards into both RCRA and CAA regulations, we anticipated some confusion about definitions that differ between the two programs. In the NPRM, we solicited comments on our expressed preference not to reconcile these issues on a national basis. (See 61 FR 17452). Several commenters suggest that EPA reconcile the issues and clarify definitions. In the final rule, we have made some changes, as discussed below, to ensure consistency of interpretation and to minimize uncertainty for facilities seeking to comply with today's rule. With these changes, we believe that revisions to the definitions themselves are not necessary.

1. Prior Approval

In the proposed rule, we stated that RCRA and CAA are similar in that they both require EPA prior approval before construction or reconstruction of a facility. There were no adverse comments received regarding this statement. The requirements for obtaining prior approval are apparently clear under both programs.

We suggested in the proposed rule that readers of part 63 might be unaware of their obligations under RCRA. Therefore, as proposed, we are inserting the following note into § 63.1206 Compliance Dates, ''An owner or operator wishing to commence construction of a hazardous waste incinerator or hazardous waste-burning equipment for a cement kiln or lightweight aggregate kiln must first obtain some type of RCRA authorization, whether it be a RCRA permit, a modification to an existing RCRA permit, or a change under already existing interim status. See 40 CFR part 270''. No adverse comments were submitted.

2. 50 Percent Benchmark

As stated in the proposed rule, RCRA and CAA both classify ''reconstruction'' as any modifications of a facility that cost more than 50 percent of the replacement cost of the facility. However, the significance of this term is different depending on which statute is being applied. Two commenters confirmed that the distinction is critical. Therefore, they concluded that, to avoid confusion, EPA should defer to the CAA definition of ''reconstruction'' under RCRA Section 1006(b) because it is the more flexible and appropriate definition.

The primary concern about the 50 percent benchmark is in relation to the limit imposed on RCRA interim status facilities for making modifications. To ensure that this limit would not present a barrier to making upgrades necessary to comply with MACT, we finalized a revision to § 270.72(b) to specify that interim status facilities can exceed the 50 percent limit if necessary to comply with MACT. (See 63 FR 33829, June 19, 1998). Therefore, there is no potential for practical conflict among the CAA and RCRA regulatory regimes, and no further amendment or clarification is needed.

3. Facility Definition

As stated in the NPRM, the definition of ''facility'' differs between CAA and RCRA. The definition has bearing in determining the value of the facility with respect to the 50 percent rule on modifications as discussed above. We proposed that the RCRA definition should be used for the RCRA application to changes during interim status, and the CAA definition should be used when determining applicability of MACT standards to new versus existing sources. Commenters disagreed with this approach and concluded that EPA should defer to the CAA definition of facility because it encompasses the entire operations at a site. We continue to believe that the CAA definition should apply to CAA requirements and that the RCRA definition should apply to RCRA requirements, since the definitions are used for a different purpose under each statute. By clarifying the 50 percent benchmark issue for RCRA interim status facilities as discussed above, we believe this satisfies commenters' concerns and, thus, it is not necessary to reconcile the facility definition.

4. No New Eligibility for Interim Status

RCRA bestows interim status on facilities that were in existence on November 19, 1980, or are in existence on the effective date of statutory or regulatory changes that render the facility subject to RCRA permitting requirements. The original RCRA rules for hazardous waste incinerators and BIFs were finalized in 1980 and 1991, respectively. Because these rules established the dates on which incinerators and BIFs were first subject to RCRA permitting requirements, the effective dates of those rules created the *only* opportunity for interim status eligibility. The interim status windows that occurred in 1980 and 1991 thus are not modified by this rule. The lone exception is that facilities currently burning only nonhazardous wastes that become newly listed or identified hazardous waste under other future rules would still be able, under existing law, to qualify for interim status (§ 270.42(g)).

5. What Constitutes Construction Requiring Approval?

The proposed rule noted that RCRA and CAA both have restrictions requiring approval prior to construction, but that each statute defines construction differently. We expressed our intent in the NPRM to retain the two definitions. In the final rule, we continue to support retaining the two definitions. Since most facilities currently possess RCRA and CAA permits, these definitions are already being applied concurrently with no apparent problems. Consequently, this is the most practical and least confusing approach for permittees and regulators.

XII. State Authorization

A. What Is the Authority for Today's Rule?

Today's rule is being issued under the joint authority of the Clean Air Act (CAA), 42 U.S.C. 7401 *et seq.*, and the Resource Conservation Recovery Act (RCRA), 42 U.S.C. 6924(o), 6924(q) and 6925. The new MACT air emissions standards are located in 40 CFR part 63. Pursuant to sections 1006(b) and 3004(a) of RCRA, 42 U.S.C. 6905(b) and 6924(a), the MACT program will only be carried out under the CAA delegated program. We strongly encourage States to adopt today's MACT standards under their CAA statute and to apply for delegation under the CAA if they do not have section 112 delegation. State implementation of the MACT portions of this rule through its delegated CAA program will facilitate coordination between the regulated entity and its State and reduce duplicative permitting requirements under the CAA and RCRA.

In addition to promulgating the MACT standards, today's rule modifies the RCRA program in other various respects and States authorized for the RCRA base program must revise their programs accordingly. For example, this rule revises the test for determining whether a facility's waste retains the Bevill exclusion by adding dioxins/furans to the list of constituents to be analyzed.

B. How Is the Program Delegated Under the Clean Air Act?

States can implement and enforce the new MACT standards through their delegated 112(l) CAA program and/or by having title V authority. A State's title V authority is independent of whether it has been delegated section 112(l) of the CAA.

Section 112(l) of the CAA allows us to approve State rules or programs to implement and enforce emission standards and other requirements for air pollutants subject to section 112. Under this authority, we developed delegation procedures and requirements located at 40 CFR part 63, subpart EEE, for National Emission Standards for Hazardous Air Pollutants (NESHAPS) under section 112 of the CAA (see 58 FR 62262, November 26, 1993, as amended, 61 FR 36295, July 10, 1996). Similar authority for our approval of state operating permit programs under title V of the CAA is located at 40 CFR part 70 (see 57 FR 32250, July 21, 1992).

Submission of rules or programs by States under 40 CFR part 63 (section 112) is voluntary. Once a State receives approval from us for a standard under section 112(l) of the CAA, the State is delegated the authority to implement and enforce the part 63 standards under the State's rules and regulations (the approved State standard would be federally enforceable). States also may apply for a partial 112 program, such that the State is not required to adopt all rules promulgated in 40 CFR part 63. We will implement the portions of the 112 program not delegated to the State. For example, documents such as the NOC will be submitted to the Administrator when due, if the State is not approved for the standards in today's rule.

Under 40 CFR 70.4(a) and section 502(d) of the CAA, States were required to submit to the Administrator a proposed part 70 (title V) permitting program by November 15, 1993. If a State did not receive our approval by November 15, 1995 for its title V program, the title V program had to be implemented by us in that State. As of today's rule, all States have approved title V programs.[305] This means that all States have the authority to incorporate all MACT standards (changes to section 112 of the CAA) into the title V permits as permit conditions, and have the authority to enforce all the terms and conditions of the title V permits. *See* 40 CFR 70.4(3)(vii).

The MACT standards are effective upon promulgation of this rule. Facilities with a remaining permit term of three or more years will be required to submit title V applications to their permitting authorities to revise their permits.[306] States will write the new

[305] Under the CAA, Indian tribes may apply to EPA to be treated as States and obtain approval of their own Clean Air Act programs. Section 301(d) of the Clean Air Act, 42 U.S.C. 7601(d); see also 40 CFR part 49. Tribes may thus become empowered to implement the section 112 and title V portions of today's rule is areas where they demonstrate jurisdiction and the capacity to do so. Currently under RCRA, there is no Tribal authorization for the RCRA Subtitle C hazardous waste program and thus EPA generally implements the RCRA portions of today's rule in Indian Country.

EPA has authority to implement the federal operating permits program 940 CFR part 71) where a State fails to adequately administer and enforce an approved part 70 program, or where a State fails to appropriately respond to an EPA objection to a part 70 permit. Additionally, some sources in U.S. Territories, the Outer Continental Shelf, and Indian Country, are subject, or will soon be subject, to part 71.

[306] Title V permits are issued for a period not to exceed five years. *See* 40 CFR 70.4(b)(3)(iii). You

Continued

MACT standards into any new, renewed, or revised title V permit and enforce all terms and conditions in the title V permit. A State's authority to write and enforce title V permits is independent of its authority to implement the changes to the MACT standards (changes to section 112 of the CAA). Therefore, while both we and the State can enforce the federal MACT standards within a title V permit, until the State receives approval from us for required changes to section 112 of the CAA, we will implement the 112 program.

C. How Are States Authorized Under RCRA?

Under section 3006(g) of RCRA, enacted as part of the Hazardous and Solid Waste Amendments (HSWA) of 1984, new requirements imposed by us as a result of authorities provided by HSWA take effect in authorized States at the same time as they do in unauthorized States—as long as the new requirements are more stringent than the requirements a State is authorized to implement. We implement these new requirements until the State is authorized for them. After receiving authorization, the State administers the program in lieu of the Federal government, although we retain enforcement authority under sections 3008, 3013, and 7003 of RCRA.

Most of the new Federal RCRA requirements in today's final rule are being promulgated through the HSWA amendments to RCRA. Regulatory changes based on HSWA authorities are considered promulgated through HSWA. The following RCRA sections, enacted as part of HSWA, apply to today's rule: 3004(o) (changes to the MACT standards), 3004(q) (fuel blending), and 3005 (omnibus). As a part of HSWA, these RCRA provisions are federally enforceable in an authorized State until the necessary changes to a State's authorization are approved by us. See RCRA section 3006, 42 U.S.C. 6926. The Agency is adding these requirements to Table 1 in § 271.1(j), which identifies rulemakings that are promulgated pursuant to HSWA.

In contrast, the change to the permit modification table (Appendix I to § 270.42) is promulgated through authorities provided to us prior to HSWA. Therefore, this change does not become effective until States adopt the revision and become authorized for that revision.

Under RCRA, States that have received authorization to implement and enforce RCRA regulatory programs are required to review and, if necessary, to modify their programs when we promulgate changes to the federal standards that result in the new federal program being more stringent or broader in scope than the existing federal standards. This is because under section 3009 of RCRA, States are barred from implementing requirements that are less stringent than the federal program. See also 40 CFR 271.21.

In four respects, we consider today's final rule to be more stringent than current federal RCRA requirements: (1) The added definitions for dioxins/furans and TEQ (40 CFR 260.10); (2) the requirement that permits for miscellaneous units must include appropriate terms and conditions from part 63, subpart EEE standards (40 CFR 264.601); (3) the establishment of new standards to control particulate matter (40 CFR 266.105(c)); and (4) the addition of dioxin/furans as listed potential Products of Incomplete Combustion (PIC) (40 CFR 266.112; Appendix VIII to 40 CFR part 266). Authorized States must adopt these requirements as part of their State programs and apply to us for approval of their program revisions. The procedures and deadlines for State program revisions are set forth in 40 CFR 271.21.

Section 3009 of RCRA allows States to impose standards that are more stringent or more extensive (*i.e.,* broader) in scope than those in the Federal program (see also 40 CFR 271.1(i)(1)). Thus, for those Federal changes that are less stringent, or reduce the scope of the Federal program, States are not required to modify their programs. Further, EPA will not implement those provisions promulgated under HSWA authority that are not more stringent than the previous federal regulations in States that have been authorized for those previous federal provisions. EPA will implement these new provisions in States that are not authorized to implement the previous federal regulations.

In two respects, we consider today's rule to be less stringent than current federal requirements: (1) The inapplicability of certain provisions of RCRA once specified part 63, subpart EEE and other requirements have been met (40 CFR 264.340(b)(1); 265.340(b)(1); 266.100(b)(1), 266.100(d)(1) and (d)(3); 266.100(h); 270.19; 270.22; 270.62; and 270.66); and (2) the provision for RCRA permit modifications to remove inapplicable RCRA conditions (Appendix I to 40 CFR part 270.42).[307]

The rest of the requirements in today's rule, in our view, are neither more nor less stringent than current regulatory requirements. They are either reiterations or clarifications of our existing regulations or policies (40 CFR 264.340(b)(2), 265.340(b)(2), 266.100(b)(2), and 266.101).

Although States must adopt only those requirements that are more stringent, in the spirit of RCRA section 1006(b), which directs us to avoid duplicative RCRA and CAA requirements, we strongly urge States to adopt all aspects of today's final rule (including the clarifying as well as less stringent sections). The adoption of all portions of today's final rule by state agencies will ensure clear, consistent requirements for owners, operators, affected sources, State regulators, and the public. Pursuant to today's rule, the permitting requirements will be implemented solely through the CAA title V program. If a RCRA permitted facility is required to use RCRA risk-based air emissions standards in addition to the CAA designated technology based standards, we will exercise our omnibus authority in section 3005 of RCRA to modify the facility's RCRA permit.[308] Therefore, we believe that the standards promulgated today properly implement the goals of sections 3004(o) and (q) of RCRA to ensure the safe and proper management of the affected combustion units and the goal of section 1006(b) of RCRA to avoid duplicative and potentially confusing permitting requirements under two different environmental statutes (RCRA and CAA). For these reasons, we encourage States to adopt these

will have three years to come into compliance with the new MACT standards. If you have fewer than three years remaining on your title V permit term, our part 70 regulations do not require you to reopen and revise your permit to incorporate the new MACT standard into the title V permit. *See* 40 CFR 70.7(f)(1)(i). However, the CAA does allow State programs to require revisions to your permit to incorporate the new MACT standard. Therefore, if you have fewer than three years remaining on your title V permit, you should consult your state permitting program regulations to determine whether a revision to your permit is necessary to incorporate the new part 63 MACT standards. If your are not required to revise your permit to incorporate the new standard, you must still fully comply with today's standard.

[307] States choosing to adopt the other less stringent changes to RCRA in today's rule also should adopt the change to 40 CFR 270.42. The change to 40 CFR 270.42 provides the RCRA permit modification procedure to eliminate inapplicable RCRA requirements once specified part 63, subpart EEE and other requirements have been met.

[308] If a State has a provision in its State air statute or regulation that is equivalent to the RCRA omnibus authority (RCRA section 3005(c)), we expect that the State will be able to use its air authority in pace of its RCRA omnibus authority.

regulations as quickly as their legislative and regulatory processes will allow.

Part Six: Miscellaneous Provisions and Issues

I. Does the Waiver of the Particulate Matter Standard or the Destruction and Removal Efficiency Standard Under the Low Risk Waste Exemption of the BIF Rule Apply?

Section 266.109 of the current BIF regulation provides a conditional exemption from the destruction and removal efficiency standard and the particulate matter standard for low risk wastes. We proposed to restrict eligibility for the waiver of the particulate matter standard to BIFs other than cement and lightweight aggregate kilns because the waiver could supersede the MACT requirements for the particulate matter standards. We had the same concern for the destruction and removal efficiency requirements. See 61 FR at 17470. After reconsidering the issue, we are clarifying that today's MACT requirements are separately applicable and enforceable and that no action is needed to ensure that a BIF waiver does not supersede the MACT requirements. See the discussions in Part Five of today's preamble regarding integration of the MACT and RCRA standards.

II. What Is the Status of the ''Low Risk Waste'' Exemption?

Section 264.340(b) and (c) exempts certain incinerators from the RCRA emission standards if the hazardous waste burned contains (or could reasonably be expected to contain) insignificant concentrations of Appendix VIII, part 261, hazardous constituents. We proposed that this ''low risk waste'' provision no longer be applicable incinerators on the MACT compliance date because a risk-based exemption from technology-based MACT standards seemed inappropriate. See 61 FR at 17470. After reconsidering the issue, we have determined that no specific action is necessary because the MACT standards are separately applicable and enforceable standards. See the discussion in Part Five of today's preamble regarding integration of the MACT and RCRA standards.

III. What Concerns Have Been Considered for Shakedown?

In the proposal, we expressed concern that some new units do not effectively use their allotted 720-hour pre-trial burn shakedown period or appropriate extensions to correct operational problems. This can potentially lead to trial burn failures and emission exceedances, which pose unnecessary risks to human health and the environment. Therefore, we proposed three shakedown options to enhance regulatory control over trial burn testing:

(1) Prior to scheduling trial burns, we would require facilities to provide the Director a minimum showing of operational readiness.

(2) We would require notification of operational readiness prior to, and following, the shakedown period.

(3) We would provide guidance on how to effectively prepare for a trial burn. These options were proposed for inclusion under both the CAA and RCRA regulations, and comments were requested regarding their usefulness.

A few commenters preferred Option 3 because it would be useful in determining how to effectively prepare for a trial burn. Regarding Options 1 and 2, two commenters felt the cost, time, and resources required for a trial burn already provide adequate financial incentive to prepare, plan, and conduct trial burns efficiently. Two commenters felt that Option 3 provided the potential for inequities in implementation of the guidance by the permit writer. In general, most commenters agreed that additional regulatory requirements are not necessary.

In light of the comments, we decided not to adopt any of the proposed options. We acknowledge that it is in the facility's best interest to conduct a successful trial burn that most facilities will properly utilize their shakedown period. However, during the transition period from RCRA to MACT compliance, we strongly encourage facilities to properly use their shakedown period to correct operational problems that pose unnecessary risks to human health and the environment.

Therefore, with the exception of risk burns, we are pursuing the deferral of RCRA trial burns to the MACT performance test requirements. A source remains subject to RCRA trial burns during the transition period to MACT compliance. For facilities where unique considerations make a SSRA necessary, risk-based permit conditions may result. In such cases, there likely would need to be conditions for all phases of operation in the RCRA permit. Thus, start-up and shakedown would still be an issue for some RCRA combustor facilities given that they would have to be in compliance with the unique RCRA emission standards even during startup and shakedown (unless the permit conditions specify otherwise).

IV. What Are the Management Requirements Prior to Burning?

Today, we are finalizing the proposal to revise 40 CFR 266.101 (''Management prior to burning'') to clarify that fuel blending activities are regulated under RCRA. See 61 FR at 17474 (April 19, 1996). As described in detail in the proposal, this is already implicit (and for some units, explicit) in existing rules. Therefore, today's rule is more an interpretive clarification. See 52 FR 11820 (April 13, 1987). By incorporating the term ''treatment'' into the regulation, we are clarifying that fuel blending activities that are conducted in units other than 90-day tanks or containers also are subject to regulation.

We received two comments expressing concern that this would subject all fuel blending-related equipment permitting, without allowing for case-by-case determinations. For example, these commenters believe that some pre-processing activities conducted by blenders (shredding, drum crushing, and other physical handling) do not meet the definition of treatment and should not be subject to permitting standards. However, we feel that these activities meet the existing definition of treatment. They are ''process(es) . . . designed to change the physical . . . composition of . . . hazardous waste so as to . . . render such waste amenable for recovery'' via combustion. See 40 CFR 260.10 (definition of ''treatment'').

Moreover, these pre-processing activities should be subject to permitting requirements. Controls on these activities are necessary to protect against releases of hazardous constituents to the environment due to the nature of those operations (*e.g.*, crushing or shredding of drums containing hazardous wastes, grinding of waste materials, etc.). *See Shell Oil* v. *EPA*, 950 F. 2d 741, 753–56 (D.C. Cir. 1991), which broadly construes the definition of treatment to assure that the RCRA goal of cradle-to-grave management of hazardous wastes is satisfied and that specific types of units remain subject to subtitle C regulation. For units that do not already meet the definition of a specific unit, subpart X is available to provide the appropriate standards.

V. Are There Any Conforming Changes to Subpart X?

In today's rule, we are making a *conforming change* to part 264 subpart X (§ 264.601) to make reference to part 63 subpart EEE.

Hazardous waste treatment, storage, and disposal facilities that are not classified under other categories (*e.g.*, tank systems, surface impoundments, waste piles, incinerators, *etc.*) are classified as miscellaneous units and regulated under part 264 subpart X. However, due to the varying types and designs of miscellaneous units, subpart X does not include specific performance standards. Instead, subpart X makes reference to requirements in other sections of the regulations. Section 264.601 of subpart X states that ''Permit terms and provisions shall include those requirements of subparts I through O and subparts AA through CC of this part, part 270, and part 146 that are appropriate for the miscellaneous unit being permitted .'' This statement directs the permitting agency to look at the requirements (*e.g.*, performance standards, operating parameters, monitoring requirements, *etc.*) from other sections in the regulations when developing appropriate permit conditions for miscellaneous units.

In the past, permitting authorities have often looked to the part 264 subpart O regulations for incinerators to develop the appropriate permit conditions for units such as thermal desorbers and carbon regeneration units. Since today's rule upgrades the air emission standards for certain source categories, these new standards also should be considered when determining the appropriate requirements for miscellaneous units, most notably those engaged in any type of thermal operation. Therefore, the language in § 264.601 of subpart X is being modified to incorporate a reference to part 63 subpart EEE.

VI. What Are the Requirements for Bevill Residues?

A. Dioxin Testing of Bevill Residues

In the proposal, we proposed to add polychlorinated dibenzo-p-dioxin and polychlorinated dibenzo-furan compounds to appendix VIII of part 266. Appendix VIII lists those compounds that may be generated as products of incomplete combustion and that must be included in testing of Bevill residues conducted pursuant to 40 CFR 266.112. Products of incomplete combustion can be unburned organic compounds that were originally present in the waste, thermal decomposition products resulting from organic constituents in the waste, or compounds synthesized during or immediately after combustion. We noted in the proposal that there is a considerable body of evidence to show that dioxin and furan compounds can be formed in the post-combustion regions of hazardous waste burning boilers, industrial furnaces, and incinerators, especially at temperatures between 250–450°C.[309] [310] Collected particulate matter in the post-combustion regions of furnaces can provide sites for adsorption of precursors, formation of dioxins and furans by surface chlorination of precursors, catalytic production of chlorine for subsequent chlorination of dioxin and furan precursors, and *de novo* synthesis of dioxins and furans. This same particulate matter may be subsequently managed as excluded Bevill residue.

No evidence was provided by commenters to show that dioxins and furans cannot be formed in cooler, post-combustion regions of furnaces (*e.g.*, ductwork, boiler tubes, heat exchange surfaces, and air pollution control devices). A few commenters referenced the total number of nondetects for all of the compounds in the cement kiln dust database. However, the relevance of this information specifically to dioxins and furans was unclear. Dioxins and furans have repeatedly been detected in cement kiln dust, as well as other Bevill residues.[311] [312]

The majority of commenters were concerned about implementation issues. Many felt that the addition of dioxins and furans to part 266 appendix VIII, in conjunction with the proposed requirement for daily sampling and analysis of Bevill residues, would make Bevill demonstrations prohibitively expensive. They also noted that the turnaround time for daily dioxin and furan analyses would delay compliance demonstrations and result in shortages in storage capacity. One commenter felt that daily sampling for dioxins and furans is not warranted because cement kiln dust at their site has already been shown to meet the proposed Bevill exclusion criteria for dioxins and furans. None of these arguments directly address our basic premise that dioxin and furan compounds can be generated in combustion systems, are of concern to the protection of human health and the environment, and, as such, should be included in part 266 appendix VIII. Rather, these comments pertain to issues that are more readily and appropriately resolved within the context of site-specific Bevill testing plans.

[309] USEPA, ''Estimating Exposure to Dioxin-Like Compounds'', EPA/600/6-88/005Ca, June 1994.

[310] USEPA, ''Combustion Emissions Technical Resource Document (CETRED)''. EPA/530/R–94/014, May 1994.

[311] USEPA, ''Report to Congress on Cement Kiln Dust'', EPA/530/R–94/001, December 1993.

[312] USEPA, ''Dioxins/Furans, Metals, Chlorine, Hydrochloric acid, and Related Testing at a Hazardous Waste-Burning Light-Weight Aggregate Kiln'', June 1997 Draft Report.

The proposed daily residue test frequency, which was cited most often as an impediment in conjunction with dioxin and furan analysis, is not being promulgated as part of today's rule. The rule will leave maximum flexibility for development of appropriate dioxin and furan analysis frequencies considering site-specific factors. Most facilities should be able to substantially limit the number of dioxin and furan analyses after an initial sampling effort. Most residue test plans rely on the concentration-based comparisons to F039 nonwastewater levels (40 CFR 266.112(b)(2)) in combination with a phased testing approach. Under the phased approach, test frequency can be substantially reduced for those constituents where initial sampling efforts reveal that concentrations are well below the F039 levels. Of the facilities where residue testing for dioxins and furans has been performed, we are aware of only two facilities where dioxins and furans have exceeded the F039 levels. Thus, the burden of higher analytical costs is expected to be appropriately limited to those few sites with significant dioxin and furan residue concentrations.

Several commenters pointed out that some Bevill residues (*e.g.*, slag from primary smelters) are generated prior to the post-combustion regions typically associated with dioxin and furan formation. Indeed, the preamble discussion in the proposal focused exclusively on post-combustion residues and did not address Bevill-exempt primary smelter slags. We currently do not have analytical data on dioxins and furans in smelter slag. However, our current information on dioxin and furan formation mechanisms suggests that it would be highly unlikely to expect significant dioxins and furans in smelter slag. Therefore, we agree that dioxin and furan analyses should be limited to those residues where there is a reasonable expectation that dioxins and furans could be present (*e.g.*, post-combustion residues).

Finally, two commenters disagreed with our assertion that dioxins and furans have been shown, in a national comparison, to be higher in residues from hazardous waste burning cement kilns than from other cement kilns. Although this information was included in the proposal as background, it is not necessary to reconcile various interpretations regarding national trends for today's rule. The 40 CFR 266.112 provisions are site-specific, and 40 CFR 266.112(b)(1) provides ample opportunity for you to demonstrate, on a site-specific basis as necessary, that waste-derived residues are not significantly different from normal residues.

After considering all of the comments on the proposal, we are adding dioxins and furans to part 266 appendix VIII in today's rule. A notation has been included to clarify that dioxin and furan analyses are required only for post-combustion residues. Commenters provided no compelling information to challenge the classification of dioxins and furans as products of incomplete combustion which can be formed in post-combustion regions of combustion systems, and the presence of dioxin and furan compounds in several post-combustion Bevill residues is clearly documented. Also, the increased use of carbon injection technology to achieve dioxin and furan stack emissions reductions could increase dioxin and furan contamination of Bevill residues in the future. The addition of dioxins and furans to part 266 appendix VIII is not expected to unduly burden the regulated community because facilities with dioxins and furans well below exclusion levels should be able to justify a minimum test frequency.

Dioxins and furans will be listed in part 266 appendix VIII simply as ''Polychlorinated dibenzo-p-dioxins'' and ''Polychlorinated dibenzo-furans''. However, the specific form of dioxins and furans that must be determined analytically will depend on the portion of the two-part test that is being implemented. If you are performing a comparison with normal residues pursuant to 40 CFR 266.112(b)(1), specific congeners and homologues must be measured and converted to TEQ values using the procedure provided in part 266, appendix IX, section 4.0. We received no comments regarding this portion of the proposal. If you are utilizing the concentration-based comparison to the F039 nonwastewater levels in 40 CFR 268.43 as outlined in 40 CFR 266.112(b)(2), then only the tetra-, penta-, and hexa-homologues need to be measured (these are the only homologues with established F039 concentration limits). One commenter seemed uncertain as to whether the tetra-, penta-, and hexa-homologue concentrations should be converted to TEQ values. We have revised the regulatory language to clarify that total concentrations for each homologue, not TEQs, should be used for the F039 comparisons. Another commenter objected to the use of F039 levels for the health-based comparison, noting that the F039 concentrations are technology-based levels. Our rationale for relying on the F039 concentrations has been explained previously (see 58 FR at 59598, November 9, 1993) and is not being revisited in today's rule.

B. Applicability of Part 266 Appendix VIII Products of Incomplete Combustion List

In the proposal, we noted the confusion regarding whether every constituent listed on the part 266 appendix VIII list must be included in residue testing at every facility. We proposed to clarify that the part 266 appendix VIII list is applicable in its entirety to every facility.

The only comments received on this issue were objections to our characterization of this change as a clarification. The commenters felt this was a substantive change that should not be enforced prior to the effective date of any final rule establishing the revision as law. The Agency is proceeding in today's rule to make the part 266 appendix VIII list applicable in its entirety to every facility by changing the title of the appendix from ''Potential PICs for Determination of Exclusion of Waste-Derived Residues'' to ''Organic Compounds for Which Residues Must Be Analyzed.'' This change is considered a revision to the part 266 regulations effective 30 days after the date of publication of today's rule. We will not seek to retroactively enforce this provision.

VII. Have There Been Any Changes in Reporting Requirements for Secondary Lead Smelters?

We proposed that secondary lead smelters subject to MACT standards for the secondary lead source category not be subject to RCRA air emission standards. 61 FR at 17474 (April 19, 1996). This exemption would apply only if a secondary lead smelter processed the type of feed material we evaluated in promulgating the secondary lead MACT standards, namely, lead-bearing hazardous wastes containing less than 500 ppm toxic nonmetals and/or hazardous wastes listed in appendix XI to 40 CFR part 266. *Id.* at 14475. Secondary lead smelters are presently not subject to RCRA air emission standards under these circumstances. See existing § 266.100 (c)(1) and (c)(3). However, they are subject to certain notification and recordkeeping requirements found in § 266.100 (c)(1)(I) and (c) (3) and on-going sampling and analysis requirements in § 266.100 (c)(1)(ii) and § 266.100 (c)(3)(i)(D). The practical effect of the proposal was to continue to relieve secondary lead smelters of these administrative requirements.

The proposal was supported by the public commenters. The reason for the proposal remains. That is, now that secondary lead smelters are complying with MACT standards for their source category, it is not necessary for them to be regulated under RCRA also for their air emissions. 60 FR 29750 (June 23, 1995). For the same reason, it is unnecessary to have the same level of recordkeeping and other administrative oversight as when these units were exempt from RCRA air emission requirements but not yet complying with CAA standards for hazardous air pollutants. 61 FR at 14474. Consequently, we are finalizing this portion of the proposal.

Today's rule takes the form of an amendment to the RCRA BIF rule (new § 266.100 (h)) and indicates that secondary lead smelters are exempt from all provisions of the BIF rule except for § 266.101, which contains the restrictions on types of hazardous waste which may be burned, as described in the first paragraph above. As proposed, a secondary lead smelter must provide a one-time notice to the Regional Administrator or State Director identifying each hazardous waste burned and stating that the facility claims an exemption from other requirements in the BIF rules. Those secondary lead smelters which have already notified pursuant to existing regulatory provisions (namely § 266.100 (c) (1) (i) or § 266.100 (c) (3) (i) (D)) would not have to renotify.

VIII. What Are the Operator Training and Certification Requirements?

Section 129 of the CAA requires us to develop and promulgate a program for training and certification of operators of facilities that burn municipal and medical wastes. We accordingly promulgated operator training and certification requirements for the operators of municipal waste combustors (60 FR 65424 (December 19, 1995)) and medical waste incinerators (62 FR 48348 (September 15, 1997)). At proposal, we considered similar requirements for hazardous waste combustor operators also and requested comments on whether: (1) Operator certification requirements are necessary for hazardous waste combustors, and (2) the American Society of Mechanical Engineers (ASME) standards (or an equivalent state certification program) are appropriate and sufficient. We note that ASME has established a Standard for the Qualification and Certification of Hazardous Waste Incinerator Operators in collaboration with the American National Standards Institute (ASME Standard Number QHO–1–1994) and has been providing certifications since 1996.

Commenters differed widely on two key issues: (1) Whether such a training program should be voluntary, mandatory, or even necessary, considering that RCRA already requires some site-specific training program (40 CFR 264.16); and (2) whether the certifying agency should be an independent body like ASME versus an industry organization like the Cement Kiln Recycling Coalition. Most commenters favored the establishment of a mandatory operator certification program by an independent organization that develops consensus standards (*e.g.*, ASME, American Society for Testing and Materials, or American National Standards Institute) in order to preserve the integrity of certification. We agree and note that ASME has already done commendable work in developing certification programs for operators of municipal waste combustors, medical waste incinerators, high capacity fossil-fuel fired plants, and hazardous waste incinerators. Each combustor program includes defined criteria for certification, including operator qualifications, recommended training, examination content, minimum passing grades, and due process. These programs are incorporated (at least in part) into EPA's combustion regulations to satisfy the CAA section 129 mandate, and we are extending similar requirements in today's rule to all hazardous waste combustor operators also. We find that the concerns about good operator training and certification that underlie the section 129 requirement for municipal waste combustors and medical waste incinerators apply as well to those persons charged with the responsibility for safe handling and burning of hazardous waste.

Some kiln operators and the Cement Kiln Recycling Coalition have commented that cement and lightweight aggregate kilns are much larger and more diverse facilities than most hazardous waste incinerators, that these kilns operate with employee unions that object to additional outside certification when site-specific training programs are already in place, and that the ASME certification programs are not pertinent or applicable to them. We recognize that there are some differences in the operation of incinerators and cement and lightweight aggregate kilns. However, these differences do not suggest that operator training and certification should be abandoned. Rather, they serve to emphasize the importance of having a rigorous operator training and certification program in place and having it subject to regulatory agency scrutiny. In that regard, we are aware of the Cement Kiln Recycling Coalition's efforts to develop a suitable industry-wide training and certification program for the kilns. However, the Cement Kiln Recycling Coalition's efforts to date have not resulted in a final industry-wide set of standards that can be relied upon in today's rule, and we note that the current general facility training programs under § 264.16 do not fully cover the areas that would need to be addressed at facilities burning hazardous waste. For example, § 264.16 neither identifies important areas of training with respect to daily operations (such as hazardous waste and residues handling operations, air pollution control device operations, troubleshooting, normal start-up and shut-down procedures, continuous emissions monitoring system operation and maintenance *etc.*) nor discriminates among the different categories of operators. Also, § 264.16 does not specify any operator certification nor minimum standards for certification, which are needed to ensure the initial and continual competence of the hazardous waste combustor facility operators.

We expect that kiln specific programs will be developed in the near future after complete analysis for consistency, reliability and conformance with principles of good operating and operator practices (including training and certification). Today's rule therefore specifies that each hazardous waste combustor facility must develop an operator training and certification program. In the case of cement and lightweight aggregate kilns, the facility must submit its program to the Agency for approval. The submittal will be evaluated for completeness, reliability and conformance with appropriate principles of good operator and operating practices (including training and certification). If a state-approved certification program becomes available, the facility's program must conform to that state program. These are to ensure that sufficient specifics are included in each facility program. In the case of hazardous waste incinerators, the facility's program must conform to either a state-approved certification program or, if none exists, to the ASME certification program (Standard No. QHO–1–1994). Again, this is to ensure that sufficient specifics are contained in a facility program.

IX. Why Did the Agency Redesignate Existing Regulations Pertaining to the Notification of Intent To Comply and Extension of the Compliance Date?

In today's final rule, we redesignate existing regulations pertaining to the Notification of Intent to Comply with subpart EEE and extensions of the compliance date to install pollution prevention or waste minimization controls to meld them into the new provisions of the subpart. This ensures that similar topics (*e.g.*, notifications, compliance requirements) are grouped together in the rule. We also revise those existing regulations to: (1) Convert the regulatory language to plain language consistent with the new provisions; (2) include references to the new provisions; and (3) include references to the actual effective date of the rule.

We promulgated these regulations as Part 1 of revised standards for hazardous waste combustors. See 63 FR 33782 (June 19, 1998). We are promulgating part 2 today, which comprises the emission standards and compliance requirements. Today's revisions to the existing standards does not constitute a repromulgation and does not reopen the comment period for those standards.

We are redesignating the existing regulations as indicated in the following table:

Existing regulation	Topic	Predesignated regulation
§ 63.1211(a) and (b)	Notification requirements for the notification of intent to comply	§ 63.1210(b) and (c)
§ 63.1211(c)	Requirements for sources that do not intend to comply	§ 63.1206(a)(2)
§ 63.1212	Progress report requirements for the notification of intent to comply	§ 63.1211(b)
§ 63.1213	Certification that must accompany the notice of intent to comply	§ 63.1212(a)
§ 63.1214	Extension of the compliance date	§ 63.1206(a)(1)
§ 63.1215	Requirements for sources that become affected sources after the effective date of the emission standards.	§ 63.1212(b)

Existing regulation	Topic	Predesignated regulation
§ 63.1216	Extension of the compliance date to install pollution prevention or waste minimization controls.	§ 63.1213

Part Seven: National Assessment of Exposures and Risks

We received many public comments on the risk assessment for the proposed rule.[313] In addition, the risk assessment was peer reviewed in accordance with EPA guidelines. Many of the commenters commented on similar topics. These topics included the representativeness of the HWC facilities modeled, the estimation of facility emissions, the exposure scenarios evaluated, and the assessment of risks from mercury. As of result of these comments, we made significant changes in the risk assessment for the final rule. Also, new information became available after proposal on food intake rates for home-produced foods and methods for assessing exposures to mercury. In addition, EPA issued guidance for use of probabilistic techniques in risk assessments and a policy for evaluating risks to children. These were also considered in making revisions to the risk assessment. A complete discussion of the risk assessment for today's rule may be found in the background document.[314]

I. What Changes Were Made to the Risk Methodology?

A. How Were Facilities Selected for Analysis?

The representativeness of the example facilities used in the risk assessment at proposal was widely questioned by commenters. We analyzed eleven example facilities for the proposed rule: two commercial incinerators, two on-site incinerators, two lightweight aggregate kilns, and five cement kilns.[315] While these facilities represented a geographically diverse set of facilities in each source category, it was not possible to demonstrate in any formal way that the facilities were representative of the universe of facilities covered by the rule.

Because of this difficulty, we concluded that the most efficient approach for assuring the representativeness of the facilities analyzed was to select a stratified random sample. The number of strata was determined by the number of categories and subcategories of sources for which risk information was desired. The final sample of facilities chosen for analysis includes 66 randomly selected facilities and 10 of the 11 facilities selected at proposal for a total sample of 76 facilities out of a universe of 165 facilities within the contiguous United States.[316] The sample sizes are as follows:

HAZARDOUS WASTE COMBUSTION FACILITY STRATUM AND SAMPLE SIZES

Combustion facility category	Stratum size	Random sample size	NPRM sample size	Final sample size	High end sampling probability [1]
Cement Kilns	18	10	5	15	98
Lightweight Aggregate Kilns	5	3	2	5	100
Commercial Incinerators:					
Including Waste Heat Boilers	20	11	2	13	97
Excluding Waste Heat Boilers	12	7	2	9	95
Large On-Site Incinerators:					
Including Waste Heat Boilers	43	17	1	18	94
Excluding Waste Heat Boilers	36	15	0	15	90
Small On-Site Incinerators:					
Including Waste Heat Boilers	79	25	0	25	96
Excluding Waste Heat Boilers	65	16	0	16	88
Incinerators With Waste Heat Boilers	29	15	1	16	92

[1] Probability that a facility that lies in the upper 10% of the distribution of risk will be sampled.

For the randomly selected facilities, sample sizes within a given category were chosen such that the probability of sampling a facility in the upper ten percent of the distribution of risk would be 90 percent or greater. The probabilities actually achieved range from 88 to 100 percent depending on the size of the original, non-randomly chosen sample and changes in the sampling frame that occurred during the random sampling process.[317]

We did not target area sources specifically for sampling because the statutory definition of major sources versus area sources is based on facility-wide emissions of hazardous air pollutants and such information was not available at the time the sampling was performed. Therefore, it was not possible to determine the sampling frame. We expect that on-site incinerators, both large and small, at large industrial facilities are major sources rather than area sources. Because area sources are of interest, we made risk inferences based on those area source incinerators that could be identified and had otherwise been

[313] ''Risk Assessment Support to the Development of Technical Standards for Emissions from Combustion Units Burning Hazardous Wastes: Background Information Document,'' February, 1996.

[314] See the background document, ''Human Health and Ecological Risk Assessment Support to the Development of Technical Standards for Emissions from Combustion Units Burning Hazardous Wastes: Background Document—Final Report,'' July, 1999.

[315] See 61 FR 17370 and ''Risk Assessment Support to the Development of Technical Standards for Emissions from Combustion Units Burning Hazardous Wastes: Background Information Document'' (February, 1996).

[316] A large on-site incinerator analyzed at proposal that is undergoing RCRA closure was excluded from the analysis.

[317] Changes in the sampling frame occurred as a result of facilities that were missing from the original sampling frame were misclassified, or were no longer burning hazardous waste and had begun RCRA closure.

sampled.[318] For cement kilns, all area sources were sampled and used for making such inferences.

B. How Were Facility Emissions Estimated?

At proposal, we estimated baseline emissions (reflecting current conditions) for the example facilities from the distribution of stack gas concentrations for the corresponding category of sources. Both central tendency and high end emissions estimates were made based on the 50th and 90th percentiles of the stack gas concentration distributions. For the purpose of evaluating risks associated with the proposal, we assumed that facilities emitted at the design level determined to be necessary to meet the standard, even if this meant an increase in emissions over baseline. Many commenters thought that using percentiles to estimate emissions was inappropriate and that site-specific emissions should be used instead. Commenters also thought that it was incorrect to project an increase in risk with the proposed standards (which occurred as a result of allowing emissions to increase over baseline). We agree with these comments. For the final rule, we estimated emissions based on site-specific stack gas emission concentrations and flow rates. Site-specific stack gas concentration data were used where emissions measurements were available; otherwise, stack gas concentrations were imputed. For today's rule, we assumed emissions would remain unchanged from baseline in instances where a facility's emissions are already below the design level (which is taken as 70 percent of the MACT standard).[319] In instances where a facility's emissions exceed the design level, we determined the percentage reduction in emissions required to meet the design level. We then applied this reduction to each chemical constituent to which the standard applies.

The imputation approach we used in instances where measured data were not available involves the random selection of emissions concentrations from a pool of emissions concentrations for other facilities and test conditions that are believed to be reasonably representative of the facility in question. For groups of interrelated constituents (*e.g.*, different dioxin congeners or mercury species), imputation was carried out for the group of interrelated constituents taken together rather than each individual constituent separately. We used the random imputation approach to preserve the variability in emissions exhibited by the pooled data. Another commonly used approach for estimating emissions, emissions factors, generally represents average conditions and does not reflect the variability in emissions across facilities in a given source category. Because the objective of the risk assessment is to characterize the distribution of risks across a given source category, we deemed the use of average emissions to be inappropriate except where only very limited data are available (*i.e.*, for cobalt, copper, and manganese). Although the random imputation approach may significantly over or under estimate emissions for a given facility (a problem also inherent in emission factors), we expect that the distributions of risk across a given source category are better characterized using random imputation than with an emissions factor approach or any other approach that does not account for the variation in emissions from one facility to the next.

Emissions estimates were made for all chemical constituents covered by the rule for which sufficient data were available, including all 2,3,7,8-chlorine substituted dibenzo(p)dioxins and dibenzofurans, elemental mercury (Hg^0), divalent mercury (Hg^{+2}), lead, cadmium, arsenic, beryllium, trivalent chromium (Cr^{+3}), hexavalent chromium (Cr^{+6}), chlorine, and hydrogen chloride. In addition, emissions estimates were made for particulate matter (PM_{10} and $PM_{2.5}$) and nine other metals, three of which (cobalt, copper, and manganese) were not assessed at proposal but were included in the risk assessment for the final rule. Chemical-specific emissions estimates could not be made for organic constituents other than dioxins and furans (*e.g.*, various products of incomplete combustion) due to the lack of sufficient emission measurements. We assessed the risks from all constituents for which chemical-specific emissions estimates could be made, as well as from particulate matter. A complete discussion of the emissions estimates used in the risk assessment may be found in the technical support documents for today's rule.[320]

C. What Receptor Populations Were Evaluated?

The risk assessment at proposal examined risks to individuals engaged in subsistence activities such as farming and fishing. Some commenters viewed these types of activities as unlikely to occur and questioned whether these types of exposures are representative of actual exposures and risk. Other commenters thought the exposure pathways included in the analysis did not fully reflect potential exposures to individuals living a true subsistence lifestyle. We share the concerns raised by commenters and have refocused the assessment on non-subsistence receptor populations such as commercial farmers, recreational anglers, and non-farm residents whose numbers and locations can be estimated from available census data. At the same time, we retained the subsistence scenarios and revised them to be more reflective of a subsistence lifestyle. Although it is not known precisely how many individuals are engaged in subsistence activities or exactly where those activities take place, subsistence does occur in some segments of the U.S. population, and we believe it is important to evaluate the associated risks.

D. How Were Exposure Factors Determined?

Since the risk assessment at proposal, we have developed new information on factors that are used to estimate exposures. We obtained data collected from previously published studies and used the data to derive exposure factor information, including information for children.[321] In particular, we reanalyzed data collected by USDA to estimate consumption of home-produced foods, such as meat, milk, poultry, fish, and eggs. Over half of farm households report consuming home-produced meats, including nearly 40 percent that report consumption of home-produced beef. In the Northeast, nearly 40 percent of farm households report consuming home-produced dairy products, and, in the Midwest, nearly 20 percent do. The percentage is lower elsewhere, averaging about 13 percent nationally. Presumably most of these households are associated with dairy farms. Most farm households that consume home-produced foods are engaged in farming as an occupation rather than a means of subsistence.

The data indicate that individual consumption of home-produced foods is

[318] Area source incinerators that were identified included commercial incinerators and on-site incinerators at U.S. Department of Defense installations.

[319] This is also consistent with the assumption made in the cost and economic analysis that facilities that are currently emitting below the design level will not need to retrofit using new control technology.

[320] See ''Final technical Support Document for HWC MACT Standards, Volume V: Emission Estimates and Engineering Costs.'' July, 1999.

[321] EPA published the new exposure factor information in the ''Exposure Factors Handbook,'' EPA/600/P–95/002Fb, August, 1997.

higher than consumption of the same foods in the general populace. We have used the information on home-produced foods to estimate the exposures to farm households and to households engaged in subsistence farming. Only the primary food commodity produced on the farm was assumed to be consumed by farm households. In contrast, a wide variety of foods was assumed to be produced and consumed by households engaged in subsistence farming.

E. How Were Risks from Mercury Evaluated?

Commenters viewed the absence of a quantitative assessment of risks from mercury as a significant failing at proposal. However, a number of issues related to assessing risks from mercury had not been adequately resolved at the time of proposal that would have allowed us to proceed with a quantitative analysis. We have since issued our Mercury Study Report to Congress, a study that has been subject to extensive peer review, and the Utility Study Report to Congress.[322] [323] With today's rule, we conclude that sufficient technical basis exists for conducting a quantitative assessment of mercury risks from hazardous waste combustors. We recognize, however, that significant uncertainties remain and the results of our mercury analysis should be interpreted with caution and be used only qualitatively.

Although the mercury analysis that accompanies today's rule is patterned after the analysis done for the Mercury Study, there are differences between the two studies in the methods used. The model we used for evaluating the fate and transport of mercury in lakes is the same as the IEM–2M model used in the Mercury Study Report to Congress. However, modifications were made to adapt it for use with rivers and streams.[324] Both studies used the ISC air dispersion model for modeling wet deposition of mercury. However, for the Mercury Study the ISC model was modified to include dry deposition of mercury vapor whereas, for the current analysis, we used a simplified treatment of dry vapor deposition. In the Mercury Study, air modeling was carried out to a distance of 50 kilometers whereas, for the current analysis, air modeling (and, therefore, the effective size of the modeled watersheds) was limited to a distance of 20 kilometers. Long-range transport of mercury emissions (beyond 50 kilometers) was considered in the Mercury Study but was not included in the current analysis. In the Mercury Study, a large number of different sources were investigated to identify whether reductions in anthropogenic or environmental sources of mercury would reduce the total exposures of mercury to the general population. The current analysis was designed to assess what reductions may occur in incremental exposures from specific industrial sources of mercury to specific individuals rather than what reductions would occur in total exposures of mercury. Also, the Mercury Study modeled exposures under varying background assumptions, but the current analysis did not assess the impact that variable background concentrations would have on the risk results. In addition, the Mercury Study received external peer review, whereas we have not conducted an external peer review of the current analysis.

In addition, there are a variety of uncertainties related to the fate and transport of mercury in the environment, such as the deposition of mercury emitted to the atmosphere via wet and dry removal processes, the transport of mercury deposited in upland areas of a watershed to a body of water, and the disposition of mercury in the water body itself, including methylation and demethylation processes, sequestering in the water column and sediments, and uptake in aquatic organisms. Furthermore, the form of mercury emitted by a given facility is thought to be a determining factor in the fate and transport of mercury in the atmosphere. Only limited data are available on the form of the mercury emitted from hazardous waste combustors. A more complete discussion of the uncertainties related to the fate and transport of mercury may be found in the Mercury Study Report to Congress.

Also important to consider is that the reference dose for methyl mercury represents a ''no-effects'' level that is presumed to be without appreciable risk. We used an uncertainty factor of 10 to derive the reference dose for methyl mercury from a benchmark dose that represents the lower 95% confidence level for the 10% incidence rate of neurologic abnormalities in children.[325] Therefore, there is a margin of safety between the reference dose and the level corresponding to the threshold for adverse effects, as indicated by the human health data. Furthermore, we applied the reference dose, which was developed for maternal exposures, to childhood exposures. This introduces additional uncertainty in the risk estimates for children. Additional uncertainties associated with assessing individual mercury risks to nonsubsistence populations and subsistence receptors are discussed under the ''Human Health Risk Characterization'' section below.

We do not know the direction or magnitude of many of the uncertainties discussed above and did not attempt to quantify the overall uncertainty of the analysis. Thus, the cumulative impact of these uncertainties is unknown, and the uncertainties implicit in the quantitative mercury analysis continue to be sufficiently great so as to limit its ultimate use for decision-making. Therefore, we have used the quantitative assessment to make qualitative judgments about the risks from mercury but have not relied on the quantitative assessment (nor do we believe it is appropriate) to draw quantitative conclusions about the risks associated with particular national emissions standards.

F. How Were Risks From Dioxins Evaluated?

Few changes have been made to the methods used for assessing risk from dioxins since proposal. Some commenters thought we should modify the toxicity equivalence factors that are used to characterize the relative risk from 2,3,7,8-chlorine substituted congeners relative to that from 2,3,7,8,-tetrachlorodibenzo(p)dioxin. As a matter of policy, we continue to use the international consensus values that were published by EPA in 1989. We are aware that revisions to the toxicity equivalence factors are being considered by the international scientific community. However, we have not adopted revised values and continue to use the 1989 toxicity equivalence factors.

We have changed the data being relied upon to characterize the bioaccumulation of dioxins in fish. Specifically, we believe that the biota-

[322] ''Mercury Study Report to Congress, Volume III: Fate and Transport of Mercury in the Environment,'' U.S. Environmental Protection Agency, EPA–452/R–97–005, December 1997.

[323] ''Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units—Final Report to Congress,'' U.S. Environmental Protection Agency, EPA–453/R–98–004a and b, February 1998.

[324] For a discussion of the mercury surface water model, see the background document, ''Human Health and Ecological Risk Assessment Support to the Development of Technical Standards for Emissions from Combustion Units Burning Hazardous Wastes: Background Document—Final Report,'' July, 1999.

[325] The uncertainty factor is intended to cover three areas of uncertainty: Lack of data from a two-generation reproductive assay; variability in the human population, in particular the wide variation in the distribution and biological half-life of methyl mercury; and lack of data on long term sequelae of developmental effects.

sediment accumulation factors used at proposal, which were derived from data for the Great Lakes, significantly understate the bioaccumulation potential in aquatic systems that have recent and ongoing contamination. Studies in Sweden and elsewhere show that where contamination is ongoing, biota-sediment accumulation factors may be higher by as much as an order of magnitude or more relative to the Great Lakes and other aquatic systems where levels in biota are influenced primarily by past contamination. For the risk assessment for today's rule, biota-sediment accumulation factors were derived from data collected by the Connecticut Department of Environmental Protection. The Connecticut study, which is discussed in detail in the dioxin reassessment, involved extensive monitoring of soils, sediments, and fish near resource recovery facilities operating in the state.[326] The data show biota-sediment accumulation factors that are a factor of two to nine times higher (depending on the individual congener) than those used previously.

G. How Were Risks from Lead Evaluated?

Risks from exposures to lead were assessed at proposal by comparing model-predicted lead levels in soil to a health-based soil benchmark criterion. Commenters pointed out that there are pathways of exposure other than those related to soils and that we should look at the overall impact of lead emissions on blood lead levels in children. We agree with these comments and have modified the risk assessment to include other pathways of exposure such as inhalation and dietary exposures, in addition to soil ingestion. The revised assessment employs the Intake/Exposure Uptake BioKinetic model to assess the incremental impact of lead intake on blood lead levels in children. The results of the blood lead modeling are used together with information on background levels of blood lead in the general population to estimate the number of children whose blood levels exceed 10 micrograms per deciliter. Our goal is to reduce children's blood lead to below this level.

H. What Analytical Framework Was Used To Assess Human Exposures and Risk?

As a result of the public and peer review comments received on the risk assessment at proposal, we modified the analysis to focus on the entire population of persons that are exposed to facility emissions rather than persons living on a few individual farms and residences. A study area was defined for each sample facility as the area surrounding the facility out to a distance of 20 kilometers (or about 12 miles). All persons residing within the study area were included in the analysis.[327] The study area was divided up into sixteen (16) sectors defined by the intersection of rings at two, five, ten and twenty kilometers and radii extending to the north, south, east, and west. For each sector, census data were used to estimate the population of those persons living in farm households by type of farm and the population of those persons living in non-farm households. Census data were also used to determine the age of all household members. Four age groups were delineated: Preschoolers (0 to 5 years), preteens (6 to 11 years), adolescents (12 to 19 years) and adults (20 years and older).

Within each study area, three or four bodies of water were chosen for analysis based on their proximity to the sample facility and the likelihood of their being used for recreational purposes, as indicated by factors such as size and accessibility. Water bodies were also chosen if they were used to supply drinking water to the surrounding community. The watershed of each water body was delineated out to a distance of 20 kilometers from the facility.

We conducted a multi-pathway exposure analysis for all the human receptors considered in the risk assessment. Household members regardless of the type of household were assumed to be exposed to facility emissions through direct inhalation and incidental ingestion of soil. In addition, in study areas where surface waters are used for drinking water, household members were also assumed to be exposed through tap water ingestion. A portion of non-farm households were assumed to engage in home gardening based on the prevalence of home gardening in national surveys. Farm households were assumed to consume the primary food commodity produced on the farm. This contrasts with the subsistence farmer who was assumed to consume predominantly home-produced foods, including meat, milk, poultry, fish, and eggs, as well as fruits and vegetables. For the purpose of characterizing the range of risks that could result from subsistence farming, it was assumed that a subsistence farm was located in every sector in a given study area. A portion of the households in each study area were assumed to engage in recreational fishing based on the prevalence of recreational fishing in national surveys. It was assumed that individual recreational anglers would fish at all of the water bodies delineated in a given study area. In contrast, households engaged in subsistence fishing were assumed to consume fish from only a single body of water. For the purpose of characterizing the range of risks that could result from subsistence fishing, the assumption was made that every body of water delineated in a given study area was used for subsistence fishing.

Air dispersion and deposition modeling were performed for each study area at all sample facilities using facility-specific information on stack configuration and emissions, along with site-specific meteorological data, terrain data (in areas of elevated terrain), and land use data. Air modeling was conducted to a distance of 20 kilometers. Long-range transport of emissions beyond this distance was not considered. Bioaccumulation in the terrestrial food chain was modeled from estimates of deposition and uptake in plants and subsequent uptake in agricultural livestock from consumption of forage and silage. Bioaccumulation in the aquatic food chain was modeled from estimates of deposition to watershed soils (and subsequent soil erosion and runoff) and direct deposition to water bodies and subsequent uptake in fish. Surface water modeling was conducted for each body of water using site-specific information relative to watershed size, surface runoff, soil erosion, water body size, and dilution flow.

Exposure modeling was performed using central tendency exposure factors (*e.g.*, duration of exposure and daily food intake) for all receptor populations. As noted below, an exposure variability analysis was also performed for selected constituents and receptor populations using exposure factor distributions. Exposure pathways varied depending on the particular human receptor and the types of activities that lead to human exposures. Age-specific rates of mean daily food intake and media contact rates, in conjunction with sector-specific media concentrations and concentrations in food, were used

[326] "Estimating Exposure to Dioxin-Like Compounds, Volume III: Site-Specfic Assessment Procedures, U.S. Environmental Protection Agency, External Review Draft, EPA/600/6–88/005Cc, June 1994

[327] Because the analysis at proposal indicated that exposures beyond 20 kilometers were well below levels of concern, we did not consider persons exposed to facility emissions that are transported beyond 20 kilometers. Also, as discussed elsewhere, the risk assessment was peer reviewed in accordance with EPA guidelines, and peer reviewes did not comment that the range of the local scale study area was insufficient (or recommend that it be increased to 50 or more kilometers).

to calculate the total (administered or potential) dose from all exposure pathways combined. Lifetime average daily dose was used as the exposure metric for assessing cancer risk and average daily dose (reflecting less than lifetime exposure) was used for assessing risks of non-cancer effects.

We estimated the risk of developing cancer from the estimated lifetime average daily dose and the slope of the dose-response curve. A cancer slope factor is derived from either human or animal data and is taken as the upper bound on the slope of the dose-response curve in the low-dose region, generally assumed to be linear, expressed as a lifetime excess cancer risk per unit exposure. Total carcinogenic risk was determined for each receptor population assuming additivity. The same approach was used for estimating cancer risks in both adults and children. This is also the same approach we used at proposal for estimating lifetime cancer risks stemming from childhood exposures. However, individuals exposed to carcinogens in the first few years of life may be at increased risk of developing cancer. For this reason, we recognize that significant uncertainties and unknowns exist regarding the estimation of lifetime cancer risks in children. Although the risk assessment at proposal was externally peer reviewed, EPA's charge to the peer review panel did not specifically identify the issue of cancer risk in children and the peer review panel did not address it.

To characterize the potential risk of non-cancer effects, we compared the average daily dose (reflecting less than lifetime exposure) to a reference dose and expressed the result as a ratio or hazard quotient. The reference dose is an estimate of a daily exposure to the human population, including sensitive subgroups, that is likely to be without an appreciable risk of deleterious effects during a lifetime. The hazard quotient, by indicating how close the average daily dose is to the reference dose, is a measure of relative risk. However, the hazard quotient is not an absolute measure of risk. For inhalation exposures, we compared modeled air concentrations to a reference concentration and expressed the result as a ratio or inhalation hazard quotient. The reference concentration is an estimate of a concentration in air that is likely to be without an appreciable risk of deleterious effects in the human population, including sensitive subgroups, from continuous exposures over a lifetime. In addition, inhalation and ingestion hazard indices were generated for each receptor population by adding the constituent-specific hazard quotients by route of exposure. The hazard index is an indicator of the potential for risk from exposures to chemical mixtures.

For dioxins, we used a margin of exposure approach to assess the potential risks of non-cancer effects. The average daily dose, in terms of 2,3,7,8-TCDD toxicity equivalents (TEQ), was compared to background TEQ exposures in the general population and expressed as a ratio or incremental margin of exposure. An incremental margin of exposure was generated for infants exposed through intake of breast milk and for other age groups exposed through dietary intake and other pathways of exposure. For lead, we characterized the risk of adverse effects in children by modeling body burden levels in blood that result from intake of lead in the diet, direct inhalation, and incidental soil ingestion and comparing these levels to levels at which community-wide efforts aimed at prevention of elevated blood levels are indicated.

Distributions of individual risk were generated for a given category of sources by weighting the individual risks using sector-specific population weights and facility-specific sampling weights. Such distributions, which were derived using central tendency exposure factors, were generated for all constituents and receptor populations. In addition, for those receptor populations and chemical constituents that exhibited risks within an order of magnitude of a potential level of concern (using central tendency exposure factors), we performed an exposure variability analysis. Normalized, age-specific distributions of food intake and exposure duration were used to adjust the risk estimates to generate a distribution of risks in each sector. For children, food intake changes significantly with age, which can affect the lifetime average daily dose. To adjust for this, a life table analysis was conducted in which individuals were followed over the duration of exposure to arrive at an age adjustment factor. The individual sector distributions were combined for a given source category using Monte Carlo sampling and the appropriate sector-specific population weights and facility-specific sampling weights.

Estimates of population risk, or the incidence of health effects in the exposed population, were made for selected receptor populations and chemical constituents. Local excess cancer incidence was estimated from the mean individual risk for a given sector and the number of persons who reside in a sector. These sector-specific cancer incidence rates were then adjusted using facility-specific sampling weights and summed for a given category of sources. Cancer incidence associated with the consumption of dioxin contaminated beef, pork, and milk by the general population was estimated at the sector level from the number of dairy cattle and the number of beef cattle and hogs slaughtered annually, adjusted using facility-specific sampling weights, and summed by source category. Excess incidence of lead poisoning in children (over and above background) was estimated at the sector level from the intake of lead in the diet, direct inhalation, and incidental soil ingestion, adjusted using facility-specific sampling weights, and summed.

Generally speaking, incidence rates for non-cancer effects can be estimated from the number of persons exposed above the reference dose (*i.e.*, the number of exceedances) and the annual turnover in the exposed population. However, non-cancer incidence rates of interest, such as the incidence of exceedances of the methyl mercury reference dose from consumption of freshwater fish, could not be estimated due to the difficulty in determining the number and frequency of visits made by recreational anglers to a given body of water. However, by making certain assumptions, it was possible to make an estimate of the portion of recreational anglers who consume fish from local water bodies that may be at risk.[328]

Due to concerns of commenters about the representativeness of the risk assessment, we also made estimates of confidence intervals about the risk estimates. Estimation of confidence intervals was made possible by virtue of the sampling design used for facility selection. The confidence intervals quantify the magnitude of the uncertainty of the risk estimates associated with sampling error only. We emphasize that the confidence intervals do not reflect other sources of uncertainty, which may be of considerably greater magnitude.

In addition to the risk estimates for individual chemical constituents, we estimated the incidence of excess mortality and morbidity associated with particulate matter emissions. Mortality and morbidity estimates were made for children and the elderly, as well as the general population, using concentration-response functions derived from human epidemiological studies. Incidence rates

[328] The assumption is that fishing activity typical of recreational fishing takes place only at the particular water bodies delineated in the analysis.

in a given sector were estimated from the size of the exposed population, including susceptible populations such as children and the elderly, and either annual mean PM_{10} and $PM_{2.5}$ concentrations or distributions of daily PM_{10} and $PM_{2.5}$ concentrations. Morbidity effects include respiratory and cardiovascular illnesses requiring hospitalization, as well as other illnesses not requiring hospitalization, such as acute and chronic bronchitis, acute upper and lower respiratory symptoms, and asthmatic attacks. As with other incidence estimates, sector-specific incidence rates were adjusted using facility-specific sampling weights and summed for a given source category.

I. What Analytical Framework Was Used to Assess Ecological Risk?

Public comments on the ecological assessment at proposal expressed the view that we should expand the assessment beyond water quality criteria. We agree with these commenters and have extended the ecological analysis to include the use of soil and sediment criteria, in addition to water quality criteria. Also, the analysis was expanded to include additional metals that are of ecological concern, such as mercury and copper.

The ecological assessment represents a screening level analysis that uses media-specific ecological criteria thought to be protective of a range of ecological receptors. Modeled surface water concentrations were compared to water quality criteria protective of aquatic life, such as algae, fish, and aquatic invertebrates, as well as piscivorous wildlife. Similarly, modeled soil concentrations were compared to soil criteria protective of the terrestrial soil community, as well as terrestrial plants and mammalian and avian wildlife. Modeled sediment concentrations were compared to sediment criteria protective of the benthic aquatic community. As a screening level analysis, we did not attempt to determine whether the specific ecological receptors upon which the media-specific criteria are based are actually present at a given site. Furthermore, we did not ascertain the occurrence of threatened or endangered species at individual sites. However, the ecological receptors upon which the media-specific criteria are based are commonly occurring species and may not be any less sensitive than other species and may be more sensitive than some, including perhaps threatened or endangered species.[329]

II. How Were Human Health Risks Characterized?

This section describes the conclusions of the human health risk assessment. For a full discussion of the methodology and the results of the assessment, see the background document for today's rule.[330]

A. What Potential Health Hazards Were Evaluated?

This section summarizes the potential health hazards from exposures to emissions from hazardous waste combustors, in particular the human health hazards associated with the chemical constituents evaluated in the risk assessment, including dioxins, mercury, lead, other metals, hydrogen chloride and chlorine, and particulate matter.

1. Dioxins

A large body of evidence demonstrates that chlorinated dibenzo(p)dioxins and dibenzofurans can have a wide variety of health effects, ranging from cancer to various developmental, reproductive and immunological effects. Dioxins are persistent and highly bioaccumulative in the environment and most human exposures occur through consumption of foods derived from animal products such as meat, milk, fish, poultry, and eggs. In 1985, we developed a carcinogenic slope factor for 2,3,7,8-TCDD of 1.56e–4 per picogram per kilogram body weight per day.[331] The slope factor represents the 95 percent upper confidence limit estimate of the lifetime excess cancer risk. Re-analysis of data from laboratory animals and cancer in humans lends support to the slope factor derived in 1985, and we continue to use the 1985 estimate pending completion of our dioxin reassessment.[332] [333]

For non-cancer effects, we believe it is inappropriate to develop a reference dose, or level which is without appreciable risk, using standard uncertainty factors. This is due to the high levels of background exposures in the general population and the low levels at which effects have been seen in laboratory animals. Instead, we have chosen to use a margin of exposure approach in which the average daily dose from a given facility is compared to the average daily dose in the general population. The ratio of the two represents the incremental margin of exposure and, as such, measures the relative increase in exposures over background.

2. Mercury

The most bioavailable form of mercury is methyl mercury, and most human exposures to methyl mercury occur through consumption of fish. Methyl mercury is known to cause neurological and developmental effects in humans at low levels. The most susceptible human population is thought to be developing fetuses. We have developed a reference dose for methyl mercury of 0.1 microgram per kilogram body weight per day that is presumed to be protective of the most sensitive human populations.[334] The reference dose is based on neurotoxic effects observed in children exposed *in utero.* Although epidemiological studies in fish-eating populations are ongoing, we believe that the reference dose is the best estimate at the present time of a daily exposure that is likely to be without an appreciable risk of deleterious effects. However, because it was derived from maternal exposures, application of the reference dose to assess children's exposures carries with it additional uncertainty beyond that otherwise related to the data and methods used for its development.

3. Lead

Exposures to lead in humans are associated with toxic effects in the nervous system at low doses and at higher doses in the kidneys and cardiovascular system. Infants and children are particularly susceptible to

[329] Multiple ecological criteria were available for most constituents and the lowest criteria were used to establish the media-specific values that were in the eco-analysis. In addition, ecotoxicological benchmarks for mammals and birds were typically derived from studies involving measures of reproductive success.

[330] ''Human Health and Ecological Risk Assessment Support to the Development of Technical Standards for Emissions from Combustion Units Burning Hazardous Wastes: Background Document—Final Report,'' July 1999.

[331] USEPA, ''Health Assessment Document for Polychlorinated Dibenzo-p-Dioxins,'' EPA/600/8–84–014F, September 1985.

[332] USEPA, ''Health Assessment Document for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds,'' External Review Draft, EPA/600/BP–92/001b, June 1994.

[333] USEPA, ''Dose Response Modeling of 2,3,7,8–TCDD,'' Workshop Review Draft, EPA/600/P–92/100C8, January 1997.

[334] USEPA, ''Mercury Study Report to Congress,'' EPA–452/R–97–007, December 1997.

[335] For a complete description of the derivation of the chronic toxicity benchmark for chlorine, see the

the effects of lead due to behavioral characteristics such as mouthing behavior, heightened absorption in the respiratory and gastrointestinal tracts, and the intrinsic sensitivity of developing organ systems. Symptoms of neurotoxicity include impairment in psychomotor, auditory, and cognitive function. These effects extend down to levels in blood of at least 10 micrograms lead per deciliter. Impairment of intellectual development, as measured by standardized tests, is thought to occur at levels below 10 micrograms per deciliter. Maternal lead exposure has been shown to be a risk factor in premature infant mortality, lead being associated with reduced birth weight and decreases in gestational age. Lead has also been associated with hypertension in both men and women and, as such, may be a risk factor for coronary disease, stroke, and premature mortality. Although dose-response relationships have been developed between blood lead levels and many of these health effects, EPA has not applied the relationships in the HWC risk analysis due to uncertainties related to the relatively small changes in blood lead expected to occur as a consequence of the MACT standards and the uncertain significance of any health benefits that might be attributed to such changes. Instead, our characterization of risks from lead focuses on the reductions in blood levels themselves and EPA's goal of reducing blood lead in children to below 10 micrograms per deciliter.

4. Other Metals

Metals that pose a risk for cancer include arsenic, cadmium, and chromium. Human epidemiological studies have shown an increase in lung cancer from inhalation exposures to arsenic, primarily in occupationally exposed individuals, and multiple internal cancers (such as liver, lung, kidney, and bladder), as well as skin cancer, from exposures to arsenic through drinking water. Human epidemiological studies have also shown an association between exposures to cadmium and lung cancer in occupational settings. These studies have been confirmed by animal studies which have shown significant increases in lung tumors from inhalation exposures to cadmium. However, cadmium administered orally has shown no evidence of carcinogenic response. A strong association between occupational exposures to chromium and lung cancer has been found in multiple studies. Although workers were exposed to both trivalent and hexavalent chromium, animal studies have shown that only hexavalent chromium is carcinogenic. There have been no studies that have reported that either hexavalent or trivalent chromium is carcinogenic by the oral route of exposure.

Other metals may pose a risk of noncancer effects. For example, in animal studies thallium has been shown to have ocular, neurological, and dermatological effects and effects on blood chemistry and the reproductive system. Signs and symptoms of similar and other effects have been observed in occupational studies of thallium exposures.

5. Hydrogen Chloride

Data on the effects of low-level inhalation exposures to hydrogen chloride are limited to studies in laboratory animals. Based on a lifetime study in rats which showed histopathological changes in the nasal mucosa, larynx, and trachea associated with exposures to hydrogen chloride, we estimated a reference concentration of 0.02 milligrams per cubic meter. The reference concentration was derived from a human equivalent lowest observed adverse effects level of 6 milligrams per cubic meter using an uncertainty factor of 300 to account for extrapolation from a lowest observed adverse effects level to a no observed adverse effects level, as well as extrapolation from animals to humans (including sensitive individuals).

6. Chlorine

Chlorine gas is a potent irritant of the eyes and respiratory system. Based on a lifetime study in rats and mice which showed histopathological changes affecting all airway tissues in the nose, we derived an interim chronic toxicity benchmark for chlorine gas of 0.001 milligrams per cubic meter. This value was derived from a human equivalent no observed adverse effects level of 0.04 milligrams per cubic meter and an uncertainty factor of 30 to account for extrapolation from animals to humans (including sensitive individuals). The human equivalent no observed adverse effects level from this study is also supported by a year-long study in monkeys.[335]

[335] For a complete description of the derivation of the chronic toxicity benchmark for chlorine, see the background document, ''Human Health and Ecological Risk Assessment Support to the Development of Technical Standards for Emissions from Combustion Units Burning Hazardous Wastes: Background—Final Report,'' July, 1999.

B. What Are the Health Risks to Individuals Residing Near HWC Facilities?

In this section, we address risks to populations that could be enumerated using estimation methods based on U.S. Census data and Census of Agriculture data. Estimates of the population of persons residing within 20 kilometers of hazardous waste combustion facilities were made for beef, dairy, produce, and pork farming households and for non-farm households. The number of home gardeners was estimated using national survey data on the portion of households that engage in home gardening. Estimates were made for each of four different age groups. In addition, population estimates were made for recreational anglers age 16 and older based on U.S. Fish and Wildlife Service survey data on recreational fishing and hunting.[336]

The risks to individuals of carcinogenic effects are expressed as the estimated increase in the probability that an individual will develop cancer over a lifetime. For non-cancer effects, risks are expressed as a hazard quotient, which is the ratio of an estimate of an individual's exposure to a health benchmark thought to be without appreciable risk. Both cancer and non-cancer risks are summarized in terms of percentiles of the national distribution of risks to individuals across a combustor category. High end risks are represented by the 90th to 99th percentiles of the distribution. Distributions for only the most highly exposed receptor populations are discussed here. The most highly exposed population varies depending on the particular chemical constituent, its fate and transport in the environment, and the pathways that lead to human exposures. Also, 90 percent confidence limits are estimated for each percentile. The size of the confidence interval reflects sampling error which is introduced by not sampling all the facilities in a given category of sources.[337] In some instances, estimates of the 90 percent confidence limits could not be made either because there were too few data points or there was insufficient spread in the data. For lightweight aggregate kilns, there is no sampling error because the sample included all known

[336] However, it was not possible to determine the number of recreational anglers that fish specifically at water bodies located in the vicinity of hazardous waste combustion facilities, such as those that were selected for modeling analyses.

[337] A 90 percent confidence interval indicates that there is a 10 percent chance that the actual value could lie outside the interval indicated, either higher or lower.

hazardous waste burning lightweight aggregate kilns.

1. Dioxins

For dioxins, our analysis shows that the most exposed population is children of dairy farmers who consume home-produced milk. High exposures were estimated for this population due to the relatively high consumption of milk by households that consume home-produced milk, the relatively high intake of milk by children compared to other age groups, and the tendency of chlorinated dioxins and furans to bioaccumulate in milk fat. A distribution of cancer risks for dioxins was generated which reflects variability in individual exposures due to site-specific differences in dioxin emissions, location of exposure, and other factors, as well as differences between individuals in exposure factors such as the length of exposure and the amount of milk consumed.

As a result of today's rule, we project that high end lifetime excess cancer risks will be reduced in this population from 2 in 100,000 (99th percentile) for both lightweight aggregate kilns and incinerators with waste heat recovery boilers to below one in one million (99th percentile) for lightweight aggregate kilns and 1 in one million (99th percentile, 90 percent upper confidence limit of 2 in one million) for incinerators with waste heat recovery boilers. For cement kilns, high end lifetime excess cancer risks are reduced only slightly, from 7 in one million (99th percentile) to 5 in one million (99th percentile). These reductions, which represent the reduction in the increment of exposure that results from dioxin emissions from hazardous waste combustors, are relatively small in relation to background exposures to dioxins generally. Considering that the number of individuals in the affected population is relatively small, only a few individuals may benefit from such reductions.

We also project that the incremental margin of exposure relative to background will be reduced in the same population from 0.2 (99th percentile for lightweight aggregate kilns) and 0.3 (99th percentile for incinerators with waste heat recovery boilers, 90 percent upper confidence limit of 0.5) to below 0.1 across all categories of combustors. Therefore, the risks associated with non-cancer effects from hazardous waste combustors are an order of magnitude or more lower than any (unknown and unquantifiable) risks that may be attributable to background exposures.

Unlike the distribution of cancer risks, the distribution of the margin of exposure reflects only site-to-site differences and does not reflect differences between individuals in the amount of milk consumed. Therefore, the exposures at the upper percentiles are likely to be underestimated.[338] Additional uncertainty is introduced because background exposures to dioxins in children have not been well characterized.

Other uncertainties include milk consumption rates and the limitations of the data available to assess consumption of home-produced milk. In addition, there are a variety of uncertainties related to the fate and transport of dioxins in the environment, including partitioning behavior into vapor and particle phases following release to the atmosphere and subsequent deposition via various wet and dry removal processes, uptake in plants such as forage and silage used by dairy cows for grazing and feeding, and the factors which affect the disposition of dioxins in dairy cattle and the extent of bioaccumulation in cow's milk.

2. Mercury

For mercury, our analysis shows that the most exposed population is recreational anglers and their families who consume recreationally-caught freshwater fish. This is because methyl mercury is readily formed in aquatic ecosystems and bioaccumulates in fish. Children have the highest exposures due to their higher consumption of fish, relative to body weight, compared to adults. Risks from exposures to methyl mercury are expressed here in terms of a hazard quotient, which is defined as the ratio of the modeled average daily dose to our reference dose. Although the reference dose was developed to be protective of exposures *in utero*, we applied the reference dose not just to maternal exposures but also to non-maternal adult and childhood exposures based on the presumption that the reference dose should be protective of neurological and developmental effects in these populations as well.

A distribution of hazard quotients was generated that reflects variability in individual exposures due to site-specific differences in mercury emissions, location of water bodies, and other factors, as well as differences between individuals in the amount of fish consumed. Other factors, such as water body-specific differences in the extent of methylation of inorganic mercury and the age and species of fish consumed were not reflected in the risk distribution. However, it is unclear what effect such factors would have on the distribution given the high degree of variability that is attributable to the factors that were considered in our analysis.

The results of our quantitative analysis for mercury are as follows. For cement kilns, we project that high end hazard quotients in adults will be reduced from a range of 0.09 to 0.4 (90th percentile, upper confidence limit of 0.1, and 99th percentile, respectively) at baseline to a range from 0.06 to 0.2 under today's rule (90th percentile, upper confidence limit of 0.08, and 99th percentile, respectively). In children, high end hazard quotients are projected to be reduced from a range of 0.2 to 0.8 (90th percentile, upper confidence limit of 0.3, and 99th percentile, respectively) at baseline to a range of 0.2 to 0.6 under today's rule (90th percentile, upper confidence limit of 0.2, and 99th percentile, respectively). For lightweight aggregate kilns, high end hazard quotients in both adults and children are below 0.1 at baseline and under today's rule. For incinerators, high end hazard quotients are below 0.01 in adults and below 0.1 in children at baseline and under today's rule. Taken together, these results appear to suggest that risks from mercury emissions (on an incremental basis) are likely to be small, although we cannot be certain of this for the reasons discussed below.

The risk results for mercury are subject to a considerable degree of uncertainty. In addition to the uncertainties discussed above in ''Overview of Methodology—Mercury'', there are other uncertainties when assessing individual mercury risks to nonsubsistence populations. In order to assess exposures to mercury emissions, we assumed that recreational anglers fish only at the water bodies within a given study area that were selected for modeling (and at no other water bodies) and that the extent of fishing activity at a given water body is related to the size of the water body.[339] As a result, in those situations where relatively low fish concentrations were modeled (and particularly if the water body was relatively large), a large portion of fish were assumed to have relatively low levels of mercury contamination and, therefore, recreational anglers who consume relatively large amounts of recreationally-caught fish were estimated to have relatively low levels

[338] The precise extent of underestimation at the upper percentiles associated with variability in milk consumption is unknown but is expected to be a factor of two.

[339] Ideally, detailed information on the fishing activities of individual anglers, including the size of the catch taken from individual locations, would be used to better assess exposures from consumption of recreationally-caught fish.

of exposure. In reality, some portion of the fish consumed by recreational anglers is likely to be contaminated with mercury at levels typical of background conditions. The effect of such background exposures is to increase actual exposures, except perhaps at the high end of the exposure distribution.[340]

We believe that the uncertainties implicit in the quantitative mercury analysis continue to be sufficiently great so as to limit its ultimate use for decision-making. Therefore, we have used the quantitative analysis to make qualitative judgments about the risks from mercury but have not relied on the quantitative analysis (nor do we believe it is appropriate) to draw quantitative conclusions about the risks associated with the MACT standards.

3. Lead

For lead, children are the population of primary concern for several reasons, including behavioral factors, absorption, and the susceptibility of the nervous system during a child's development. We have chosen to use blood lead level as the exposure metric, consistent with the U.S. Centers for Disease Control criteria for initiating intervention efforts. Lead exposures occur through a variety of pathways, including inhalation, incidental ingestion of soil and household dust, and dietary intake. Our analysis indicates that the population having the highest exposures are children who consume home-produced fruits and vegetables. However, children who do not consume home-produced foods also have relatively high exposures due to incidental ingestion of soil and household dust.

Blood lead distributions were generated that represent incremental exposures to lead emissions from hazardous waste combustors. These distributions reflect variability in individual exposures due to site-specific differences in lead emissions, location of exposure, and other factors, as well as differences between individual children in behavior patterns, absorption, and other pharmacokinetic factors. The IEUBK model that was used to estimate blood lead levels considers inter-individual variability in behavior related to lead exposure, such as mouthing activity. However, the model does not explicitly consider variability for the specific dietary pathways assessed for children of home gardeners, that is, consumption of home-produced fruits and vegetables. Therefore, the blood lead distributions may not fully reflect inter-individual variability that results from such individual differences.

Modeled blood lead (PbB) levels can be compared with background exposures in the same age group (children ages 0 to 5 years) in the general population. The median blood lead level in children in the general population is 2.7 micrograms per deciliter (μg/dL), and 4.4 and 1.3 percent of children have blood lead levels that exceed 10 and 15 μg/dL, the levels at which community wide prevention and individual intervention efforts, respectively, are recommended.[341] However, the percentages vary widely depending on such factors as race, ethnicity, income, and age of the housing units occupied. Children whose blood lead levels are already elevated are the most susceptible to further increases in blood lead levels.

As a result of today's rule, we project that high end (90th to 99th percentile) incremental blood lead (PbB) levels in children will decrease from 0.24 to 0.50 micrograms per deciliter to 0.02 to 0.03 μg/dL for cement kilns. For incinerators, incremental PbB levels are projected to decrease from 0.6 to 1.2 μg/dL (90th to 99th percentile) to 0.02 to 0.03 μg/dL. For lightweight aggregate kilns, incremental PbB levels are projected to decrease from 0.02 to 0.03 μg/dL (90th to 99th percentile) to less than 0.01 μg/dL under the MACT standards. Although these reductions in incremental exposures represent only a fraction of the PbB level of concern (10 μg/dL), they can be significant in children with PbB levels that are already elevated from exposures to other sources of lead. In addition, there is evidence that effects on the neurological development of children may occur at blood lead levels so low as to be essentially without a threshold. Under the MACT standards, blood lead levels attributable to HWCs will be one percent or less of background levels typical of children in the general population.

4. Other Metals

We assessed both direct and indirect human exposures to a dozen different metals in addition to mercury. Exposures to non-mercury metals are generally quite low. Under today's rule, we project that lifetime excess cancer risks from exposures to carcinogenic metals (i.e., arsenic) will be below 1 in 10 million for all source categories. Hazard quotients for all source categories are projected to be at or below 0.01 (99th percentile) for all non-mercury metals under the MACT standards. These risks reflect variability in individual exposures due to site-specific differences in emissions, location of exposure, and other factors. However, the risks do not reflect differences between individuals in exposure factors such as the length of exposure and the amount of food ingested. Therefore, we may have underestimated risks at the upper percentiles of the distribution.[342] A full exposure factor variability analysis was not carried out because the risks using mean exposure factors are comparatively low. Risks from exposure to metals are also subject to uncertainty related to modeling of fate and transport in the environment such as deposition of airborne metals to soils, forage, and silage and subsequent uptake in farm animals.

5. Inhalation Carcinogens

We also assessed the combined cancer risk associated with inhalation exposures to all inhalation carcinogens, assuming additivity of the risks from individual compounds. The populations that have the highest inhalation exposures are adult farm or non-farm residents. Adults have the longest exposure duration relative to other age groups and adult farmers have less mobility and, therefore, longer durations of exposure than non-farm residents. However, depending on the location of farms and non-farm households, adult non-farm residents can have lifetime average exposures that are as high as adult farm residents.

Under today's rule, we project that lifetime excess cancer risks from inhalation exposures will be below 1 in 10 million for all source categories. The risks for inhalation carcinogens reflect variability in individual exposures due to site-specific differences in metals emissions, location of exposure, and other factors. However, they do not reflect differences between individuals

[340] We have previously estimated that median exposures to methyl mercury in the general population from seafood consumption are in the range of 0.01 to 0.03 μg/kg BW/day (Mercury Study Report to Congress, December 1997). These exposures correspond to hazard quotients of 0.1 to 0.3, values which (except for cement kilns) are higher than the 90th to 99th percentile hazard quotients estimated here for incremental exposures among recreational anglers.

[341] Data from the Centers for Disease Control's National Health and Nutrition Examination survey (NHANES III, phase 2) conducted from October 1991 to September 1994.

[342] For dioxins, inclusion of exposure factor variability increased the risk of cancer at the upper (90th to 99th) percentiles by less than a factor of two to a factor of five. However, the effect on the distribution of risks could differ for metals depending on the health effect of concern (i.e., cancer versus non-cancer), the pathway of exposure, and relative differences in the site-to-site variability of emissions.

in the length of exposure or other exposure factors. Therefore, we may have underestimated risks at the upper percentiles of the distribution.[343] A full exposure factor variability analysis was not carried out for inhalation carcinogens because the risks using mean exposure factors are comparatively low.

Estimates of inhalation risks are subject to a number of uncertainties. Individuals spend a majority of their time indoors and it is uncertain how representative modeled, outdoor, ambient air concentrations are of concentrations indoors. Also, the daily activities of individuals living in the vicinity of a given facility will tend to moderate actual exposures compared to modeled exposures at a fixed location. Meteorological information was generally obtained from locations well removed from modeled facilities and, therefore, may not be representative of conditions in the immediate vicinity of the stack. Limited information was available on the size of structures located near or adjacent to stacks at the modeled facilities. Building downwash, that can result from the presence of such structures, may significantly increase ground-level ambient air concentrations, particularly at locations that are relatively close to the point of release. In addition, the effect of elevated terrain was only considered when the terrain rose above the height of the stack. However, elevated terrain below stack height can lead to an increase in ground-level concentrations depending on the distance from the stack. Nevertheless, our projections of inhalation cancer risks are sufficiently low that we do not believe the uncertainties introduced by these factors impacts our conclusion that these risks are relatively low.

6. Other Inhalation Exposures

Of the compounds we evaluated that are not carcinogenic, the highest inhalation exposures are for hydrogen chloride and chlorine gas. We express the risks from these in terms of an inhalation hazard quotient, which is defined as the ratio of the modeled air concentration to our reference concentration. The receptor population with the highest inhalation hazard quotients is variable and depends on site-to-site differences in the location of farm and non-farm households and differences in emissions. A distribution of hazard quotients was generated that reflects variability in individual exposures due to site-specific differences in chlorine emissions, location of exposure, and other factors. However, the distribution does not reflect individual differences in activity patterns or breathing rates.[344] Also, because the reference concentration is intended to be protective of long-term, chronic exposures over a lifetime, the distribution does not reflect temporal variations in exposure.[345]

Under today's rule, we project that inhalation hazard quotients will be at or below 0.01 for both hydrogen chloride and chlorine gas for all source categories. The same uncertainties related to indoor versus outdoor concentrations and atmospheric dispersion modeling are also applicable to hydrogen chloride and chlorine. However, our projections of non-cancer inhalation risks are sufficiently low that we do not believe the uncertainties impact our conclusion that these risks are relatively low.

C. What Are the Potential Health Risks to Highly Exposed Individuals?

We also assessed exposures to individuals that could be more highly exposed than the populations that could be characterized using census data. These include persons engaged in subsistence activities such as farming and fishing. Although the frequency of these activities is unknown, such activities do occur in some segments of the U.S. population, and we believe that it is important to evaluate risks associated with such activities. In addition, risks associated with subsistence farming place a bound on potential risks to farmers who raise more than one type of livestock. Information on the numbers of farms that produce more than one food commodity (*e.g.*, beef and milk) is not available from the U.S. Census of Agriculture. Therefore, in assessing risks to farm populations, we may have underestimated the risks to farmers and their families that consume more than one type of home-produced food commodity.

We assumed that subsistence farmers obtain substantially all of their dietary intake from home-produced foods, including meats, milk, poultry, fish, and fruits and vegetables. We used data on the mean rate of consumption of home-produced foods in households that consume home-produced foods to estimate the average daily intakes from subsistence farming. For subsistence fishing, we used data on the mean rate of fish consumption among Native American tribes that rely on fish for a major part of their dietary intake.

We do not have specific information on the existence or location of subsistence farms or water bodies used for subsistence fishing at sites where hazardous waste combustors are located. Therefore, we hypothetically assumed that subsistence farming does occur at each of the modeled facilities and, furthermore, that it occurs within each of the sixteen sectors within a study area. We also assumed that subsistence fishing takes places at each of the modeled water bodies. The results of the analysis are summarized in the form of frequency distributions of individual risk. The distributions must be interpreted in relation to the frequency of the modeled scenarios and not the likelihood of such exposures actually occurring.[346]

The risk results for subsistence receptors are highly uncertain, primarily due to the lack of information on the location of subsistence farms (or even the occurrence of subsistence farms within the study area of a given facility) and the assumption that individuals engaged in subsistence farming obtain essentially their entire dietary intake from home-produced foods.

1. Dioxins

Under today's rule, we project that lifetime excess cancer risks from dioxin exposures associated with subsistence farming will be below 1 in 100,000 for all categories of combustors, with the exception of cement kilns at the lowest frequency of occurrence. The lifetime excess cancer risk for cement kilns is estimated to be 2 in 100,000 at a frequency of 1 percent. This indicates that only 1 in 100 sectors are expected to have risks of this magnitude or greater, assuming that subsistence farms are located in all sectors at all hazardous waste burning cement kilns. However, because the sectors increase in size with increasing distance, the probability that a subsistence farm would be exposed to

[343] The precise extent of underestimation at the upper percentiles associated with variability in the duration of exposure is unknown but is expected to be a factor of three or less.

[344] Differences in breathing rates are not considered because the exposure factors used in deriving the reference concentration are fixed.

[345] Although short-term exposures to hydrogen chloride and chlorine gas resulting from routine releases can be significantly higher than long-term exposures, we do not believe that such exposures are high enough to pose a health concern because the threshold for acute effects is quite high in comparison to that for chronic effects.

[346] Moreover, the modeled scenarios cannot be considered equally probable because the sectors in which farms were located are of unequal area, being much smaller closer to a facility and much larger farther away and because any particular sector may be more or less likely to support farming activities depending on soils, precipitation, existing land uses, and other conditions. Similarly, the modeled water bodies may be more or less likely to support intensive fishing activity depending on their size, productivity, and other characteristics.

this level of risk is probably considerably less than 1 percent.

We project that the incremental margin of exposure relative to background will be reduced to 0.1 or below for incinerators under today's rule except at the lowest frequency of occurrence (*i.e.*, 1 percent) for which a margin of exposure of 0.2 is projected. However, the incremental margins of exposure for cement kilns and lightweight aggregate kilns are projected to remain above 0.1 at a frequency of 10 percent or greater (ranging up to 0.2 at a frequency of 5 percent for lightweight aggregate kilns and 0.7 at a frequency of 1 percent for cement kilns). This indicates that more than 1 in 10 sectors are expected to have risks associated with non-cancer effects that are within an order of magnitude of any (unknown and unquantifiable) risks that may be attributable to background exposures. However, for the reasons stated previously, the probability that a subsistence farm would be exposed to this level of risk is probably considerably lower than indicated by the number of sectors.

Under today's rule, we project lifetime excess cancer risks from dioxin exposures associated with subsistence fishing will be below 1 in one million for incinerators and lightweight aggregate kilns. For cement kilns, high end cancer risks under today's rule range from 3 in one million to 4 in one million (at frequencies of 10 and 5 percent, respectively) in adults and from 2 in one million to 4 in one million (at frequencies of 10 and 5 percent, respectively) in children (6 to 11 years of age). We project that the incremental margin of exposure relative to background will be below 0.1 for subsistence fishing for both children and adults for all categories of combustors under today's rule.

2. Metals

Our analysis indicates that the highest risks from metals (other than mercury) are from arsenic, thallium, and lead. Under today's rule, we project that lifetime excess cancer risks from arsenic exposures associated with subsistence farming will be below 1 in one million for all source categories. Hazard quotients for thallium are projected to be at or below 0.01 (99th percentile) under today's rule, except for cement kilns. For cement kilns, hazard quotients for thallium are projected to range from 0.03 to 0.4 (90th to 99th percentiles). Incremental blood lead levels are projected to be at or below 0.03 μg/dL for all source categories under today's rule. Blood lead at these levels are about one percent of background levels typical of children in the general population.

3. Mercury

From the results of our quantitative analysis we project that, under today's rule, hazard quotients for incremental exposures to mercury associated with subsistence fishing will be at or below 1 in both adults and children. These results apply to incinerators, lightweight aggregate kilns, and cement kilns at the very lowest frequency of occurrence that was analyzed (*i.e.*, 1 percent).

The risk results for mercury are subject to a considerable degree of uncertainty. In addition to the uncertainties discussed above in "Overview of Methodology—Mercury", there are other uncertainties when assessing individual mercury risks to subsistence receptors. We assumed that individuals engaged in subsistence fishing obtain all the fish they consume from a single water body. To the extent that individuals may fish at more than one water body, the effect of this assumption may be to exaggerate the risk from water bodies having relatively high modeled fish concentrations.

The uncertainties implicit in the quantitative mercury analysis continue to be sufficiently great so as to limit its ultimate use for decision-making. Therefore, we have used the quantitative analysis to make qualitative judgments about the risks from mercury but have not relied on the quantitative analysis (nor do we believe it is appropriate) to draw quantitative conclusions about the risks associated with the MACT standards.

D. What Is the Incidence of Adverse Health Effects in the Population?

We estimated the overall risk to human receptor populations for those chemical constituents that posed the highest individual risks and whose populations could be enumerated. These included excess cancer incidence in the general population from the consumption of agricultural commodities produced in the vicinity of hazardous waste burning facilities, excess cancer incidence in the local population, and excess incidence of children with elevated blood lead levels. In addition, we estimated the avoided incidence of mortality and morbidity in the local population associated with reductions in exposures to particulate matter emissions.[347] Incidence is generally expressed in terms of the annual number of new cases of disease in the exposed population. However, for diseases such as cancer which have a long latency period, the annual incidence represents the lifetime incidence associated with an exposure of one year. For diseases with recurring symptoms, the annual incidence represents the number of episodes of disease over a year's time.

1. Cancer Risk in the General Population

Agricultural commodities produced in the vicinity of hazardous waste combustors may be consumed by the general population (*i.e.*, individuals who reside outside the study area). Commodities such as meat and milk may be contaminated with dioxins and, therefore, pose some risk to individuals that consume them. We estimated the amount of "diet accessible" dioxin in meat and milk produced at hazardous waste combustors that would be consumed by the general population and estimated the number of additional cancer cases that could result from such exposures. The approach is predicated on the assumption that cancer risks follow a linear, no-threshold model in the low dose region.

Our agricultural commodity analysis indicates that, as a result of today's rule, annual excess cancer incidence in the general population will be reduced from 0.5 cases per year (90 percent confidence interval, 0.4 to 0.6) to 0.1 cases per year (90 percent confidence interval, 0.1 to 0.2). Most of the risk is associated with the consumption of milk and other dairy products. The combustor categories that contribute most to the reduction are incinerators with waste heat recovery boilers and lightweight aggregate kilns.

2. Cancer Risk in the Local Population

Individuals that live and work in the vicinity of hazardous waste combustors are exposed to a number of compounds that are carcinogenic by oral or inhalation routes of exposure or both. These include dioxin, arsenic, beryllium, cadmium, chromium, and nickel. We estimated the annual cancer incidence in each of the enumerated receptor populations based on the mean individual risk in each sector and sector-specific population estimates. The resulting incidence estimates were weighted using facility-specific sampling weights and summed.

Our analysis of cancer risks in the local population indicates that, as a result of today's rule, annual excess

[347] Excess incidence refers to the incidence of disease beyond that which would otherwise be observed in the population, absent exposures to the sources in question. Avoided incidence is the reduction in incidence of disease in the population that would be expected from a reduction in exposures to the sources in question.

cancer incidence will be reduced from 0.1 cases per year (90 percent confidence interval, 0.08 to 0.2) to 0.02 cases per year (90 percent confidence interval, 0.01 to 0.03). Nearly all of the risk reduction, which occurs almost entirely among non-farm residents, is attributable to incinerators and results mainly from reductions in emissions of metals, primarily arsenic, cadmium, and chromium.

3. Risks From Lead Emissions

Children that live near hazardous waste combustor are exposed to lead emissions through the diet and through inhalation and incidental soil ingestion. Children that already have elevated blood lead levels may have their levels further increased as a result of such exposures, some of whom may have their blood lead levels increased beyond 10 µg/dL. We estimated the increase, or excess incidence, of elevated blood levels above 10 µg/dL by estimating the number of children in each sector with blood lead levels above 10 µg/dL as a result of background exposure and subtracting that from the number of children above 10 µg/dL as a result of both background exposure and incremental exposures from hazardous waste combustors. This estimate represents the annual rate of increase in the number of children with elevated blood lead beyond background.

Our analysis indicates that, as a result of today's rule, the excess incidence of elevated blood lead will be reduced from 7 cases per year to less than 0.1 cases per year. The reduction is primarily attributable to incinerators, although a small reduction (0.4 cases per year) is attributable to cement kilns. These reductions occur entirely among non-farm residents. Children of minority and low income households generally have higher background exposures to lead and are more likely to have blood levels elevated above 10 µg/dL than children from other demographic groups and, therefore, are more likely to benefit from reductions in lead exposures. However, our analysis did not consider the influence of such socioeconomic factors. For this reason, we believe that we may have underestimated the reductions in excess incidence of elevated blood lead levels, including potential reductions attributable to cement kilns and lightweight aggregate kilns.

4. Risks From Emissions of Particulate Matter

Human epidemiological studies have demonstrated a correlation between community morbidity and mortality and ambient levels of particulate matter, particularly fine particulate matter (below 2.5 or 10 microns in diameter, depending on the study), across a wide variety of geographic settings. Lower particulate matter is associated with lower mortality, lower rates of hospital admissions, and a lower incidence of respiratory disease. Concentration-response functions for various health endpoints have been derived from these studies, and we used these functions to estimate the reduction in the incidence of mortality and morbidity associated with a reduction in emissions of particulate matter.

Our analysis indicates that, as a result of today's rule, there will be between 1 and 4 fewer premature mortalities per year associated with particulate matter emissions (depending on which study is used). In addition, we project there will be 6 fewer hospitalizations, 25 fewer cases of chronic bronchitis, 180 fewer cases of lower respiratory disease, per year.

The mortality estimates are subject to some uncertainty due to the fact that the lower estimate (which is derived from long-term studies) assumes no threshold for effects and the upper estimate (which is derived from short-term studies) may include mortalities that are premature by as little as a few days. The no threshold assumption may be appropriate, however, considering that the reduction in mortality is projected to occur entirely from incinerators, especially on-site incinerators. Such incinerators are located at manufacturing facilities that are likely to have other particulate matter emissions and both on-site, and commercial incinerators are typically located in industrial areas where there may be many other sources of particulate matter emissions, resulting in ambient particulate matter levels that are well above any threshold. Also, because the particulate matter modeling was conducted to 20 rather than 50 kilometers, the inhalation risks may be understated, especially from PM that is 2.5 microns in diameter and smaller which can be transported over long distances from HWCs.

III. What Is the Potential for Adverse Ecological Effects?

The ecological assessment is based on a screening level analysis in which model-estimated media concentrations are compared to media-specific ecotoxicological criteria that are protective of multiple ecological receptors. The analysis used an ecological hazard quotient as the metric for assessing ecological risk. The ecological hazard quotient is the ratio of the model-estimated media concentration to the ecotoxicological criterion. Hazard quotients above 1 suggest that a potential for adverse ecological effects may exist. Ecotoxicological criteria for soils, surface waters, and sediments were used in the analysis. Ecotoxicological criteria for soil are intended to be broadly protective of terrestrial ecosystems, including the soil community, terrestrial plants, and consumers such as mammals and birds. Ecotoxicological criteria for surface water are intended to be protective of the aquatic community, including fish and aquatic invertebrates, primary producers such as algae and aquatic plants, and fish-eating mammals and birds. Sediment criteria are intended to be protective of the benthic community. The analysis was conducted for dioxins, mercury, and fourteen other metals. Only the results for dioxins and mercury are discussed here. Very low or no potential for ecological risk was found for the other metals.[348] For a full discussion of the ecological assessment, see the background document for today's rule.[349]

A. Dioxins

A variation on the general screening level approach was used for assessing ecological risks from dioxins in surface water. Rather than basing the assessment on ambient water quality criteria for the protection of wildlife, ecotoxicological benchmarks for 2,3,7,8-tetrachlorodibenzo(p)dioxin (TCDD) for fish-eating birds and mammals (i.e., no observed adverse effects levels) were used to make a direct comparison with estimated intakes of dioxins in fish in terms of 2,3,7,8–TCDD toxicity equivalents (TEQ). This approach accounts for the different rates of bioaccumulation of the various 2,3,7,8 dibenzo(p)dioxin and dibenzofuran congeners and avoids the conservatism of comparing an ambient water quality criterion for 2,3,7,8–TCDD to model-estimated water concentrations in terms of 2,3,7,8–TCDD TEQs. The results of our analysis indicate no exceedances of the ecotoxicological benchmarks for 2,3,7,8–TCDD for any category of hazardous waste combustors. One limitation of the ecological assessment for dioxins is that water quality criteria for the protection of aquatic life are not

[348] Although minor exceedances of the ecotoxicological criteria for lead were noted for incinerators, the exceedances were eliminated under today's rule.

[349] ''Human Health and Ecological Risk Assessment Support to the Development of Technical Standards for Emissions from Combustion Units Burning Hazardous Wastes: Background Document—Final Report,'' July, 1999.

available. However, fish and aquatic invertebrates are generally less sensitive to dioxins than mammals and birds.

For assessing the potential for ecological risk in terrestrial ecosystems, soil criteria developed for 2,3,7,8–TCDD for the protection of mammals and birds were compared to model-estimated soil concentrations in terms of 2,3,7,8–TCDD TEQs. Because the more highly chlorinated 2,3,7,8 dibenzo(p)dioxin and dibenzofuran congeners are expected to bioaccumulate in prey species more slowly than 2,3,7,8–TCDD, the potential for ecological risk is likely to be overstated. Our analysis indicates that, at baseline, less than one percent of the study areas surrounding hazardous waste combustors have the potential for ecological risk from dioxins in soil. Under today's rule, we project no exceedances of the ecotoxicological criteria for dioxins in soil. The soil ecotoxicological criterion for dioxins is derived from studies of reproductive and developmental effects in mammals. Potential impacts to terrestrial plant and soil communities could not be evaluated due to a lack of sufficient ecological toxicity data. However, vertebrates such as mammals and birds are known to be more sensitive to dioxin exposure than invertebrates. Therefore, we consider the potential for risk to invertebrate receptors to be low.

B. Mercury

The ecological assessment of mercury is based on water quality criteria for the protection of wildlife that were developed for the Mercury Study Report to Congress. The assessment used the lowest of the available water quality criteria for individual fish-eating avian and mammalian wildlife species. The frequency distribution of ecological hazard quotients for total mercury indicates the potential for adverse ecological effects for cement kilns. Our analysis indicates that, for cement kilns, exceedances of the ecotoxicological criteria for total mercury may occur over 40 percent of study area surface waters at baseline. Above a hazard quotient of 1, the frequency of exceedances drops off quickly, with hazard quotients above 2 occurring at a frequency of 1 percent. The ecological hazard quotients remain essentially unchanged under today's rule. However, we project no exceedances of the ecotoxicological criteria for methyl mercury. Because methyl mercury is the form of mercury that is of greatest concern for fish-eating mammals and birds, the lack of exceedances suggests that the potential for ecological effects is relatively low. Our analysis also suggests relatively low potential for ecological effects for incinerators and lightweight aggregate kilns. Although our analysis indicates that exceedances of the ecotoxicological criteria for total mercury may occur over 22 percent of study area surface waters for lightweight aggregate kilns and 6 percent for incinerators at baseline, these are reduced to no exceedances and less than 1 percent, respectively, under today's rule. Moreover, we project no exceedances of the ecotoxicological criteria for methyl mercury. The significance of these results must be judged in the context of the considerable uncertainties related to the fate and transport of mercury in the environment, as discussed elsewhere in today's notice, the presence of background levels of mercury, and the level of protection afforded by the underlying ecotoxicological criteria.

For soils, our analysis indicates that less than one percent of the study areas surrounding hazardous waste combustors have the potential for ecological risk at baseline. Under today's rule, we project no exceedances of the ecotoxicological criteria for mercury for incinerators and lightweight aggregate kilns. For cement kilns, we project exceedances at a frequency of much less than one percent. The soil ecotoxicological criterion for mercury is derived from studies of the reproductive capacity of earthworms. Although earthworms serve a vital function in the soil community, given the redundancy and abundance of soil organisms and the low frequency of exceedances, we believe that adverse impacts to the terrestrial ecosystem, including higher trophic levels such as terrestrial mammals, are unlikely.

As a screening level analysis, the ecological assessment is subject to a number of limitations. The analysis assumes the occurrence of the ecological receptors on which the ecotoxicological criteria are based in all modeled sectors and water bodies. Although the ecological receptors included in the analysis are commonly occurring species, they may not be present in the same locations at which exceedances are predicted due to a lack of suitable habitat or other factors. Furthermore, the range of predator and prey species may exceed the spatial extent of the estimated exceedances. Many primary and secondary consumers are opportunistic feeders with substantial variability in both the type of food items consumed as well as the seasonal patterns of feeding and foraging. These behaviors can be expected to moderate exposures to chemical contaminants and reduce the potential for risk. On the other hand, gaps exist in the ecotoxicological data base such that not all combinations of chemical constituents and ecological receptors could be evaluated. In addition, media concentrations could not be estimated for all habitats that may be important to ecological receptors, such as wetlands. Also, our analysis did not consider the possible impact of background concentrations. Therefore, although as a screening level analysis the ecological assessment has a tendency toward conservatism, we cannot say for certain that no potential exists for ecological risks that fall beyond the scope of the assessment.

Part Eight: Analytical and Regulatory Requirements

I. Executive Order 12866: Regulatory Planning and Review (58 FR 51735)

Is This a Significant Regulatory Action?

Under Executive Order 12866 (58 FR 51735, October 4, 1993), we must determine whether a regulatory action is ''significant'' and, therefore, subject to OMB review and the requirements of the Executive Order. The Order defines ''significant regulatory action'' as one that is likely to result in a rule that may:

(1) Have an annual effect on the economy of $100 million or more, adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlement, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

Under the terms of Executive Order 12866, we have reviewed today's rule and determined that it does not represent an ''economically significant'' regulatory action, as defined under point one above. The aggregate annualized social costs for this rule are under $100 million (ranging from $50 to $63 million for the final standards). However, it has been determined that this rule is a ''significant regulatory action'' because it may raise novel legal or policy issues (point four above). As such, this action was submitted to OMB for review. Changes made in response to OMB suggestions or recommendations will be documented in the public record.

We have prepared economic support materials for today's final action. These documents are entitled: Assessment of the Potential Costs, Benefits, and Other Impacts of the Hazardous Waste Combustion MACT Standards—Final Rule, and, Addendum To The Assessment of the Potential Costs, Benefits, and Other Impacts of the Hazardous Waste Combustion MACT Standards—Final Rule. The Addendum and Assessment documents were designed to adhere to analytical requirements established under the Executive Order, and corresponding Agency and OMB guidance; subject to data, analytical, and resource limitations.

This part of the Preamble is organized as follows: I. Executive Order 12866 (as addressed above), II. What Activities have Led to Today's Rule?—presenting a summary of the analytical methodology and findings from the 1996 RIA for the proposed action, and, a summary of substantive peer review and public stakeholder comments on this document, with Agency responses, III. Why is Today's Rule Needed?—justifying the need for Federal intervention, IV. What Were The Regulatory Options?—presenting a brief discussion of the scope of alternative regulatory options examined, V. What Are the Potential Costs and Benefits of Today's Rule?—summarizing methodology and findings from the final Assessment document, VI. What Considerations Were Given to Issues Like Equity and Children's Health?, VII. Is Today's Rule Cost-Effective?, VIII. How Do the Costs of Today's Rule Compare to the Benefits?, IX. What Consideration Was Given to Small Businesses? X. Were Derived Air Quality and Non-Air Impacts Considered? XI. Is Today's Rule Subject to Congressional Review?, XII. How is the Paperwork Reduction Act Considered in Today's Rule?, XIII. Was the National Technology Transfer and Advancement Act Considered?, and, XIV. Were Tribal Government Issues Considered? (Executive Order 13084).

The RCRA docket established for today's final rulemaking maintains a copy of the complete final Assessment and Addendum documents for public review. Readers interested in these economic support materials are strongly encouraged to read both documents to ensure full understanding of the methodology, data, findings, and limitations of the analysis.

II. What Activities Have Led to Today's Rule?

In May of 1993, we introduced a draft Waste Minimization and Combustion Strategy designed to reduce reliance on the combustion of hazardous waste and encourage reduced generation of these wastes. Among the key objectives of the strategy was the reduction of health and ecological risks posed by the combustion of hazardous wastes. As part of this strategy, we initiated the development of MACT emissions standards for hazardous waste combustion facilities.

On April 19, 1996, we published the proposal, which included revisions to standards for hazardous waste incinerators and hazardous waste burning cement kilns and lightweight aggregate kilns. These proposed MACT standards were designed to address a variety of hazardous air pollutants, including dioxins/furans, mercury, semivolatile and low volatile metals, and chlorine. We also proposed to use emissions of carbon monoxide and hydrocarbons as surrogates for products of incomplete combustion.

A. What Analyses Were Completed for the Proposal?

We completed an economic analysis in support of the proposal. This Regulatory Impact Assessment (RIA), examined and compared the costs and benefits of the proposed standards, as required under Executive Order 12866. Industry economic impacts, environmental justice, waste minimization incentives, and other impacts were also examined. This RIA also fulfilled the requirements of the Regulatory Flexibility Act by evaluating the effects of regulations on small entities. This document, Regulatory Impact Assessment for Proposed Hazardous Waste Combustion MACT Standards (November 13, 1995), Appendices (November 13, 1995), and two Addenda (November 13, 1995 and February 12, 1996) are available in the docket established for the proposed action.

Throughout the development of the proposal, we considered many alternative regulatory options. A full discussion of the methodology and findings of all options considered is in the Regulatory Impact Assessment (RIA). Only the floor option and our preferred option (*i.e.,* the floor option and beyond-the-floor options for selected hazardous air pollutants) are discussed in this summary.

1. Costs

To develop industry compliance cost estimates, we categorized or modeled combustion units based on source category and size and estimated engineering costs for the air pollution control devices needed to achieve the proposed standards. Based on current emissions and air pollution control device information, we developed assumptions regarding the type of upgrades that units would require. This ''model plants'' engineering cost analysis was used because our data were limited.

Total annual compliance cost estimates for the floor option and the beyond-the-floor standards ranged from $93 million to $136 million, respectively, beyond the baseline. For the floor option, on-site incinerators represented 55 percent of total nationwide costs, cement kilns represented 29 percent, commercial incinerators represented 14 percent, and lightweight aggregate kilns represented 2 percent. Of the total beyond-the-floor costs, on-site incinerators represented 50 percent, cement kilns represented 32 percent, commercial incinerators represented 15 percent, and lightweight aggregate kilns represented 3 percent. For the incremental impacts of going from the floor to beyond-the-floor, lightweight aggregate kilns were projected to experience a 100 percent increase in compliance costs, cement kilns would experience a 63 percent increase, commercial incinerators and on'site incinerators, at 54 and 34 percent, respectively. Overall, compliance costs associated with the proposed action were projected to result in significant economic impacts to the combustion industry.

The RIA also examined average total annual compliance costs per combustion unit. This indicator was designed to assess the relative impact of the rule on each facility type in the combustion universe. Findings projected that cement kilns were likely to incur the greatest average incremental cost per unit, totaling $770,000 annually at the floor and $1.1 million annually for the proposed beyond-the-floor standards. The costs for LWAKs ranged from $490,000 to $825,000. The costs for on-site incinerators ranged from $340,000 to $486,000. The costs for commercial incinerators ranged from $493,000 to $730,000. These costs assume no market exits. Once market exit occurs, average per unit costs may be significantly lower, particularly for on-site incinerators.

The analysis also examined the floor and proposed beyond-the-floor impacts on a per ton basis. In the baseline, average prices charged to burn hazardous waste were estimated to be $178 per ton for cement kilns, $188 per ton for lightweight aggregate kilns, $646 per ton for commercial incinerators, and $580 per ton for on-site incinerators (approximate internal transfer price).

Baseline burn costs (before consolidation) for these facilities were found to average $104 per ton for cement kilns, $194 per ton for lightweight aggregate kilns, $806 per ton for commercial incinerators, and $28,460 per ton for on-site incinerators.[350] Incremental compliance costs at the floor and proposed BTF levels were estimated to be $23 to $31 per ton for commercial incinerators, $40 to $50 per ton for cement kilns, $39 to $56 per ton for lightweight aggregate kilns, and $47 to $57 per ton for on-site incinerators.

From comparison of these prices and baseline burn costs, some high-cost facilities, especially commercial and on-site incinerators, appeared to be burning below break-even levels. The incremental compliance costs of the proposal would make these facilities even less competitive. The RIA estimated that, of the facilities which are currently burning hazardous waste, three cement kilns, two lightweight aggregate kilns, six commercial incinerators, and eighty-two on-site incinerators would likely stop burning hazardous waste over the long term. These were incremental to projected baseline market exits estimated at the time of proposal. Most of the facilities that exit the market were ones that burned smaller amounts of hazardous waste.

We also conducted a generalized cost effectiveness analysis for the proposal. We found that the cost per hazardous air pollutant is often difficult to estimate because the air pollution control devices often control more than one pollutant. Therefore, it was not feasible to estimate precise costs per pollutant. Once the compliance expenditures had been estimated, the total mass emission reduction achieved when facilities comply with the standards option was estimated. The total incremental cost per incremental reduction in pollutant emissions was then estimated. Considering all facilities together, dioxin, mercury, and metals costs per unit reduction are quite high because small amounts of the dioxin and metals are released into the environment. For other pollutants, expenditures per ton are much lower. Please refer to the November 13, 1995 draft RIA for a complete discussion of the methodology and findings.

2. Benefits

Our evaluation showed that background levels of dioxin in beef, milk, pork, chicken, and eggs were approximately 0.50, 0.07, 0.30, 0.20, and 0.10 parts per trillion fresh weight, respectively, on a toxicity equivalent (TEQ) basis. These background levels and information on food consumption were then used to estimate dietary intake in the general population. That estimate was 120 picograms TEQ per day. We also collected background data on dioxins in fish, taken from 388 locations nationwide. At 89 percent of the locations, fish contained detectable levels of at least two of the dioxin and furan compounds for which analyses were conducted. We then estimated total dioxin emissions from hazardous waste combustors at 0.94 kg TEQ per year. This represented about 9 percent of total anthropogenic emissions of dioxins in the U.S. at the time. The dioxin estimates have been revised since then.

While no one-to-one relationship between emissions and risk exists, it was inferred that hazardous waste-burning sources were likely to contribute significantly to dioxin levels in foods. In the proposal, we estimated that these dioxin emissions would be reduced to 0.07 kg TEQ per year at the floor levels and to 0.01 kg TEQ per year at the beyond the floor levels. We estimated this to result in decreases of approximately 8 and 9 percent in total estimated anthropogenic U.S. emissions, respectively. Our position at proposal was that reductions in these emissions, in conjunction with reductions from other dioxin-emitting sources, would help reduce dioxin levels in foods over time and, therefore, reduce the likelihood of adverse health effects, including cancer.

Mercury is a concern in both occupational and environmental settings. Human exposures to methyl mercury occur primarily from ingestion of fish. Mercury contamination results in routine fish consumption bans or advisories in over two thirds of the States. At the proposal, we estimated a safe exposure level to methyl mercury (the reference dose) at 0.0001 mg per kg per day. We collected data on chemical residues in fish from 388 locations nationwide and found that fish contained detectable levels of mercury at 92 percent of the locations. Similar results have been obtained in other studies, strongly suggesting that long-range atmospheric transport and deposition of anthropogenic emissions is occurring. Our research found that, for persons who eat significant amounts of freshwater fish, exposures to mercury may be significant compared to the threshold at which effects may occur in susceptible individuals.

Our estimates for the proposal indicated that hazardous waste combustors emitted a total of 10.1 Mg of mercury per year, representing about 4 percent of the U.S. anthropogenic total. Implementation of the floor levels were estimated to reduce mercury emissions from all hazardous waste-burning sources to 3.3 Mg per year. The proposed beyond-the-floor levels would drop this to an estimated 2.0 Mg per year. Such reductions were estimated to lower total anthropogenic U.S. emissions by approximately 3 percent. Reductions in these mercury emissions, in conjunction with the Agency's efforts to reduce emissions from other mercury-emitting sources, would help diminish mercury levels in fish over time and, therefore, reduce the likelihood of adverse health effects occurring in fish-consuming populations.

Other benefits we investigated for the proposal included ecological benefits, property value benefits, soiling and material damage, aesthetic damages, and recreational and commercial fishing impacts. Overall, the analysis of the ecological risk suggested that water quality criteria may be exceeded only in small watersheds located near waste combustion facilities. Furthermore, such exceedances would occur only when assuming very high emissions. The preliminary analysis for the proposal indicated that property value impacts may be very significant because of emission reductions from hazardous waste combustion facilities. A detailed review of this analysis, as well as other benefits (*e.g.,* avoided clean-up as result of reduced particulate matter releases), is presented in chapter 5 of the November 13, 1995 Regulatory Impact Assessment.

3. Other Regulatory Issues

We also examined other issues associated with the proposal. These included environmental justice, unfunded federal mandates, regulatory takings, and waste minimization.

a. Environmental Justice. We completed an analysis of demographic characteristics of populations near cement plants and commercial hazardous waste incinerators and compared them to county and state populations. This analysis focused on spatial relationships between these

[350] Baseline costs were calculated by identifying all costs of hazardous waste burning. For commercial incinerators and on-site incinerators, all costs of construction, operation and maintenance are included. This also includes RCRA permits and existing air pollution control devices. The costs for on-site burners are extremely high because the costs are distributed across the small amount of hazardous waste burned. For cement kilns and lightweight aggregate kilns, only the incremental costs of with burning hazardous waste are included (e.g., permits). The cost of the actual units (which are primarily for producing cement or aggregate) are not included in the baseline.

facilities and the adjacent minority and low income populations. The study did not describe the actual health status of these populations nor how their health might be affected in proximity to hazardous waste facilities. Results indicated that 27 percent of all cement plants and 37 percent of the sample of incinerators had minority percentages within a one mile radius which exceed the corresponding county minority percentages by more than five percentage points. Eighteen percent of all cement plants and 36 percent of the sample of incinerators had poverty percentages which exceed the county poverty percentages by more than five percentage points. Please see chapter seven of the November 13, 1995 RIA for a full discussion of the environmental justice methodology and findings conducted for the proposal.

b. Unfunded Federal Mandates. Our analysis of compliance with the Unfunded Mandates Reform Act (UMRA) of 1995 found that the proposal contained no State, local, tribal government, or private sector Federal mandates as defined under the regulatory provisions of Title II of UMRA. We concluded that the rule implements requirements specifically set forth by Congress, as stated in the CAA and RCRA. The proposed standards were not projected to result in mandated annualized costs of $100 million or more to any state, local, or tribal government. Furthermore, the proposed standards would not significantly or uniquely affect small governments.

c. Regulatory Takings. We found no indication that the proposed MACT standards would be considered a taking, as defined by legislation being considered by Congress at the time. Property would not be physically invaded or taken for public use without the consent of the owner. Also, the proposed standards would not deprive property owners of economically beneficial or productive use of their property or reduce the property's value.

d. Incentives for Waste Minimization and Pollution Prevention. We briefly examined the potential for waste minimization in the proposal. Preliminary results suggested that generators have a number of options for reducing or eliminating waste. To evaluate whether facilities would adopt applicable waste minimization measures, a simplified pay back analysis was used. Using information on per-facility capital costs for each technology, we estimated the time period required for the cost of the waste minimization measure to be returned in reduced combustion expenditures. Our assessment of waste minimization found that approximately 630,000 tons of waste may be amenable to waste minimization. For a complete description of the analysis please see the November 13, 1995 Regulatory Impact Assessment.

4. Small Entity Impacts

The Regulatory Flexibility Act (RFA) of 1980 requires Federal agencies to consider impacts on small entities throughout the regulatory process. Section 603 of the RFA calls for an initial screening analysis to determine whether small entities will be adversely affected by the regulation. If affected small entities are identified, regulatory alternatives must be considered to mitigate the potential impacts. Small entities, as described by the Act, are only those ''businesses, organizations, and governmental jurisdictions subject to regulation.'' We used information from Dunn & Bradstreet, the American Business Directory, and other sources to identify small businesses. Based on the number of employees and annual sales information, we identified eleven firms which might be considered directly affected small entities. We found that directly affected small entities were unlikely to be significantly affected and that over one-third of those that were considered small, while having a relatively small number of employees, had annual sales in excess of $50 million per year. Also, small entities impacted by the proposal were found to be those that burn very little waste and hence face very high cost per ton burned. These facilities were expected to discontinue burning hazardous waste rather than complying with the proposal. These costs of discontinuing waste burning would not be so high as to be a significant impact. Thus, we found that the proposal may, at most, have a minor impact on a limited number of affected small businesses.

B. What Major Comments Were Received on the Proposal RIA?

The November 13, 1995 Regulatory Impact Assessment (RIA) received comment from many concerned stakeholders. We also conducted a formal peer review of the RIA. We appreciate all comments received and incorporated many of the suggestions into the final Assessment document to improve the analysis. A summary of the key issues presented by stakeholders and the peer reviewers is presented below, along with our responses. You are requested to review the complete documents: Comment Response Document—Addressing The Public Comments Received On: Regulatory Impact Assessment for Proposed Hazardous Waste Combustion MACT Standards, Draft, November 13, 1995, and, Peer Review Response Document—Addressing The Peer Review Received On: Regulatory Impact Assessment for Proposed Hazardous Waste Combustion MACT Standards, Draft, November 13, 1995. These documents, available in the RCRA docket established for today's action, present complete responses to all substantive comments received on the 1995 RIA.

1. Public Comments

We received several general comments on the accuracy of the baseline and compliance costs applied in the RIA. Several commenters suggested that we revise baseline and compliance costs to improve their accuracy, which we did. Instead of using a model plant approach for assigning compliance and baseline costs to modeled combustion facilities, costs for today's rule have been estimated using combustion system-specific parameters including gas flow rate, baseline emissions, air pollution control devices currently in place, total chlorine in feed, stack moisture, and temperature at the inlet to the air pollution control device. These system-specific baseline and compliance costs allow for greater accuracy in estimating national costs and predicting which facilities are likely to stop burning hazardous waste. Also, the baseline costs include clinker production penalties at cement kilns and use updated incinerator capital costs, labor requirements, and ash disposal costs.

Various commenters were concerned that the consolidation routine in the economic modeling was unrealistic. For the final economic assessment, we revised the consolidation routine to incorporate capacity constraints that affect the ability of combustion facilities to consolidate wastes into fewer systems at a given facility. Maximum capacity rates (tons per year) were derived by using the feed rates in OSW's database (pounds per year) and assuming 8,000 hours per year of operation. Wastes are assumed to be consolidated into fewer combustion systems at a single facility to the extent that the capacity constraints allow the systems to absorb the displaced hazardous wastes.

Many commenters felt that the waste minimization analysis of the 1995 RIA was unrealistic and overestimated gains. They suggested that the waste minimization analysis be improved to reflect other constraints faced by waste generators. For the 1999 Assessment, we conducted an expanded and significantly improved analysis of waste minimization alternatives, using a more detailed decision framework for evaluating waste minimization investment decisions. This framework attempts to capture the full inventory of costs, savings, and revenues, including indirect, less tangible items typically omitted from waste minimization analysis, such as liability and corporate image. For each alternative that was identified as viable for currently combusted waste streams, cost curves were developed for a range of waste quantities, as cost varies by waste quantity. These cost curves were then used to determine whether a waste generator would shift from combustion to waste minimization alternatives as combustion prices rise.

Some commenters suggested that we model waste markets to reflect segmentation across waste types, instead of simply applying different prices for kilns and incinerators. In response, we have developed a revised pricing approach that covers seven categories of waste types and prices. The economic model used for the 1999 Assessment incorporates these seven different waste types and prices. Waste management prices depend on several factors: Waste form (solid/liquid/sludge), heat content, method of delivery (*e.g.,* bulk versus drum), and contamination level (*e.g.,* metals or chlorine content). In addition, regulatory constraints (*e.g.,* prohibitions against burning certain types of wastes) and technical constraints (*e.g.,* adverse effects of certain waste streams on cement product quality) also influence combustion prices. Although data limitations prevent the inclusion of all factors, the information on heat content and constituent concentrations from EPA's National Hazardous Waste Constituent Survey (NHWCS) allowed us to enhance the characterization of combusted waste.

A few commenters indicated that the baseline costs of waste burning for cement kilns should include the shared joint costs of cement production. We do not include cement production costs in the costs of waste burning because they are not part of the incremental costs introduced by hazardous waste burning at kilns. We believe this assumption is appropriate, given that cement production is the principal activity of cement kilns that burn hazardous waste. Furthermore, that same kiln would be required in the production of cement regardless of hazardous waste combustion activities. We did, however, evaluate whether some of the more economical marginal kilns may be covering cement production costs with hazardous waste burning revenues. These findings are reported in the 1999 Assessment document.

Some were concerned that shutdown costs and environmental risks associated with combustion facility closures were not accounted for in the 1995 economic analysis. We found that many of the facilities that are expected to close are those that are were operating significantly below capacity in the baseline. This suggests that such facilities may not have been fully recovering their capital costs and are likely to close, even in the absence of the MACT standards. Therefore, while closure is not costless, closure costs attributable directly to the MACT standards are likely to be relatively small. With regard to increased risks from transportation of hazardous wastes, the incremental health risks will be minimal since these facilities are burning small quantities of waste. In fact, we estimate that less than 1.5 percent of the wastes currently burned at combustion facilities will be reallocated due to facility closure. Moreover, spills and other accidents caused by trucking hazardous waste (the most common means of shipment for hazardous materials) generally are considered low-probability events, especially relative to the total number of accidents occurring within transportation overall.

Some commenters felt that potential impacts on generators and fuel blenders were not adequately addressed. In the 1995 RIA, we considered these costs and determined that hazardous waste generators and fuel blenders would likely see price increases for combusted waste streams, though the magnitude of the price increase will depend on the type of waste and the non-combustion waste management alternatives available for that waste type. The price increase faced by generators was estimated at 10 percent of market prices.

The major hazardous waste burning sectors frequently presented alternative views regarding various key waste burning issues. These included: Facility market exits, revenues, impacts resulting from waste feedrate modifications, impacts from alternative fuel usage, price impacts, and available practical capacity. We have reviewed and evaluated the substantiative information submitted by all concerned stakeholders and believe our final Assessment and Addendum documents reflect a fair and balanced representation of baseline conditions and post-rule incremental economic impacts.

2. Peer Review

The peer reviewers suggested that we clarify the aims, objectives, and organizing principles for the 1995 RIA. They stated that, while the 1995 RIA generally meets the requirements set forth by OMB's Guidance regarding the economic analysis of federal regulations under Executive Order 12866, the RIA would be substantially improved if it fully conformed with OMB's Guidance, especially with regard to organization and statement of objectives. For the 1999 Assessment, we have tried to restructure the document to be more in line with OMB's 1996 Guidance for conducting Economic Analysis of Federal Regulations Under Executive Order 12866. The 1999 Assessment includes the following elements in the first chapter to address concerns of the reviewers: the objectives of the Economic Assessment, the analytical requirements the document fulfills, the rationale for regulatory action, an examination of alternative regulatory options, the anticipated effect of the MACT standards, and the analytic approach and organization for the subsequent chapters.

The peer reviewers also suggested that the compliance costs need to be clearly distinguished from social costs, as defined by the theory of applied welfare economics. For the 1999 Assessment, we have been careful to clarify the difference between compliance costs and social costs and explain how the rule will likely affect producers and consumers. The final Assessment explicitly lays out the economic framework for the social cost analysis and distinguishes these from compliance cost estimates. The hazardous waste combustion market is diverse, dynamic, and segmented. Because data are not adequate to support a full econometric analysis at this level of complexity, we have applied a simplified approach that brackets the welfare loss attributable to today's rule. This approach bounds potential economic welfare losses by considering two scenarios: (1) Compliance costs assuming no market adjustments (the upper bound) and (2) market adjusted compliance costs (the lower bound).

The peer reviewers also suggested that the benefits analysis was not fully responsive to the requirements of Executive Order 12866. For the 1999 Assessment, we have applied results from an extensive multi-pathway risk assessment to develop human health and ecological benefit estimates. For the human health analysis, benefits are estimated from cancer and noncancer risk reductions. Cancer risk reduction estimates are monetized by applying the value of a statistical life (VSL) to the risk reduction expected to result from the MACT standards. Monetary values are assigned to noncancer benefits using a direct-cost approach which focuses on the expenditures averted by decreasing the occurrence of an illness or other health effect. Ecological benefits are also included in the 1999 Assessment.

The peer reviewers suggested that easily burned waste streams would command lower prices and that this should be reflected in the economic modeling. They also indicated that certain combustion sectors may only handle these easy-to-burn waste types and that this should be reflected in baseline costs for these combustors. The pricing approach used in the 1999 Assessment assigns different prices to different types of wastes. Waste management prices depend on several factors, which include: waste form (solid/liquid/sludge), heat content, method of delivery (*e.g.,* bulk versus drum), and contamination level (*e.g.,* metals or chlorine content). In addition, regulatory constraints (*e.g.,* prohibitions against burning certain types of wastes) and technical constraints (*e.g.,* adverse effects of certain waste streams on cement product quality) also influence combustion prices. Although data limitations prevent us from accounting for all factors, the information on heat content and constituent concentrations from EPA's National Hazardous Waste Constituent Survey (NHWCS) allowed us to enhance the characterization of combusted waste. In addition to pricing refinements, the 1999 Assessment adjusts baseline costs to reflect differences in the performance and capabilities across combustion systems.

The peer reviewers were also concerned that the 1995 RIA applied outdated data in the analysis. The most recent available data were used in the 1995 RIA. The 1999 Assessment, once again, applies the most recently available, and verified data.

The peer reviewers suggested that fully-loaded cost-per-ton estimates should be provided for each waste minimization alternative so that these could be compared with combustion prices. For the 1999 Assessment, we conducted an expanded and significantly improved analysis of waste minimization alternatives. This analysis used a more detailed decision framework for evaluating waste minimization investment decisions that captures the full inventory of costs, savings, and revenues, including indirect, less tangible items typically omitted from waste minimization analysis, such as liability and corporate image. For each viable waste minimization alternative for currently combusted waste streams, cost curves were developed for a range of waste quantities because cost varies by waste quantity. These cost curves were then used to determine whether a waste generator would shift from combustion to waste minimization alternatives as combustion prices rise.

III. Why Is Today's Rule Needed?

Today's rule will reduce the level of several hazardous air pollutants, including dioxins and furans, mercury, semi-volatile and low volatile metals, and chlorine gas. Carbon monoxide, hydrocarbons, and particulate matter will also be reduced. Most hazardous waste combustion facilities are currently operating with some air pollution control devices in place. However, existing pollutants from these facilities are still emitted at levels found to result in risks to human health and the environment. Human exposure to these combustion air toxics occurs both directly and indirectly and leads to cancer, respiratory diseases, and possibly developmental abnormalities. A preliminary screening analysis suggests that ecosystems are also at risk from these air pollutants.

The hazardous waste combustion industry operates in a dynamic market. Several combustion facilities and systems have closed or consolidated over the past several years and this trend is likely to continue. These closures and consolidations may lead to reduced air pollution, in the aggregate, from hazardous waste facilities. However, the ongoing demand for hazardous waste combustion services will ultimately result in a steady equilibrium as the market adjusts over the long-term. We therefore expect that air pollution problems from these facilities, and the corresponding threats to human health and ecological receptors, will continue if today's rule were not implemented.

The market has generally failed to correct the air pollution problems resulting from the combustion of hazardous wastes. This has occurred for several reasons. First, there exists no natural market incentive for hazardous waste combustion facilities to incur additional costs implementing control measures because the individuals and entities who bear the negative human health and ecological impacts associated with these actions have no direct control over waste burning decisions. This may be referred to as an environmental externality, where the private industry costs of combustion do not fully reflect the human health and environmental costs of hazardous waste combustion. Second, the parties injured by the combusted pollutants are not likely to have the resources or technological expertise to seek compensation from the damaging entity (combustion facility) through legal or other means. Finally, emissions from hazardous waste combustion facilities directly affect a "public good," the air. Improved air quality benefits human health and the environment. These benefits cannot be limited to just those who pay for reduced pollution. The absence of government intervention, therefore, will result in a free market that does not provide the socially optimal quantity and quality of public goods, such as air.

We recognize the need for federal regulation as the optimal means of correcting market failures leading to the negative environmental externalities resulting from the combustion of hazardous waste. The complex nature of the pollutants, waste feeds, waste generators, and the diverse nature of the combustion market would limit the effectiveness of a non-regulatory approach such as taxes, fees, or an educational-outreach program. Furthermore, requirements for MACT standards under the Clean Air Act, as mandated by Congress, has compelled us to select today's regulatory approach.

IV. What Were the Regulatory Options?

We carefully assembled and evaluated all data and relevant information acquired since the proposal. We considered several alternative MACT options since the proposal, ultimately leading to today's rule. Please refer to Part Four of this preamble for more detail on option development and the specific approach and methodology used in developing the final standards. This section of today's preamble briefly discusses and assesses the final regulatory levels and two primary options. The final regulatory levels, as discussed in Part Four, establish a combination of floor and beyond-the-floor standards for the pollutants of concern. Of the options analyzed, one addresses a floor only scenario and the other examines beyond-the-floor levels for dioxins/furans and mercury, based on activated carbon injection (ACI). The reader may wish to examine the Assessment document for a complete discussion of the analytical methodology, costs, benefits, and other projected impacts of today's rule and options. This Assessment document is available in the RCRA docket for today's rule.

V. What Are the Potential Costs and Benefits of Today's Rule?

A. Introduction

The value of any regulatory policy is traditionally measured by the net change in social welfare that it generates. Our economic assessment for today's rule evaluates costs, benefits, economic impacts, and other impacts such as environmental justice, children's health, unfunded mandates, waste minimization incentives, and small entity impacts. To conduct this analysis, we examined the current combustion market and practices, developed and implemented a methodology for examining compliance and social costs, applied an economic model to analyze industry economic impacts, quantified (and, where possible, monetized) benefits, and followed appropriate guidelines and procedures for examining equity considerations, children's health, and other impacts. The data we used in this analysis were the most recently available at the time of the analysis. Data verification, relevance, and public disclosure issues prevented us from incorporating data from certain sources. Furthermore, because our data were limited, the estimated findings from these analyses should be viewed as national, not site specific impacts.

B. Combustion Market Overview

The hazardous waste industry comprises three key segments: hazardous waste generators, fuel blenders and intermediaries, and hazardous waste incinerators. Hazardous waste is combusted at three main types of facilities: Commercial incinerators, on-site incinerators, and waste burning kilns (cement kilns and lightweight aggregate kilns). Commercial incinerators are generally larger in size and designed to manage virtually all types of solids, as well as liquid wastes. On-site incinerators are more often designed as liquid-injection systems that handle liquids and pumpable solids. Waste burning kilns burn hazardous wastes to generate heat and power for their manufacturing processes.

As of the date of our analysis, 172 combustion facilities are permitted to burn hazardous waste in the United States. On-site incinerators (private and government) represent 129 facilities (or 75 percent of this total), commercial incinerators represent 20 facilities, cement kilns represent 18 facilities, and lightweight aggregate kilns represent five facilities. A facility may have one or more combustion systems. Companies that generate large quantities of uniform hazardous wastes generally find it more economical and efficient to combust these wastes on-site using their own noncommercial systems. Commercial incineration facilities manage a wide range of waste streams generated in small to medium quantities by diverse industries. Cement kilns and lightweight aggregate kilns derive heat and energy by combining clean burning (solvents and organics) high-Btu liquid hazardous wastes with conventional fuels. The EPA Biennial Reporting System (BRS) reports a total demand for all combusted hazardous waste, across all three types of facilities, at nearly 3.3 million tons in 1995.

Most of the waste managed by combustion comes from a relatively narrow set of industries. The entire chemical industry in 1995 generated 74 percent of all combusted waste. Within this sector, the organic chemicals subsector was the largest source of waste sent to combustion, providing about 32 percent of all combusted waste. The pesticide and agricultural chemical industry generated 12 percent of the total. No other single sector generated more than 10 percent of the total.

Regulatory requirements, liability concerns, and economics influence the demand for combustion services. Regulatory forces influence the demand for combustion by mandating certain hazardous waste treatment standards (land disposal restriction requirements, etc.). Liability concerns of waste generators affect combustion demand because combustion, by destroying organic wastes, greatly reduces the risk of future environmental problems. Finally, if alternative waste management options are more expensive, hazardous waste generators will likely choose to send their wastes to combustion facilities in order to increase their overall profitability.

Throughout much of the 1980s, hazardous waste combustors enjoyed a strong competitive position and generally maintained a high level of profitability. During this period, EPA regulations requiring combustion greatly expanded the waste tonnage for this market. In addition, federal permitting requirements, as well as powerful local opposition to siting of new incinerators, constrained the entry of new combustion systems. As a result, combustion prices rose steadily, ultimately reaching record levels in 1987. The high profits of the late 1980s induced many firms to enter the market, in spite of the difficulties and delays anticipated in the permitting and siting process. Hazardous waste markets have changed significantly since the late 1980s. In the early 1990s, substantial overcapacity resulted in fierce competition, declining prices, poor financial performance, numerous project cancellations, and some facility closures. Since the mid 1990s, several additional combustion facilities have closed, while many of those that have remained open have consolidated their operations. There still remains significant overcapacity throughout the hazardous waste combustion industry.

C. Baseline Specification

Proper and consistent baseline specification is vital to the accurate assessment of incremental costs, benefits, and other economic impacts associated with today's rule. The baseline essentially describes the world absent today's rule. The incremental impacts of today's rule are evaluated by predicting post MACT compliance responses with respect to the baseline. The baseline, as applied in this analysis, is the point at which today's rule is promulgated. We recognize that the baseline should not simply describe a point in time, but rather should describe the state of the world over time, absent today's rule. The Assessment describes the data sources used in specifying the baseline and examines how each of these factors are likely to change over time in the absence of today's rule. Finally, because this analysis precedes final rule promulgation, data sources used to determine the baseline will necessarily predate the point of rule promulgation. A full discussion of baseline specification is presented in the Assessment document for today's rule.

D. Analytical Methodology and Findings—Engineering Compliance Cost Analysis

The total compliance costs for existing hazardous waste combustion facilities are developed using engineering models that assign pollution control measures and costs to each modeled combustion system. The engineering model also incorporates other compliance costs, such as monitoring requirements, permit modifications, sampling and analyses, and other recordkeeping and reporting requirements. We applied the same basic approach in developing compliance costs for new sources as was used for existing sources. Please see the Assessment document for a complete discussion of the analytical methodology applied for existing and new facilities.

Compliance costs presented in this section are based on a static analysis assuming no market adjustments.

Results from this static analysis should therefore be considered ''high-end'' estimates. The engineering compliance cost analysis reveals that each combustion system will likely comply with the final standards through a different combination of pollution control measures. This is likely to result in widely diverse per system compliance costs across combustion sectors. The average annualized per system costs, across all sectors, are projected to range from about $0.16 to $0.72 million for compliance with the final standards. Per system costs at the floor are estimated to range from $0.16 to $0.68 million, while these costs under the beyond-the-floor activated carbon injection (ACI) option would range from $0.36 to $0.99 million. Cement kilns were generally found to experience the highest per system compliance costs, while the commercial and on-site incinerators would generally experience the lowest per system costs. The compliance costs per ton of hazardous waste burned are projected to increase from 31 to 41 percent for cement kilns and about 35 percent for lightweight aggregate kilns. The increase for commercial incinerators is estimated at 20 percent of the baseline burn costs. The regulated community is also likely to experience some cost savings as a result of the streamlined administrative procedures established through today's final rule.

The compliance cost analysis contains a variety of uncertainties. The most significant include: The limited availability of emissions data upon which engineering controls are based, lack of baseline air pollution control device data for a number of facilities, and the difficulty in determining the extent to which feed control may be used as a feasible alternative method of compliance. While uncertainties are acknowledged, we do not believe that the above data limitations significantly bias the results either upward or downward.

In addition to costs incurred by the private sector, today's rule is also likely to result in incremental costs and savings to government regulatory entities at different levels as they administer and enforce the new emissions standards and related requirements. EPA Regional offices, state agencies, as well as some local agencies may incur some combination of incremental costs associated with permitting. Modifications of the permitting process related to Clean Air Act provisions could cost governmental entities, nationwide, approximately $330,000 per year. Potential government activities could also include the state rulemaking efforts necessary for agencies to modify their RCRA permitting processes as part of the ''Fast-Track'' provisions. State rulemakings and authorization of the modified procedures could cost states between $500,000 and $700,000, nationwide. Streamlined RCRA permit modification procedures may also result in aggregate savings ranging from $0.4 to $2.1 million. Overall economic impacts on particular governmental regulatory entities will depend on a variety of factors that are difficult to characterize with precision. Furthermore, economic impacts associated with governmental activities will differ in the way in which a particular governmental entity may choose to implement the requirements.

E. Analytical Methodology and Findings—Social Cost Analysis

We examined social cost impacts potentially associated with today's rule. Total social costs include the value of resources used to comply with the standards by the private sector, the value of resources used to administer the regulation by the government, and the value of output lost due to shifts of resources to less productive uses. To evaluate these shifts in resources and changes in output requires predicting changes in behavior by all affected parties in response to the regulation, including responses of directly-affected entities, as well as indirectly-affected private parties.

For this analysis, social costs are grouped into two categories: economic welfare (changes in consumer and producer surplus), and government administrative costs. The economic welfare analysis conducted for today's rule uses a simplified partial equilibrium approach to estimate social costs. In this analysis, changes in economic welfare are measured by summing the changes in consumer and producer surplus. This simplified approach bounds potential economic welfare losses associated with the rule by considering two scenarios: Compliance costs assuming no market adjustments, and market adjusted compliance costs.

Social costs presented in this section assume market adjustments. Under this scenario, increased compliance costs are examined in the context of likely incentives combustion facilities would have to continue burning hazardous wastes and the competitive balance in different combustion sectors. Furthermore, combustion facilities are likely to try to recover these increased costs by charging higher prices to generators and fuel blenders. This scenario estimates market adjusted compliance costs by assessing baseline profitability, profitability post-rule using different price increase scenarios, and waste management alternatives in order to help predict combustion price increases.

Overall, the difference in aggregate compliance costs for all sectors of the existing regulated community to meet any of the examined scenarios is not substantial. Total annualized market adjusted costs for all sectors are estimated to range from $44 to $50 million under the floor option. Under the beyond-the-floor (ACI) option, these costs are estimated to range from $98 to $107 million. For all sectors to meet the final standards, our best estimate of total annualized costs ranges from $50 to $63 million, depending upon level of price pass-through. All cost estimates are incremental to the baseline. These estimates, however, are not incremental to any mutual requirements potentially associated with cement kilns meeting standards established under the nonhazardous waste burner cement kiln rule.

Cement kilns ($17–24 million) and private on-site incinerators ($20–24 million) make up about 76 percent of aggregate national costs under the final standards. For cement kilns, this is due primarily to the high costs per system. For private on-site incinerators, the high costs are primarily due to the large number of combustion systems. Total costs are less for commercial incinerators ($5–6 million, or 10 percent) because of lower costs per system relative to cement kilns and due to the limited number of commercial units relative to on-site incinerators. Lightweight aggregate kilns ($3 million) represent about 5 to 6 percent of the total costs, due primarily to the limited number of units. Government on-site units make up the remainder.

F. Analytical Methodology and Findings—Economic Impact Analysis

Various market adjustments are expected in response to the increased costs of hazardous waste combustion associated with today's rule. Economic impacts may be measured through numerous factors. This analysis examines market exit estimates, waste reallocations, employment impacts, combustion price increases, industry impacts, and the multirule or joint impacts analysis. Economic impacts presented in this section are distinct from the social costs analysis, which represents only the monetary value of market disturbances.

1. Market Exit Estimates

The hazardous waste combustion industry operates in a dynamic market, with a number of systems/facilities projected to exit the hazardous waste burning market under baseline conditions (see Section V. B of this Part). As a result, this analysis presents market exit estimates expected to result under the baseline, as well as from today's rule. This approach is developed in an effort to present a more accurate estimate of ''real-world'' incremental impacts resulting from the final standards. Market exit estimates are derived from a breakeven analysis designed to determine system and facility viability. This analysis is subject to several assumptions, including: engineering cost data on the baseline costs of waste burning, cost estimates for pollution control devices, prices for combustion services, and assumptions about the waste quantities burned at these facilities. It is important to note that, for most sectors, exiting the hazardous waste combustion market is not equivalent to closing a plant. (Actual plant closure would only be expected in the case of an exit from the hazardous waste combustion market of a commercial incinerator closing all its systems.)

A relatively small percentage of facilities (including no lightweight aggregate kilns) are projected to stop burning hazardous waste as a result of the incremental requirements associated with today's rule. Those facilities that do exit were found to be marginally profitable in the baseline, burning low quantities of hazardous waste. The economic model post-consolidation results indicate that, in response to today's rule, the following number of combustion facilities are expected to cease burning hazardous waste in the short term: Cement kilns, zero out of 18 facilities; lightweight aggregate kilns, zero out of five facilities; commercial incinerators, zero out of 20 facilities; and private on-site incinerators, 16 out of 111 facilities.

The number of anticipated market exits increases in the long term due to the necessity of recovering the capital costs of combustion. However, because this also holds true in the baseline, an increased number of projected long-term baseline market exits may, in some cases, actually decrease the number of incremental long-term exits. There remain zero incremental market exits for LWAKs and commercial incinerators over the long-term. Incremental market exits for cement kilns, however, increase from zero in the short-term to up to two over the long-term. Incremental market exits for private on-site incinerators decline from 16 in the short-term to 13 over the long-term. This is due to a 62 percent increase in baseline market exits from the short-term to the long-term.

2. Quantity of Waste Reallocated

Combustion systems that can no longer cover costs (i.e., those below the dynamic breakeven quantity) are projected to stop burning hazardous waste. Hazardous wastes from these systems will likely be reallocated to other viable combustion systems at the same facility if there is sufficient capacity, alternative combustion facilities that continue burning, or waste management alternatives (*e.g.*, solvent reclamation). Because combustion is likely to remain the lowest cost option, we expect most reallocated wastes will continue to be managed at combustion facilities.

The economic model indicates that, in response to today's rule, between 14,000 to 42,000 tons of currently burned hazardous waste could be reallocated to other facilities or waste management alternatives. This estimate represents between 0.4 and 1.3 percent of the total quantity of combusted hazardous wastes and is incremental to projected long-term baseline reallocations of approximately 100,000 tons. Currently, there is more than adequate capacity within the remaining sources of the combustion market to accommodate this reallocated waste, even at the high-end estimate.

3. Employment Impacts

Today's rule is likely to cause employment shifts across all of the hazardous waste combustion sectors. These shifts will occur as specific combustion facilities find it no longer economically feasible to keep all of their systems running, or to stay in the hazardous waste market at all. When this occurs, workers at these locations may lose their jobs. At the same time, the rule may result in employment gains, as new purchases of pollution control equipment stimulate additional hiring in the pollution control manufacturing sector and as additional staff are required at combustion facilities for various compliance activities.

a. Employment Impacts—Losses. Primary employment losses in the combustion industry are likely to occur when combustion systems consolidate the waste they are burning into fewer systems or when a facility exits the hazardous waste combustion market altogether. Operation and maintenance labor hours are expected to be reduced for each system that stops burning hazardous waste. For each facility that completely exits the market, employment losses will likely also include supervisory and administrative labor.

Total incremental employment dislocations potentially resulting from the final standards range from approximately 100 to 230 full-time-equivalent (FTE) jobs under the floor and the recommended options. Under the beyond-the-floor (ACI) option the high-end estimate of employment dislocations increases by almost 9 percent to approximately 250 FTEs. Among the different sectors, on-site incinerators are responsible for most of the total estimated number of job losses. Their significant share of the losses is a function of both the large number of on-site incinerators in the universe as well as the relatively high number of expected exits within this sector. Cement kilns are responsible for the second largest number of expected employment losses due to the number of systems that consolidate waste-burning at these facilities.

b. Employment Impacts—Gains. In addition to employment losses, today's rule will also lead to job gains as firms invest to comply with the various requirements of the rule and add additional operation and maintenance personnel for the new pollution equipment and other compliance activities, such as new reporting and record keeping requirements.

The total annual employment gains (without particulate matter continuous emission monitors) associated with the floor and recommended final standards are approximately 300 FTEs. The beyond-the-floor (ACI) option may increase the high-end employment gain estimate to as much as 620 FTEs. About one-third to one-half of all estimated job gains are projected to occur in the pollution control equipment industry. The remaining job gains will occur at the combustion facilities as additional personnel are hired for operation and maintenance and permitting requirements.

While it may appear that this analysis suggests overall net job creation under particular options and within particular combustion sectors, such a conclusion would be inappropriate. Because the gains and losses occur in different sectors of the economy, they should not be added together. Doing so would mask important distributional effects of the rule. In addition, the employment gain estimates reflect within sector impacts only and therefore do not account for job displacement across sectors as investment funds are diverted from other areas of the larger economy.

4. Combustion Price Increases

All combustion facilities that remain in operation will experience increased operational costs under today's rule. To protect their profits, each facility will have an incentive to pass these increased costs on to their customers (generators and blenders) in the form of higher combustion prices. Generators and blenders are expected to pay these higher prices unless they have less expensive waste management alternatives.

Under the theory of market price adjustments, as applied in the economic model, waste would be sent to the least expensive alternatives first, all else being equal. At the same time, prices would rise to the point at which all demand for waste management is met. In theory, the last tons would be managed by substituting non-combustion or waste minimization alternatives. The most efficient waste management substitute for these wastes would cap price increases, resulting in a new market price. Combustion facilities, in turn, would each set their prices at this market price in order to maximize profits. Less efficient waste management scenarios may earn just enough to stay in business over the short term, but would not recover capital costs. Combustion systems operating above the market price would lower their prices or exit the market. In reality, the hazardous waste combustion marketplace is very complex, and the determination of an adjusted market price would be an ongoing process affected by numerous factors, including price differentials among regions, waste stream types, and generators.

Available economic data on the cost of waste management alternatives for combusted hazardous waste, including source reduction and other waste minimization options, are not precise enough to allow for an accurate estimate of the maximum price increase that combustors may pass through to generators and fuel blenders. However, available data do indicate that the demand for hazardous waste combustion is relatively inelastic and that combustion facilities are likely to pass through approximately 75 percent of compliance costs in the least-cost sector. High-cost sectors, however, may pass through less than the 75 percent estimate. We also analyzed a 25 percent price pass through scenario. Under the recommended final standards, the weighted average combustion price per ton is projected to increase anywhere from about 0.5 to 11 percent, depending upon sector and scenario. Prices were found to increase by as much as 25 percent under the beyond-the-floor (ACI) option.

5. Industry Profits

Hazardous waste-burning profits for all combustion sectors, on average, are expected to decline post-rule. This decline, however, will not be consistent across sectors. Hazardous waste-burning profits for cement kilns are projected to decrease by no more than 10 percent, while profits for commercial incinerators would decrease by no more than 2 percent. These profit margin estimates are based on a simple calculation that subtracts projected operating costs from revenues. These estimates provide relative measures of profit changes and should not be used to predict absolute profit margins in these industries.

Compliance costs associated with meeting today's rule are estimated to represent less than 2 percent of the pollution control expenditures in industries that contain facilities with on-site incinerators. For cement kilns, however, compliance costs are expected to increase total pollution control expenditures by no more than 60 percent at waste-burning facilities.

To comply with today's rule, many facilities will need to purchase additional pollution control equipment. From the perspective of the pollution control industry, these expenditures will translate into additional revenues and profits. Total profits for the air pollution control industry are likely to increase as a result of today's rule.

6. National-Level Joint Economic Impacts

Analyzing national-level economic impacts in a market context provides an opportunity to assess the distributional effects on cement producers, lightweight aggregate kilns, and commercial incinerators. As a supplement to today's analysis, we used the model developed for the Portland Cement MACT rulemaking to estimate national-level economic impacts of today's Hazardous Waste Combustion (HWC) MACT rule in an interactive market context. This analysis was conducted to estimate joint impacts of today's rule in conjunction with the Portland Cement MACT rule and the Cement Kiln Dust rule. The Portland Cement MACT model incorporates compliance costs for each affected cement kiln, lightweight aggregate kiln, and commercial incinerator and then projects national level impacts associated with these facilities and for the general Portland cement market. On-site incinerators were not included in this analysis because they do not generally compete in the commercial hazardous waste combustion market. Results from this analysis are separated into three categories: Market-, industry-, and social-level impacts associated with imposition of the recommended final standards and the two HWC MACT options (floor and beyond-the-floor (ACI)).

Joint national-level economic impact results combining the HWC MACT options with the Portland Cement MACT and Cement Kiln Dust Rule are summarized in this section. Market, industry, and social cost impacts are discussed. This analysis assumes simultaneous implementation of all three rules.

Market-level impacts for this joint scenario, assuming the floor option, result in increased costs of cement production and burning hazardous waste at affected cement kilns. The national market price of Portland cement is projected to increase by about 2.0 percent, while domestic production would decline by about 4.0 percent. Market impacts for the joint scenario with the recommended final standards and the beyond-the-floor (ACI) option were found to be generally equivalent to results under the floor option. The extent to which domestic cement producers face competition from foreign cement imports will limit the degree of domestic price increases. Furthermore, the U.S. cement market is regionally specific. While nationwide average market price and production impacts are estimated to be relatively minor, producers in selected regions may experience significant revenue and production impacts, either positive or negative.

Under the joint scenario with the floor option, the market prices for both liquid and solid hazardous waste incineration are projected to increase by about 8.6 percent and 1.4 percent, respectively. The price change for liquids is higher than that observed for the floor only, while the price change for solids is virtually the same. For cement kilns, the increased costs associated with all three regulations, combined with their reductions in cement production, is projected to cause their supply of hazardous waste incineration services to fall by around 11.0 percent for both liquids and solids. In response to the regulatory costs, lightweight aggregate kilns also reduce their supply of liquid hazardous waste incineration by around 9.0 percent. For commercial incinerators, the supply of hazardous waste incineration increases by nearly 6.0 percent for liquids and close to 3.0

percent for solids. The market impacts for the joint scenario, using the recommended final standards and the beyond-the-floor (ACI) alternative, were found to be similar to those for the floor option. One exception is the market price for liquids, which increases by a greater percentage under the joint scenario with the beyond-the-floor (ACI) alternative. This results in a greater reduction in liquid hazardous waste burned at cement kilns and lesser decreases in liquids incinerated at commercial incinerators.

Industry-level impacts under the joint impacts scenario with the floor option indicate that Portland cement plants may see total gross revenues decline by nearly 3.0 percent from their current baseline. This decline in total revenue results from foregone revenues associated with producing less Portland cement and lost revenues from burning hazardous waste. The total net costs for these cement plants are also projected to decrease, reflecting the increase in costs associated with burning hazardous waste, plus the increase in cement kiln dust management costs, and the decrease in costs associated with producing less cement. The net result, indicates a decline in aggregate nationwide earnings before interest and taxes (EBIT) of about 5.5 percent from the current baseline. Lightweight aggregate kilns are also projected to incur a decline in hazardous waste-related EBIT of about 5.5 percent. Alternatively, as a group, the commercial incinerators are expected to experience a net gain of around 11.0 percent in annual earnings under this joint scenario with the floor option. These joint industry-level impacts on EBIT indicate a similar pattern across each regulatory scenario, except for lightweight aggregate kilns under the beyond-the-floor (ACI) option, where EBIT declines by nearly 14.0 percent. Industry-level impacts under the joint impact analysis also includes estimates of plant or system closures. The joint analysis under each hazardous waste combustion scenario indicates that three cement plants and 14 to 15 kilns may cease production. Furthermore, five cement kilns are projected to stop burning hazardous waste. The analysis also indicates that one lightweight aggregate kiln may discontinue burning hazardous waste and one to two commercial incinerators may close operations and stop burning hazardous waste with the joint implementation of all three rules. These market exit estimates include projected baseline closures.

Social-level impacts, or social costs, under the joint scenarios indicate that, for both Portland cement and hazardous waste incineration services, consumers are worse off due to the increase in prices and reductions in consumption. For producers of Portland cement and incineration services, cement kilns and lightweight aggregate kilns are worse off (on a nationwide basis) due to the decline in market share, while commercial incinerators are better off due to the increase in prices and market share.

Refer to the final Assessment document and appendices for a complete discussion of joint impacts.

G. Analytical Methodology and Findings—Benefits Assessment

This section discusses the benefits assessment for today's rule. Results from our multi-pathway human health and ecological risk assessment are used to evaluate incremental benefits to society of emission reductions at hazardous waste combustion facilities.[351] Total monetized benefits are estimated at $19.2 million. This section also summarizes how today's rule may lead to changes in the types and quantities of wastes generated and managed at combustion facilities through increased waste minimization.

1. Human Health and Ecological Benefits

a. Risk Assessment Overview. The basis for the benefits assessment is our multi-pathway risk assessment model. This model estimates baseline risks from hazardous waste combustion emissions, as well as expected risks after today's rule is implemented. The model examines both inhalation and ingestion pathways to estimate human health risks. A less detailed screening-level analysis is used to identify the potential for ecological risks. The risk assessment is carried out for the regulatory baseline (no regulation), the final recommended standards, and the two MACT options (floor and beyond-the-floor (ACI)). The assessment uses a case study approach in which 76 hazardous waste combustion facilities and their site-specific land uses and environmental settings are characterized. The randomly selected facilities in the study include 43 on-site incinerators, 13 commercial incinerators, 15 cement kilns, and five lightweight aggregate kilns.

The pollutants analyzed in the risk assessment are dioxins and furans, selected metals, particulate matter, chlorine, and hydrogen chloride. The metals modeled in the analysis include antimony, arsenic, barium, beryllium, cadmium, chromium, copper, cobalt, lead, manganese, mercury, nickel, selenium, silver, and thallium. The fate and transport of the emissions of these pollutants is modeled to arrive at concentrations in air, soil, surface water, and sediments. To assess human health risks, these concentrations can be converted to estimated doses to the exposed populations using exposure factors such as inhalation and ingestion rates. These doses are then used to calculate cancer and noncancer risks, if the appropriate health benchmarks are available. To assess potential ecological risks, soil, surface water and sediment concentrations are compared with eco-toxicological criteria representing protective screening values for ecological risks. Because these criteria are based on *de minimis* ecological effects and thus represent conservative values, an exceedance of the eco-toxicological criteria does not necessarily indicate ecological damages. It simply suggests that potential damages cannot be ruled out.

To characterize the cancer and noncancer risks to the populations listed above, the risk assessment breaks down the area surrounding each modeled combustion facility into 16 polar grid sectors. For each polar grid sector, risk estimates can be developed for different age groups and receptor populations (*e.g.*, 0 to 5 year old children of subsistence fishers). This approach is used because geographic and demographic differences across polar grid sectors leads to sectoral variation in individual risks. Thus, individual risk results are aggregated across sectors to generate the distribution of risk to individuals in the affected area. An additional Monte Carlo analysis was conducted to incorporate variability in other exposure factors such as inhalation and ingestion rates for three scenarios that were thought to comprise the majority of the risk to the study area population. These scenarios address cancer risk from dioxin exposure to beef and dairy farms and noncancer risk from methyl mercury exposure to recreational anglers.

b. Human Health Benefits—Methodology. Human health benefits are assessed by identifying those pollutants for which emission reductions are expected to result in improvements to human health or the

[351] The RIA for the proposal included results from a screening analysis designed to assess the potential magnitude of property value benefits caused by the MACT standards. This analysis is not included in the Economic Assessment for the Final Rule due to limitations of the benefits transfer approach and because property value benefits likely overlap with human health and ecological benefits. Including property value benefits would result in double-counting.

environment. The relevant results from the risk assessment for the pollutants of concern are then examined, focusing on population risk results based on central tendency exposure parameters. The risk assessment data are expressed as indicators of potential benefits, such as reduced cancer incidence or reduced potential for developing particular illnesses or abnormalities. Where possible, monetary values are assigned to these benefits using a benefits transfer approach.

To assign monetary values to cancer risk reduction estimates, we apply the value of a statistical life to the risk reduction expected to result from the MACT standards. The value of a statistical life is based on an individual's willingness to pay to reduce a risk of premature death or their willingness to accept increases in mortality risk. Because there are many different estimates of value of a statistical life in the economic literature, we estimate the reduced mortality benefits using a range of value of a statistical life estimates from 26 policy-relevant value-of-life studies. The estimated value of a statistical life figures from these studies range from $0.7 million to $15.9 million (adjusted to 1996 dollars), with a mean value of $5.6 million. The expected number of annual premature statistical deaths avoided are multiplied by the value of a statistical life estimate to determine the estimated monetary value of the mortality risk reductions.

A variety of approaches are used to evaluate the benefits associated with noncancer risk reductions. For particulate matter, both morbidity and mortality benefits are estimated. Particulate matter is the only non-carcinogen in the risk assessment for which there is sufficient dose-response information to estimate numbers of cases of disease and deaths from exposures. For lead and mercury, upper bound estimates of the population at risk are used. This is because information is only available on the potential of an adverse effect, with no estimates available on the likelihood of these effects.

We assign monetary values to noncancer benefits using a direct cost approach which focuses on the expenditures averted, and the opportunity cost of time spent in the hospital, by decreasing the occurrence of an illness or other health effect. While the willingness to pay approach used for valuing the cancer risk reductions is conceptually superior to the direct cost approach, measurement difficulties, such as estimating the severity of various illnesses, precludes us from using this approach here. Direct cost measures are expected to understate true benefits because they do not include cost of pain, suffering, and time lost. On the other hand, because we use upper bound estimates of the population at risk, we cannot conclude that the results are biased in one direction or the other.

c. Human Health Benefits—Results. Human health benefits are expected from both cancer and noncancer risk reductions. Less than one cancer case per year is expected to be avoided due to reduced emissions from combustion facilities. The majority of the cancer risk reductions are linked to consumption of dioxin-contaminated agricultural products exported beyond the boundaries of the study area. Less than one-third of the cancer risk reductions occur in local populations living near combustion facilities. Cancer risks for local populations are attributed primarily to reductions in arsenic and chromium emissions. These pollutants account for almost 85 percent of total local cancer incidences in the baseline. By applying value of a statistical life estimates to these cases, the total annual cancer risk reductions (benefits) in going from the baseline to the final standards, are valued at between $0.13 and $9.9 million, with a best estimate of approximately $2.02 million.

Across all receptor populations, individual cancer risks are greatest for subsistence farmers. Dioxin is the primary pollutant that drives the cancer risk for this sensitive receptor population. A lack of population data prevented us from quantifying benefits for this sub-population. It is possible, however, to characterize the reduction in risk from baseline to implementation of today's rule. With the exception of one particular scenario, the cancer risk for all subsistence farmers is reduced to below levels of concern after implementation of today's rule. Today's rule is also expected to result in lower cancer risks for children of subsistence farmers.

Most of the noncancer human health benefits from today's rule come from reductions in particulate matter. Some additional noncancer benefits come from reduced blood lead levels in children living near combustion facilities. Total annual noncancer benefits from quantifiable sources are valued at between $9.85 and $73.8 million, with a best estimate of about $17.2 million. Uncertainties implicit in the quantitative mercury analysis continue to be sufficiently great so as to limit its ultimate use in the monetization of noncancer benefits. Please review the Addendum and chapter six of the Assessment document for a complete discussion of human health benefits resulting from today's rule.

d. Ecological Benefits—Methodology. Ecological benefits are based on a screening analysis for ecological risks that compares soil, surface water, and sediment concentrations with eco-toxicological criteria based on *de minimis* thresholds for ecological effects. Because these criteria represent conservative values, an exceedance of the eco-toxicological criteria only indicates the potential for adverse ecological effects and does not necessarily indicate ecological damages. For this reason, benefits of avoiding adverse ecological impacts are discussed only in qualitative terms.

The basic approach for determining whether ecosystems or biota are potentially at risk consists of five steps: (1) Identify susceptible ecological receptors that represent relatively common species and communities of wildlife, (2) develop eco-toxicological criteria for receptors that represent acceptable pollutant concentrations, (3) estimate baseline and post-rule pollutant concentrations in sediments, soils, and surface waters of the study areas, (4) for each land area or water body modeled, compare the modeled media concentrations to ecologically protective levels to estimate eco-toxicological hazard quotients, and (5) total the land and water areas containing hazard quotients exceeding one and compare this number for the baseline and post-rule scenario. The reduction in the land and water area potentially at risk indicates a potential for avoiding adverse ecological impacts. Monetary values are not assigned to these potential benefits.

e. Ecological Benefits—Results. Ecological benefits are attributable primarily to reductions in dioxin and mercury for terrestrial ecosystems. For these ecosystems, hazard quotients are reduced to acceptable levels for approximately 115 to 150 square kilometers of land located within 20 kilometers of all combustion facilities. Ecological benefits associated with freshwater aquatic ecosystems are attributable to reductions in lead, with hazard quotients reduced to acceptable levels for approximately 35 to 40 square kilometers of these surface waters. These reductions of ecological risk criteria below levels of concern only indicates a potential for ecological improvement.

2. Waste Minimization Benefits

While many facilities may implement end-of-pipe controls such as fabric filters and high-energy scrubbers to achieve MACT control, emission reductions may also be accomplished by reducing the volume or toxicity of wastes currently combusted. In addition, generators may also consider waste management alternatives such as solvent recycling. For purposes of this analysis, these types of responses will be referred to as ''waste minimization.'' This section summarizes the potential waste minimization benefits resulting from implementation of today's rule.

As today's rule is implemented, the costs of burning hazardous waste will increase, resulting in market incentives for greater waste minimization. To predict the quantity of waste that could be reallocated from combustion to waste minimization due to economic considerations, we conducted a comprehensive waste minimization analysis that considered in-process recycling, out-of-process recycling, and source reduction. The objective of the analysis was to predict the quantity of hazardous wastes that may be reallocated to these waste minimization alternatives under different combustion price increase scenarios.

Overall, the analysis shows that a variety of waste minimization alternatives are available for managing those hazardous waste streams that are currently combusted. The quantity projected to be reallocated from combustion to waste minimization alternatives, however, depends upon the expected price increase for combustion services. At potential price increases ranging from $10 to $20 per ton, as much as 240,000 tons of hazardous waste may be reallocated from combustion to waste minimization alternatives. This represents approximately 7 percent of the total quantity of hazardous waste currently combusted.

VI. What Considerations Were Given to Issues Like Equity and Children's Health?

By applicable statute and executive order, we are required to complete an analysis of today's rule with regard to equity considerations and other regulatory concerns. This section assesses the potential impacts of today's rule as it relates to environmental justice, children's health issues, and unfunded federal mandates. Small entity impacts are examined in a separate section.

A. Executive Order 12898, ''Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations'' (February 11, 1994)

This Order is designed to address the environmental and human health conditions of minority and low-income populations. To comply with the Executive Order, we have assessed whether today's rule may have disproportionate effects on minority populations or low-income populations. We have analyzed demographic data presented in the reports ''Race, Ethnicity, and Poverty Status of the Populations Living Near Cement Plants in the United States'' (EPA, August 1994) and ''Race, Ethnicity, and Poverty Status of the Populations Living Near Hazardous Waste Incinerators in the United States'' (EPA, October 1994). These reports examine the number of low-income and minority individuals living near a relatively large sample of cement kilns and hazardous waste incinerators and provide county, state, and national population percentages for various sub-populations. The demographic data in these reports provide several important findings when examined in conjunction with the risk reductions projected from today's rule.

We find that combustion facilities, in general, are not located in areas with disproportionately high minority and low-income populations. However, there is evidence that hazardous waste burning cement kilns are somewhat more likely to be located in areas that have relatively higher low-income populations. Furthermore, there are a small number of commercial hazardous waste incinerators located in highly urbanized areas where there is a disproportionately high concentration of minorities and low-income populations within one and five mile radii. The reduced emissions at these facilities due to today's rule could represent meaningful environmental and health improvements for these populations. Overall, today's rule should not result in any adverse environmental or health effects on minority or low-income populations. Any impacts on these populations are likely to be positive due to the reduction in emissions from combustion facilities near minority and low-income population groups. The Assessment document available in the RCRA docket established for today's rule presents the full Environmental Justice Analysis.

B. Executive Order 13045: Protection of Children From Environmental Health Risks and Safety Risks (62 FR 19885, April 23, 1997)

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

Today's final rule is not subject to the Executive Order because it is not economically significant as defined under point one of the Order, and because the Agency does not have reason to believe the environmental health or safety risks addressed by this action present a disproportionate risk to children.

The topic of environmental threats to children's health is growing in regulatory importance as scientists, policy makers, and village members continue to recognize the extent to which children are particularly vulnerable to environmental hazards. Recent EPA actions including today's rule, are in the forefront of addressing environmental threats to the health of children. The risk assessment conducted in support of today's rule indicates that children are the beneficiaries of much of the reduction in potential illnesses and other adverse effects associated with combustion facility emissions. The risk assessment used a multi-pathway and multi-constituent evaluation in order to examine potential effects of combined exposures on children. Setting environmental standards that address combined exposures and that are protective of the heightened risks faced by children are both goals named within EPA's ''National Agenda to Protect Children's Health from Environmental Threats.'' Areas for potential reductions in risks and related health effects that were identified by the risk assessment are all targeted as priority issues within EPA's September 1996 report, Environmental Health Threats to Children.

A few significant physiological characteristics are largely responsible for children's increased susceptibility to environmental hazards. First, children eat proportionately more food, drink proportionately more fluids, and breathe more air per pound of body weight than do adults. As a result, children potentially experience greater levels of exposure to environmental threats than do adults. Second, because children's bodies are still in the process of development, their immune systems, neurological systems, and other immature organs can be more easily and considerably affected by environmental hazards. The connection between these physical characteristics and children's susceptibility to environmental threats are reflected in the higher baseline risk levels for children living near hazardous waste combustion facilities. The risk assessment addresses threats to children's health associated with hazardous waste combustion by evaluating reductions in risk for children as well as for adults and the population overall. For all exposed sub-populations, the assessment evaluated risks to four different age groups: 0 to 5 years, 6 to 11 years, 12 to 19 years, and adults over 20 years. Where possible, the risk assessment has provided both population and individual risk results for children. Both cancer and noncancer risks are examined across the age groups of children, focusing on the most susceptible sub-populations. The combined effects of several carcinogens, one of the goals named within the Agency's ''National Agenda to Protect Children's Health from Environmental Threats,'' were examined.

The key findings from the risk assessment indicate that children do not face significant cancer risks from hazardous waste combustion emissions. Only in the case of children of subsistence farmers do baseline cancer risks exceed 1×10^{-5} for the most highly exposed children. Implementation of the final standards would reduce these risks below levels of concern [352].

The analysis also found that much of the noncancer risk reductions resulting from implementation of today's rule may benefit children specifically. These are projected as a result of lower exposures to mercury, lead, and particulate matter, three types of pollutants addressed in the noncancer risk reductions which primarily affect children. Mercury emission reductions may reduce risks of developmental abnormalities in potential future offspring of recreational anglers and subsistence fishermen. In addition, particulate matter reductions may prevent some asthma attacks affecting children, but these benefits have not been quantified. Finally, reduced lead exposures for children are expected from today's rule. This benefit may help prevent cognitive and nervous system developmental abnormalities for children of the most highly exposed sub-populations, including subsistence fishermen and beef and dairy farmers. Analytical and data limitations prevented reasonable monetization of these findings.

C. Unfunded Mandates Reform Act of 1995 (UMRA) (Pub. L. 104–4)

Executive Order 12875, ''Enhancing the Intergovernmental Partnership'' (October 26, 1993), calls on federal agencies to provide a statement supporting the need to issue any regulation containing an unfunded federal mandate and describing prior consultation with representatives of affected state, local, and tribal governments. Signed into law on March 22, 1995, the Unfunded Mandates Reform Act (UMRA) supersedes Executive Order 12875, reiterating the previously established directives while also imposing additional requirements for federal agencies issuing any regulation containing an unfunded mandate.

Today's rule is not subject to the requirements of sections 202, 204 and 205 of UMRA. In general, a rule is subject to the requirements of these sections if it contains ''Federal mandates'' that may result in the expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of $100 million or more in any one year. Today's final rule does not result in $100 million or more in expenditures. The aggregate annualized social costs for today's rule are projected to range from $50 to $63 million under the final standards.

For rules that are subject to the requirements of these sections, key requirements include a written statement with an analysis of benefits and costs; input from state, local and tribal governments; and selection of the least burdensome option (if allowed by law) or an explanation for the option selected. We recognize the potential for aggregate one-time capital expenditures to exceed $100 million in any one year should various industry sectors choose not to amortize capital expenditures. Under this scenario, the Assessment document for today's rule meets analytical requirements established under UMRA.

Today's rule is not subject to the requirements of section 203 of UMRA. Section 203 requires agencies to develop a small government Agency plan before establishing any regulatory requirements that may significantly or uniquely affect small governments, including tribal governments. EPA has determined that this rule will not significantly or uniquely affect small governments. The small entity impacts analysis, presented in Appendix G of the final Assessment, found that no hazardous waste combustion units are owned by small governments.

Finally, because we are issuing today's rule under the statutory authority of the Clean Air Act, the rule should be exempt from all relevant requirements of the UMRA. In addition, compliance with the rule is voluntary for nonfederal governmental entities since state and local agencies choose whether or not to apply to EPA for the permitting authority necessary to implement today's rule.

VII. Is Today's Rule Cost Effective?

We have developed a cost-effectiveness measure that examines cost per unit reduction of emissions for each hazardous air pollutant, pollutant group, or surrogate. Cost-effectiveness measures are useful for comparing across different air pollution regulations. Moreover, we have typically used cost-effectiveness measures (defined as ''dollar-per-unit of pollutant removed'') to assess the decision to go beyond-the-floor for MACT standards.

Developing cost-effectiveness estimates for individual air pollutants assists us in making beyond-the-floor decisions for individual pollutants. The two analytic components of the individual cost-effectiveness analysis are: (1) Estimates of emission control expenditures per air pollutant for each regulatory option, and (2) estimates of emission reductions under each regulatory option. Individual cost-effectiveness measures for each MACT option are calculated as follows:

- HWC MACT Floor—Costs and emission reductions are incremental to the baseline,
- HWC MACT Final Standards—Costs and emission reductions are incremental to the MACT Floor, and
- Beyond-the-Floor—Activated Carbon Injection (ACI) MACT—Costs and emission reductions are incremental to the MACT Floor.

Single-level cost-effectiveness results across all HWC MACT options range

[352] Also, the analysis used the same approach to estimate cancer risks in both adults and children. However, individuals exposed to carcinogens in the first few years of life may be at increased risk of developing cancer. For this reason, we recognize that significant uncertainties and unknowns exist regarding the estimation of lifetime cancer risks in children. We also note that this analysis of cancer risks in children has not been externally peer reviewed.

from seven hundred dollars to $34.3 million per megagram reduced for all pollutants, individually, except dioxin. Dioxin control ranges from $25,000 to $903,000 per gram reduced. Dioxin control for incinerators to meet the floor standard is estimated at $903,000 per gram, with an additional $368,000 per gram to go from the floor to the final BTF TEQ standard. The control of SVM emitted from cement kilns is estimated to cost $67,000 per megagram from the baseline to the floor. Moving from the floor standard to the final BTF SVM standard for cement kilns is estimated to cost $502,000 per megagram. These results indicate that the more highly toxic pollutants such as dioxin are often much more expensive to control on a per-gram basis.

We did not apply cost-effectiveness alone in establishing beyond-the-floor levels for selected constituents regulated under the final HWC MACT standards. Several other measurement factors were incorporated into the beyond-the-floor decision, including: health benefits (especially those for children), regulatory precedent, cost-effectiveness of other MACT standards, and reliability of baseline data.

The method for calculating cost-effectiveness makes several simplifying assumptions. The two most important address the metrics employed for measuring cost-effectiveness and the actual methodology used to estimate the cost and emission reduction figures. Alternative measurement criteria for different constituents may lead to perceived distortions in scope. The cost-effectiveness methodology assumes that all facilities continue operating and install pollution control equipment or implement feed reductions to comply with the MACT standards. Both of these limiting assumptions may lead to overstatement or understatement of results. Other limitations that will influence these cost-effectiveness estimates include: (1) The feed control costing approach, which may lead to the overstatement of expenditures per pollutant due to the assumption of upper-bound cost estimates, (2) apportionment of costs, which are currently assigned according to the percentage reduction required to meet the standard for each pollutant controlled by the device, and (3) the assumption that units control emissions to the 70 percent design level.

VIII. How Do the Costs of Today's Rule Compare to the Benefits?

Comparing overall costs and benefits may help provide an assessment of this rule's overall efficiency and impacts on society. This section compares the total social costs of today's rule with its total monetized and nonmonetized benefits. The total annual monetized benefits of today's rule are estimated at $19.2 million (undiscounted) for the recommended final standards. These monetized benefits, however, may represent only a subset of potential avoided health effects, both cancer and noncancer cases. In comparison, the total annualized social costs of the rule are projected to range from $50 to $63 million. Social costs also include government administrative costs.

Across regulatory options, costs exceed monetized benefits more than two-fold. However, today's rule is expected to provide benefits that cannot be readily expressed in monetary terms. These benefits include health benefits to sensitive sub-populations such as subsistence anglers and improvements to terrestrial and aquatic ecological systems. When these benefits are taken into account, along with equity-enhancing effects such as environmental justice and impacts on children's health, the benefit-cost comparison becomes more complex but also more favorable. Consequently, the final regulatory decision becomes a policy judgment which takes into account efficiency as well as equity concerns and the positive direction of real, but unquantifiable, benefits.

IX. What Consideration Was Given to Small Businesses?

A. Regulatory Flexibility Act (RFA) as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), 5 USC 601 et seq.

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

We have determined that hazardous waste combustion facilities are not owned by small entities (local governments, tribes, etc.) other than businesses. Therefore, only businesses were analyzed. For the purposes of the impact analyses, small entity is defined either by the number of employees or by the dollar amount of sales. The level at which a business is considered small is determined for each Standard Industrial Classification (SIC) code by the Small Business Administration.[353]

Affected individual waste combustors (incinerators, cement kilns, and lightweight aggregate kilns) will bear the impacts of today's rule. These units will incur direct economic impacts as a result of today's rule. While not required under the Act and guidelines, we have also examined potential secondary impacts on small business units potentially affected by today's rule, such as hazardous waste generators and fuel blenders. Although hazardous waste combustors are the only group that would bear direct economic impacts from today's rule, this ''secondary impacts'' analysis was conducted because we assume that some portion of the burden would be passed on to customers of combustion facilities through price increases. This section describes the small entity analysis we conducted in support of today's rule.

B. Analytical Methodology

For combustors and blenders, we conducted facility-by-facility analyses of small businesses. We examined company data on employment and sales and then compared these data to statutory small business thresholds based on employment or annual sales, as defined for its industry by the Small Business Administration in 13 CFR part 121. Combustion or blender units where the facility or parent company data fell below the small business thresholds were classified as small businesses. The analysis was more complex for generators, however, because the rule may indirectly affect more than 11,000 generators. Given the large number of generators who would be affected by today's rule, it was necessary to conduct an initial, broad screening analysis to identify small business generators that might face significant secondary impacts. This screening analysis involved assigning each facility to an industry group, identifying industry groups that are dominated by small businesses, and then assuming that all generators in those small business dominated industries are small. Further analyses were then conducted on these groups or specific facilities.

We next compiled compliance cost data in an effort to establish a threshold for measuring ''significant economic impact.'' This threshold was set where compliance costs exceed one percent of

[353] SIC codes are used rather than the new NAICS codes because waste generator, blender, and combustor data were only available according to SIC code. However, a general conversion table containing NAICS codes for each reported SIC code is presented in the Assessment document.

facility gross sales. If costs do not exceed one percent of sales, then the regulation is unlikely to have a significant economic impact on small businesses within the category examined. Finally, we examined whether the significant economic impact (if any) would be borne by a ''substantial number'' of small businesses. If the regulation results in required compliance costs exceeding one percent of gross sales for more than 100 small businesses or 20 percent of all small businesses within the industry category examined, then the ''substantial number'' threshold is exceeded.

The cost of compliance with the new standards will determine the severity of impacts on small businesses. The costs to combustors used in this analysis coincide with the 70 percent engineering standard analyzed in the full economic assessment. The price increases experienced by generators and blenders were calculated on a per ton basis of waste shipped using 25 and 75 percent price pass-through scenarios. The price impacts were assumed to be uniform across facility types, with both generators and blenders experiencing the price pass-through effect. In practice, this pass through would likely be split between the two, depending on market factors. Note that the impacts from these price increases are indirect effects, as only hazardous waste combustors bear direct economic impact of today's rule.

C. Results—Direct Impacts

Only six facilities, out of the total universe of 172 hazardous waste combustion facilities, met the definition of small businesses. Of these six, two were found to experience annual compliance costs exceeding one percent of sales. Both of these facilities are owned by a common parent that qualifies as a small business. Therefore, this final rule affects a very limited number of small business combustors and has effects of greater than one percent on only two of these facilities (one business).

While the significant economic impact threshold was exceeded for two facilities (one corporation), these impacts do not extend to a substantial number of small entities. With just two facilities exceeding the one percent threshold, neither a substantial number of facilities nor a substantial fraction of an affected industry would face these impacts. After considering the economic impacts of today's final rule on small entities, I certify that this action will not have a significant economic impact on a substantial number of small entities.

Although this final rule will not have a significant economic impact on a substantial number of directly impacted small entities, EPA nonetheless has assessed the potential of this rule to adversely impact small entities subject to the rule.

D. Results—Indirect Impacts

Direct impacts of the rule extend only to combustors of hazardous waste. To supplement our analysis, indirect impacts on generators and blenders were also examined. We understand that some portion of the combustor's compliance costs would most likely be passed on to generators and blenders, and we have made an effort to analyze these impacts in the spirit of the legislation.

We found that indirect economic effects on generators would not impose a significant impact on a substantial number of small generators. Under both price pass-through scenarios (25 and 75 percent), some generators exceeded the one percent cost as percentage of sales threshold for ''significant impacts.'' In no case, however, was the ''substantial number'' threshold exceeded. Under the 25 percent pass-through scenario, 18 generators had a cost as percentage of sales greater than one percent, but that accounts for only 0.85 percent of all small business generators. While the impact threshold was exceeded by 58 generators in the 75 percent pass through scenario, this is still less than the 100 entity threshold established for a substantial number. You should note that the sales thresholds were selected conservatively as the average sales for the smallest establishments in the SIC code.

Like generators, blenders do not incur direct costs as a result of the rule. However, they may bear a portion of its impact indirectly as costs are passed through from combustors. A total of 21 small business blenders were identified. Depending on the pass-through assumption, between six and 14 blenders exceed the significant impact threshold. Impacts for some of these facilities were found to represent a significant share of their annual gross sales.

Under the 25 percent price pass-through scenario, the number of blenders exceeding the cost as percentage of sales threshold do not represent a substantial number of facilities, either in absolute number or as a percentage of total blenders. Under the 75 percent scenario, however, the 14 establishments with cost as percentage of sales greater than one percent represent just over 20 percent of the 67 blenders identified for this analysis. In a few cases, the cost as percentage of sales could exceed 10 percent.

E. Key Assumptions and Limitations

This analysis was based on several simplifying assumptions. Four key assumptions may have the most significant impact on findings. First, not all small generators may be captured in our analysis of small business dominated industries. This exclusion may be offset by the fact that some generators who are not small may be incorporated in the small business dominated industries. Second, to calculate the benchmark sales for generators, we used average sales by four-digit SIC code for firms with fewer than 20 employees. This may understate economic impacts for the smallest firms in the industry while overstating impacts for larger firms. Third, compliance costs were assumed to be passed through almost completely to the shipper of the waste. This may overstate the impact on generators and blenders. Finally, we assumed that all waste currently managed by combustion continues to be disposed of in this manner. Impacts on combustors, generators, and blenders may be overstated if waste minimization or other lower cost alternatives are available.

Results from this report should also be evaluated within the context of some key analytical limitations. For example, in recent years there has been significant volatility in market behavior and pricing practices in the hazardous waste combustion industry. Furthermore, combustion prices have experienced a general downward tend since 1985 as a result of overcapacity in the market and slow growth in the generation of hazardous waste. Accounting for this price trend, the increase expected under today's rule may affect generators and blenders less significantly than anticipated. Finally, many hazardous waste generators may be more concerned about other aspects of waste management than with prices.

X. Were Derived Air Quality and Non-Air Impacts Considered?

The final Combustion MACT standards are projected to result in the reallocation and diversion of relatively small amounts of hazardous waste resulting in an unspecified increase in the level of fossil fuel substitution. This substitution with nonhazardous waste fuel sources may result in marginal increases in the annual number of mining and transport injuries, in addition to potential increased emissions of criteria pollutants (SO_x, NO_x, and CO_2). We recognize these concerns but feel any potential non-air impacts are largely addressed through alternative regulatory or market scenarios. First, some of the hazardous waste reallocated from current combustors will likely be sent to other waste-burning facilities, thereby off-setting primary or supplementary fossil fuel usage. Even if fossil fuel burning does increase to some degree, these SO_2 and NO_x emissions are expected to be regulated under existing standards, *e.g.*, criteria pollutant emissions are currently addressed by the Clean Air Act. Finally, we find that even if fossil fuel use is increased, the risks to miners (primarily coal miners) are voluntary risks. Miners are compensated for these increased risks through wage premiums established in response to market dynamics and recurrent negotiations between union and corporate representatives.

While the primary environmental impact of the MACT standards are improvements in air quality resulting from emissions reductions at combustion facilities, other non-air environmental impacts also result from the rule. Namely, use of some air pollution control equipment and shifts in waste burning result in increased water, solid waste, and energy impacts. We did not assess the monetary costs of these impacts because we expect the incremental costs will be small relative to the total compliance costs of the rule. You are requested to review the Addendum prepared in support of today's final rule for an expanded discussion of these impacts.

XI. The Congressional Review Act (5 U.S.C. 801 et seq., as Added by the Small Business Regulatory Enforcement Fairness Act of 1996)

Is Today's Rule Subject to Congressional Review?

The Congressional Review Act, 5 U.S.C. 801 *et seq.*, as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. EPA will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the **Federal Register**. A Major rule cannot take effect until 60 days after it is published in the **Federal Register**. This action is not a ''major rule'' as defined by 5 U.S.C. 804(2). This rule will be effective September 30, 1999.

XII. Paperwork Reduction Act (PRA), 5 U.S.C. 3501–3520

How Is the Paperwork Reduction Act Considered in Today's Rule?

The Office of Management and Budget (OMB) has approved the information collection requirements (ICR) contained in this rule under the provisions of the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.* and has assigned OMB control numbers 2050–0073 (''New and Amended RCRA Reporting and Recordkeeping Requirements for Boilers and Industrial Furnaces Burning Hazardous Waste'') for the RCRA provisions and 2060–0349 (''New and Amended Reporting and Recordkeeping Requirements for National Emissions Standards for Hazardous Air Pollutants from Hazardous Waste Combustors'') for the CAA provisions.

EPA is required under section 112(d) of the Clean Air Act to regulate emissions of HAPs listed in section 112(b). The requested information is needed as part of the overall compliance and enforcement program. The ICR requires that affected sources retain records of parameter and emissions monitoring data at facilities for a period of five years, which is consistent with the General Provisions to 40 CFR part 63 and the permit requirements under 40 CFR part 70. All sources subject to this rule will be required to obtain operating permits either through the State-approved permitting program or, if one does not exist, in accordance with the provisions of 40 CFR part 71, when promulgated. Section 3007(b) of RCRA and 40 CFR part 2, subpart B, which defines EPA's general policy on the public disclosure of information, contain provisions for confidentiality.

The public reporting burden for this collection of information for the CAA provisions under OMB control number 2060–0349 is estimated to average 297 hours per respondent per year for an estimated 229 respondents. The annual public reporting and record keeping burden for collection of information is estimated to be 67,977 hours and a cost of approximately $1.6 million. The total annualized capital costs and total annualized operation and maintenance costs associated with these requirements are $15,000 and nearly $1.6 million, respectively.

The estimates for RCRA provisions under OMB control number 2050–0073 include an annual public reporting and record keeping burden *reduction* for collection of information of 131,228 hours and a cost burden *reduction* of $4.9 million. The reductions in total annualized capital costs and total annualized operation and maintenance costs associated with these requirements are $2.1 million and $2.8 million, respectively. The negative cost represents the reduced burden on 25 facilities getting out of the hazardous waste combustor universe due to the comparable fuels exemption. A further reduction in this RCRA information collection requirement burden will occur after three years when the combustors will start reporting under the CAA information collection requirements.

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

An Agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA's regulations are listed in 40 CFR part 9 and 48 CFR Chapter 15. EPA is amending the table in 40 CFR part 9 of currently approved ICR control numbers issued by OMB for various regulations to list the information requirements contained in this final rule.

XIII. National Technology Transfer and Advancement Act of 1995 (Pub L. 104–113, § 12(d) (15 U.S.C. 272 Note)

Was the National Technology Transfer and Advancement Act Considered?

The rulemaking involves technical standards. Therefore, EPA conducted a search to identify potentially applicable voluntary consensus standards (VCS). However, we identified no such standards, and none were brought to our attention in the comments, that would ensure consistency throughout the regulated community. Our response-to-comments document discusses this determination. Therefore, we have decided to use the Air Methods contained in part 60, appendix A.

As noted in the proposed rule, the National Technology Transfer and Advancement Act of 1995 (NTTAA) directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (*e.g.*, materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies. The NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards.

In the proposal, we discussed the manual emission test methods that would be required for emission tests and calibration of continuous emission monitors and relied heavily on the BIF methods in 40 CFR part 266, appendix IX. On December 30, 1997, we published a NODA which in part questioned whether the task of determining the appropriate manual method tests to be used for compliance should be simplified. The stack sampling and analysis methods for hazardous waste combustors are under the current BIF and incinerator rules for compliance tests (with a few exceptions) that are located in SW–846. For compliance with the New Source Performance Standard and other air rules, methods are located in 40 CFR part 60, appendix A. Potentially, you could be required to perform two identical tests, one for compliance with MACT or RCRA and one for compliance with other air rules, using identical test methods simply because one method is an ''SW–846'' method and the other an ''air method.'' Further, the NODA stated that stack test methods hazardous waste combustors use for compliance should be found in one place to facilitate compliance. Therefore, we stated our intention to reference 40 CFR part 60, appendix A (Except for dioxin/furans, where we stated method 0023A of SW–846.), when it requires a specific stack-sampling test method.

Since the time of the proposal, we instituted the ''Performance-Based Measurement System.'' This system identifies performance related criteria that can be used to evaluate alternative methods. Methods determined to contain criteria or are a ''Methods-Based Parameters'' method are required, and are the only methods that can be used for regulatory tests.

Commenters generally supported use of the Air Methods contained in part 60, appendix A, or their ''SW–846'' equivalent. Furthermore, because these methods were used to establish the final standards contained in today's rulemaking, application of non approved methods would result in unreliable and inconsistent measurements. Therefore, today's rule will require the use of the Air Methods contained in part 60, appendix A. Section 63.7 describes procedures for the use of alternative test methods for MACT sources. This procedure involves using Method 301 of part 63, appendix A, to validate an alternate test method and submitting the data to us. We then decide if the proposed method is acceptable. Absent this approval under § 63.7 procedures, alternate methods cannot be used.

Today's rule, by requiring the use of only part 60, appendix A methods (method 0023A of SW–846 for dioxin/furans) for compliance determinations and particulate matter continuous emission monitor correlations, would maintain national consistency with the selection of specific manual stack sampling methods. We have determined that this approach would facilitate ease of implementation with today's ''self implementing'' MACT rule. Again, alternate methods may be approved by the Administrator via the provisions of § 63.7(f) and part § 63, appendix A, Method 301, Field Validation or Pollutant Measurement Methods from Various Waste Media.

XIV. Executive Order 13084: Consultation and Coordination With Indian Tribal Governments (63 FR 27655)

Were Tribal Government Issues Considered?

The requirements of section 3(b) of Executive Order 13084 do not apply to this rule. They apply to rules that are not required by statute, that significantly or uniquely affect the communities of Indian tribal governments, and that impose substantial direct compliance costs on those communities. EPA cannot issue those rules unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by the tribal governments, or EPA consults with those governments and gives required information to OMB. But today's rule does not significantly or uniquely affect the communities of Indian tribal governments.

For many of the same reasons described in the Unfunded Mandates Reform Act discussion (section VI.C above), the requirements of Executive Order 13084 do not apply to today's rule. Promulgation of today's rule is under the statutory authority of the CAA. Also, while Executive Order 13084 does not provide a specific gauge for determining whether a regulation ''significantly or uniquely affects'' an Indian tribal government, today's rule does not impose substantial direct compliance costs on tribal governments and their communities. Tribal communities are not predominantly located near hazardous waste combustion facilities, when compared with other communities throughout the nation. Finally, tribal governments will not be required to assume any permitting responsibilities associated with this final rule because permitting authority is voluntary for nonfederal government entities.

Shortly after forming the regulatory workgroup for this rulemaking in April 1994, we looked for ways to obtain the input of state, local, and tribal governments into the rulemaking process. As a result, representatives from four State environmental agencies agreed to participate in the workgroup. These representatives were asked to consider the impacts of this rule of the state, local, and tribal level. These representatives served on the workgroup until Final Agency Review in November 1998. As members of the workgroup, they participated in workgroup meetings and conference calls resulting in the development of rulemaking issues and their solutions. They also provided written comments on our work products on several occasions, including the proposal, the May 1997 NODA, and the Final Agency Review package.

In their comments on the proposal and subsequent notices of data availability, these representatives raised concerns over the following issues:

—Use of site-specific risk assessments under RCRA
—Continuous emissions monitors
—Manual sampling methods
—Compliance schedule
—Use of test data to establish operating limits
—Automatic waste feed cutoffs
—Performance testing schedule
—Recordkeeping requirements
—Permitting issues
—Assessment of potential costs and benefits
—Human health benefits
—Area sources
—Notification and reporting requirements
—Protectiveness of human health as required by RCRA
—Redundant requirements
—State authorization
—Public participation
—CAAA and RCRA coordination

—Adequate public comment
—Implementation flexibility
—Allocation of grants
—And many other technical issues

We addressed the issues raised by these four representatives to the fullest extent possible in today's rule. The comments received from these representatives are included in the rulemaking docket, together with all other comments received. We highlighted and addressed some of these comments in today's preamble. We responded to all comments in the Response to Comments document, which has been made available to the Office of Management and Budget and is available in the docket for today's rule.

Part Nine: Technical Amendments to Previous Regulations

I. Changes to the June 19, 1998 ''Fast-Track'' Rule

A. Permit Streamlining Section

Today's regulations correct a typographical error to § 270.42 Appendix I entry L(9) promulgated in the Fast-track rule. Entry L(9) incorrectly cited § 270.42(i), whereas today's regulations correctly amends entry L(9) to cite § 270.42(j).

B. Comparable Fuels Section

In the June 19th rule, we explained that our methodology for identifying the comparable fuels specifications was to select the highest benchmark fuel value in our data base for each constituent (see 63 FR at 33786). However, the results reported in the final rule—Table 1 to § 261.38—do not consistently follow our methodology. In several instances, the highest value was not presented in the table, as pointed out by commenters to the final rule. Therefore, in today's rule, we are amending the comparable fuels portion of the Fast-track rule to make necessary conforming changes to the comparable fuels specifications as listed in Table 1 of § 261.38—Detection and Detection Limit Values for Comparable Fuel Specifications. Please see the USEPA, ''Final Technical Support Document for HWC MACT Standards, Volume 4'' July 1999, for a detailed discussion of the changes to Table 1.

In addition, because these are technical corrections (i.e. corrections where we made arithmetic or other inadvertent mistakes in applying our stated methodology for calculating the comparative fuel levels) we find that giving notice and opportunity for public comment is unnecessary within the meaning of 5 U.S.C. 553 (b) (B). In fact, the errors were brought to our attention by an entity that applied the stated methodology and derived the correct values which we are restoring in this amendment. (We did, however, provide actual notice of these intended corrections to entities we believed most interested in the issue, so that these entities did have an opportunity for comment to us.) For the same reasons, we find that there is good cause for the rule to take effect immediately, rather than wait 30 days. See 5 U.S.C. 553 (d) (3). Finally, since notice and comment is unnecessary, this correction is not a ''rule'' for purposes of the Regulatory Flexibility Act (see 5 U.S.C. 601 (2)), and may take effect immediately before submission to Congress for review (see 5 U.S.C. 808 (2)).

List of Subjects

40 CFR Part 60

Environmental protection, Administrative practice and procedure, Air pollution control, Aluminum, Ammonium sulfate plants, Batteries, Beverages, Carbon monoxide, Cement industry, Coal, Copper, Dry cleaners, Electric power plants, Fertilizers, Fluoride, Gasoline, Glass and glass products, Grains, Graphic arts industry, Heaters, Household appliances, Insulation, Intergovernmental relations, Iron, Labeling, Lead, Lime, Metallic and nonmetallic mineral processing plants, Metals, Motor vehicles, Natural gas, Nitric acid plants, Nitrogen dioxide, Paper and paper products industry, Particulate matter, Paving and roofing materials, Petroleum, Phosphate, Plastics materials and synthetics, Polymers, Reporting and recordkeeping requirements, Sewage disposal, Steel, Sulfur oxides, Sulfuric acid plants, Tires, Urethane, Vinyl, Volatile organic compounds, Waste treatment and disposal, Zinc.

40 CFR Part 63

Air pollution control, Hazardous substances, Incorporation by Reference, Reporting and recordkeeping requirements

40 CFR Part 260

Administrative practice and procedure, Confidential business information, Environmental protection, Hazardous waste.

40 CFR Part 261

Environmental Protection Hazardous waste, Recycling, Reporting and recordkeeping requirements.

40 CFR Part 264

Air pollution control, Environmental protection, Hazardous waste, Insurance, Packaging and containers, Reporting and recordkeeping requirements, Security measures, Surety bonds.

40 CFR Part 265

Air pollution control, Environmental protection, Hazardous waste, Insurance, Packaging and containers, Reporting and recordkeeping requirements, Security measures, Surety bonds, Water supply.

40 CFR Part 266

Environmental protection, Energy, Hazardous waste, Recycling, Reporting and recordkeeping requirements.

40 CFR Part 270

Administrative practice and procedure, Confidential business information, Environmental Protection Agency, Hazardous materials transportation, Hazardous waste, Reporting and recordkeeping requirements, Water pollution control, Water supply.

40 CFR Part 271

Administrative practice and procedure, Confidential business information, Environmental Protection Agency, Hazardous materials transportation, Hazardous waste, Indians-lands, Intergovernmental relations, Penalties, Reporting and recordkeeping requirements, Water pollution control, Water supply.

Dated: July 30, 1999.

Carol M. Browner,

Administrator..

For the reasons set out in the preamble, title 40 of the Code of Federal Regulations is amended as follows:

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

1. The authority citation for part 60 continues to read as follows:

Authority: 42 U.S.C. 7401–7601.

2. Appendix A to part 60 is amended by adding a new entry for ''Method 5I'' in numerical order to read as follows:

Appendix A—Test Methods

* * * * *

Method 5I—Determination of Low Level Particulate Matter Emissions From Stationary Sources

Note: This method does not include all of the specifications (*e.g.*, equipment and supplies) and procedures (*e.g.*, sampling and analytical) essential to its performance. Certain information is contained in other EPA procedures found in this part. Therefore, to obtain reliable results, persons using this method should have experience with and a thorough knowledge of the following Methods: Methods 1, 2, 3, 4 and 5.

1. *Scope and Application.*

1.1 Analyte. Particulate matter (PM). No CAS number assigned.

1.2 Applicability. This method is applicable for the determination of low level particulate matter (PM) emissions from stationary sources. The method is most effective for total PM catches of 50 mg or less. This method was initially developed for performing correlation of manual PM measurements to PM continuous emission monitoring systems (CEMS), however it is also useful for other low particulate concentration applications.

1.3 Data Quality Objectives. Adherence to the requirements of this method will enhance the quality of the data obtained from air pollutant sampling methods. Method 5I requires the use of paired trains. Acceptance criteria for the identification of data quality outliers from the paired trains are provided in Section 12.2 of this Method.

2. *Summary of Method.*

2.1. Description. The system setup and operation is essentially identical to Method 5. Particulate is withdrawn isokinetically from the source and collected on a 47 mm glass fiber filter maintained at a temperature of 120 ± 14°C (248 ± 25°F). The PM mass is determined by gravimetric analysis after the removal of uncombined water. Specific measures in this procedure designed to improve system performance at low particulate levels include:

1. Improved sample handling procedures
2 Light weight sample filter assembly
3. Use of low residue grade acetone

Accuracy is improved through the minimization of systemic errors associated with sample handling and weighing procedures. High purity reagents, all glass, grease free, sample train components, and light weight filter assemblies and beakers, each contribute to the overall objective of improved precision and accuracy at low particulate concentrations.

2.2 Paired Trains. This method must be performed using a paired train configuration. These trains may be operated as co-located trains (to trains operating collecting from one port) or as simultaneous trains (separate trains operating from different ports at the same time). Procedures for calculating precision of the paired trains are provided in Section 12.

2.3 Detection Limit. a. Typical detection limit for manual particulate testing is 0.5 mg. This mass is also cited as the accepted weight variability limit in determination of ‘‘constant weight’’ as cited in Section 8.1.2 of this Method. EPA has performed studies to provide guidance on minimum PM catch. The minimum detection limit (MDL) is the minimum concentration or amount of an analyte that can be determined with a specified degree of confidence to be different from zero. We have defined the minimum or target catch as a concentration or amount sufficiently larger than the MDL to ensure that the results are reliable and repeatable. The particulate matter catch is the product of the average particulate matter concentration on a mass per volume basis and the volume of gas collected by the sample train. The tester can generally control the volume of gas collected by increasing the sampling time or to a lesser extent by increasing the rate at which sample is collected. If the tester has a reasonable estimate of the PM concentration from the source, the tester can ensure that the target catch is collected by sampling the appropriate gas volume.

b. However, if the source has a very low particulate matter concentration in the stack, the volume of gas sampled may need to be very large which leads to unacceptably long sampling times. When determining compliance with an emission limit, EPA guidance has been that the tester does not always have to collect the target catch. Instead, we have suggested that the tester sample enough stack gas, that if the source were exactly at the level of the emission standard, the sample catch would equal the target catch. Thus, if at the end of the test the catch were smaller than the target, we could still conclude that the source is in compliance though we might not know the exact emission level. This volume of gas becomes a target volume that can be translated into a target sampling time by assuming an average sampling rate. Because the MDL forms the basis for our guidance on target sampling times, EPA has conducted a systematic laboratory study to define what is the MDL for Method 5 and determined the Method to have a calculated practical quantitation limit (PQL) of 3 mg of PM and an MDL of 1 mg.

c. Based on these results, the EPA has concluded that for PM testing, the target catch must be no less than 3 mg. Those sample catches between 1 mg and 3 mg are between the detection limit and the limit of quantitation. If a tester uses the target catch to estimate a target sampling time that results in sample catches that are less than 3 mg, you should not automatically reject the results. If the tester calculated the target sampling time as described above by assuming that the source was at the level of the emission limit, the results would still be valid for determining that the source was in compliance. For purposes other than determining compliance, results should be divided into two categories—those that fall between 3 mg and 1 mg and those that are below 1 mg. A sample catch between 1 and 3 mg may be used for such purposes as calculating emission rates with the understanding that the resulting emission rates can have a high degree of uncertainty. Results of less than 1 mg should not be used for calculating emission rates or pollutant concentrations.

d. When collecting small catches such as 3 mg, bias becomes an important issue. Source testers must use extreme caution to reach the PQL of 3 mg by assuring that sampling probes are very clean (perhaps confirmed by low blank weights) before use in the field. They should also use low tare weight sample containers, and establish a well-controlled balance room to weigh the samples.

3. *Definitions.*

3.1 *Light Weight Filter Housing.* A smaller housing that allows the entire filtering system to be weighed before and after sample collection. (See. 6.1.3)

3.2 *Paired Train.* Sample systems trains may be operated as co-located trains (two sample probes attached to each other in the same port) or as simultaneous trains (two separate trains operating from different ports at the same time).

4. *Interferences.*

a. There are numerous potential interferents that may be encountered during performance of Method 5I sampling and analyses. This Method should be considered more sensitive to the normal interferents typically encountered during particulate testing because of the low level concentrations of the flue gas stream being sampled.

b. Care must be taken to minimize field contamination, especially to the filter housing since the entire unit is weighed (not just the filter media). Care must also be taken to ensure that no sample is lost during the sampling process (such as during port changes, removal of the filter assemblies from the probes, etc.).

c. Balance room conditions are a source of concern for analysis of the low level samples. Relative humidity, ambient temperatures variations, air draft, vibrations and even barometric pressure can affect consistent reproducible measurements of the sample media. Ideally, the same analyst who performs the tare weights should perform the final weights to minimize the effects of procedural differences specific to the analysts.

d. Attention must also be provided to weighing artifacts caused by electrostatic charges which may have to be discharged or neutralized prior to sample analysis. Static charge can affect consistent and reliable gravimetric readings in low humidity environments. Method 5I recommends a relative humidity of less than 50 percent in the weighing room environment used for sample analyses. However, lower humidity may be encountered or required to address sample precision problems. Low humidity conditions can increase the effects of static charge.

e. Other interferences associated with typical Method 5 testing (sulfates, acid gases, etc.) are also applicable to Method 5I.

5. *Safety.*

Disclaimer. This method may involve hazardous materials, operations, and equipment. This test method may not address all of the safety concerns associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to determine the applicability and observe all regulatory limitations before using this method.

6. *Equipment and Supplies.*

6.1 Sample Collection Equipment and Supplies. The sample train is nearly identical in configuration to the train depicted in Figure 5–1 of Method 5. The primary difference in the sample trains is the lightweight Method 5I filter assembly that attaches directly to the exit to the probe. Other exceptions and additions specific to Method 5I include:

6.1.1 Probe Nozzle. Same as Method 5, with the exception that it must be constructed of borosilicate or quartz glass tubing.

6.1.2 Probe Liner. Same as Method 5, with the exception that it must be constructed of borosilicate or quartz glass tubing.

6.1.3 Filter Holder. The filter holder is constructed of borosilicate or quartz glass front cover designed to hold a 47-mm glass fiber filter, with a wafer thin stainless steel (SS) filter support, a silicone rubber or Viton O-ring, and Teflon tape seal. This holder design will provide a positive seal against leakage from the outside or around the filter. The filter holder assembly fits into a SS filter holder and attaches directly to the outlet of the probe. The tare weight of the filter, borosilicate or quartz glass holder, SS filter support, O-ring and Teflon tape seal generally will not exceed approximately 35 grams. The filter holder is designed to use a 47-mm glass fiber filter meeting the quality criteria in of Method 5. These units are commercially available from several source testing equipment vendors. Once the filter holder has been assembled, desiccated and tared, protect it from external sources of contamination by covering the front socket with a ground glass plug. Secure the plug with an impinger clamp or other item that will ensure a leak-free fitting.

6.2 Sample Recovery Equipment and Supplies. Same as Method 5, with the following exceptions:

6.2.1 Probe-Liner and Probe-Nozzle Brushes. Teflon® or nylon bristle brushes with stainless steel wire handles, should be used to clean the probe. The probe brush must have extensions (at least as long as the probe) of Teflon, nylon or similarly inert material. The brushes must be properly sized and shaped for brushing out the probe liner and nozzle.

6.2.2 Wash Bottles. Two Teflon wash bottles are recommended however, polyethylene wash bottles may be used at the option of the tester. Acetone should not be stored in polyethylene bottles for longer than one month.

6.2.3 Filter Assembly Transport. A system should be employed to minimize contamination of the filter assemblies during transport to and from the field test location. A carrying case or packet with clean compartments of sufficient size to accommodate each filter assembly can be used. This system should have an air tight seal to further minimize contamination during transport to and from the field.

6.3 Analysis Equipment and Supplies. Same as Method 5, with the following exception:

6.3.1 Lightweight Beaker Liner. Teflon or other lightweight beaker liners are used for the analysis of the probe and nozzle rinses. These light weight liners are used in place of the borosilicate glass beakers typically used for the Method 5 weighings in order to improve sample analytical precision.

6.3.2 Anti-static Treatment. Commercially available gaseous anti-static rinses are recommended for low humidity situations that contribute to static charge problems.

7. *Reagents and Standards.*

7.1 Sampling Reagents. The reagents used in sampling are the same as Method 5 with the following exceptions:

7.1.1 Filters. The quality specifications for the filters are identical to those cited for Method 5. The only difference is the filter diameter of 47 millimeters.

7.1.2 Stopcock Grease. Stopcock grease cannot be used with this sampling train. We recommend that the sampling train be assembled with glass joints containing O-ring seals or screw-on connectors, or similar.

7.1.3 Acetone. Low residue type acetone, ≤0.001 percent residue, purchased in glass bottles is used for the recovery of particulate matter from the probe and nozzle. Acetone from metal containers generally has a high residue blank and should not be used. Sometimes, suppliers transfer acetone to glass bottles from metal containers; thus, acetone blanks must be run prior to field use and only acetone with low blank values (≤0.001 percent residue, as specified by the manufacturer) must be used. Acetone blank correction is not allowed for this method; therefore, it is critical that high purity reagents be purchased and verified prior to use.

7.1.4 Gloves. Disposable, powder-free, latex surgical gloves, or their equivalent are used at all times when handling the filter housings or performing sample recovery.

7.2 Standards. There are no applicable standards or audit samples commercially available for Method 5I analyses.

8. *Sample Collection, Preservation, Storage, and Transport.*

8.1 Pretest Preparation. Same as Method 5 with several exceptions specific to filter assembly and weighing.

8.1.1 Filter Assembly. Uniquely identify each filter support before loading filters into the holder assembly. This can be done with an engraving tool or a permanent marker. Use powder free latex surgical gloves whenever handling the filter holder assemblies. Place the O-ring on the back of the filter housing in the O-ring groove. Place a 47 mm glass fiber filter on the O-ring with the face down. Place a stainless steel filter holder against the back of the filter. Carefully wrap 5 mm (1⁄4 inch) wide Teflon'' tape one timearound the outside of the filter holder overlapping the stainless steel filter support by approximately 2.5 mm (1⁄8 inch). Gently brush the Teflon tape down on the back of the stainless steel filter support. Store the filter assemblies in their transport case until time for weighing or field use.

8.1.2 Filter Weighing Procedures. a. Desiccate the entire filter holder assemblies at 20 ± 5.6°C (68 ± 10°F) and ambient pressure for at least 24 hours. Weigh at intervals of at least 6 hours to a constant weight, *i.e.,* 0.5 mg change from previous weighing. Record the results to the nearest 0.1 mg. During each weighing, the filter holder assemblies must not be exposed to the laboratory atmosphere for a period greater than 2 minutes and a relative humidity above 50 percent. Lower relative humidity may be required in order to improve analytical precision. However, low humidity conditions increase static charge to the sample media.

b. Alternatively (unless otherwise specified by the Administrator), the filters holder assemblies may be oven dried at 105°C (220°F) for a minimum of 2 hours, desiccated for 2 hours, and weighed. The procedure used for the tare weigh must also be used for the final weight determination.

c. Experience has shown that weighing uncertainties are not only related to the balance performance but to the entire weighing procedure. Therefore, before performing any measurement, establish and follow standard operating procedures, taking into account the sampling equipment and filters to be used.

8.2 Preliminary Determinations. Select the sampling site, traverse points, probe nozzle, and probe length as specified in Method 5.

8.3 Preparation of Sampling Train. Same as Method 5, Section 8.3, with the following exception: During preparation and assembly of the sampling train, keep all openings where contamination can occur covered until justbefore assembly or until sampling is about to begin. Using gloves, place a labeled (identified) and weighed filter holder assembly into the stainless steel holder. Then place this whole unit in the Method 5 hot box, and attach it to the probe. Do not use stopcock grease.

8.4 Leak-Check Procedures. Same as Method 5.

8.5 Sampling Train Operation.

8.5.1. Operation. Operate the sampling train in a manner consistent with those described in Methods 1, 2, 4 and 5 in terms of the number of sample points and minimum time per point. The sample rate and total gas volume should be adjusted based on estimated grain loading of the source being characterized. The total sampling time must be a function of the estimated mass of particulate to be collected for the run. Targeted mass to be collected in a typical Method 5I sample train should be on the order of 10 to 20 mg. Method 5I is most appropriate for total collected masses of less than 50 milligrams, however, there is not an exact particulate loading cutoff, and it is likely that some runs may exceed 50 mg. Exceeding 50 mg (or less than 10 mg) for the sample mass does not necessarily justify invalidating a sample run if all other Method criteria are met.

8.5.2 Paired Train. This Method requires PM samples be collected with paired trains.

8.5.2.1 It is important that the systems be operated truly simultaneously. This implies that both sample systems start and stop at the same times. This also means that if one sample system is stopped during the run, the other sample systems must also be stopped until the cause has been corrected.

8.5.2.2 Care should be taken to maintain the filter box temperature of the paired trains as close as possible to the Method required temperature of 120 ± 14°C (248 ± 25°F). If separate ovens are being used for simultaneously operated trains, it is recommended that the oven temperature of each train be maintained within ± 14°C (± 25°F) of each other.

8.5.2.3 The nozzles for paired trains need not be identically sized.

8.5.2.4 Co-located sample nozzles must be within the same plane perpendicular to the gas flow. Co-located nozzles and pitot assemblies should be within a 6.0 cm × 6.0 cm square (as cited for a quadruple train in Reference Method 301).

8.5.3 Duplicate gas samples for molecular weight determination need not be collected.

8.6 Sample Recovery. Same as Method 5 with several exceptions specific to the filter housing.

8.6.1 Before moving the sampling train to the cleanup site, remove the probe from the train and seal the nozzle inlet and outlet of the probe. Be careful not to lose any condensate that might be present. Cap the filter inlet using a standard ground glass plug and secure the cap with an impinger clamp. Remove the umbilical cord from the last impinger and cap the impinger. If a flexible line is used between the first impinger condenser and the filter holder, disconnect the line at the filter holder and let any condensed water or liquid drain into the impingers or condenser.

8.6.2 Transfer the probe and filter-impinger assembly to the cleanup area. This area must be clean and protected from the wind so that the possibility of losing any of the sample will be minimized.

8.6.3 Inspect the train prior to and during disassembly and note any abnormal conditions such as particulate color, filter loading, impinger liquid color, etc.

8.6.4 Container No. 1, Filter Assembly. Carefully remove the cooled filter holder assembly from the Method 5 hot box and place it in the transport case. Use a pair of clean gloves to handle the filter holder assembly.

8.6.5 Container No. 2, Probe Nozzle and Probe Liner Rinse. Rinse the probe and nozzle components with acetone. Be certain that the probe and nozzle brushes have been thoroughly rinsed prior to use as they can be a source of contamination.

8.6.6 All Other Train Components. (Impingers) Same as Method 5.

8.7 Sample Storage and Transport. Whenever possible, containers should be shipped in such a way that they remain upright at all times. All appropriate dangerous goods shipping requirements must be observed since acetone is a flammable liquid.

9. *Quality Control.*

9.1 Miscellaneous Field Quality Control Measures.

9.1.1 A quality control (QC) check of the volume metering system at the field site is suggested before collecting the sample using the procedures in Method 5, Section 4.4.1.

9.1.2 All other quality control checks outlined in Methods 1, 2, 4 and 5 also apply to Method 5I. This includes procedures such as leak-checks, equipment calibration checks, and independent checks of field data sheets for reasonableness and completeness.

9.2 Quality Control Samples.

9.2.1 Required QC Sample. A laboratory reagent blank must be collected and analyzed for each lot of acetone used for a field program to confirm that it is of suitable purity. The particulate samples cannot be blank corrected.

9.2.2 Recommended QC Samples. These samples may be collected and archived for future analyses.

9.2.2.1 A field reagent blank is a recommended QC sample collected from a portion of the acetone used for cleanup of the probe and nozzle. Take 100 ml of this acetone directly from the wash bottle being used and place it in a glass sample container labeled ''field acetone reagent blank.'' At least one field reagent blank is recommended for every five runs completed. The field reagent blank samples demonstrate the purity of the acetone was maintained throughout the program.

9.2.2.2 A field bias blank train is a recommended QC sample. This sample is collected by recovering a probe and filter assembly that has been assembled, taken to the sample location, leak checked, heated, allowed to sit at the sample location for a similar duration of time as a regular sample run, leak-checked again, and then recovered in the same manner as a regular sample. Field bias blanks are not a Method requirement, however, they are recommended and are very useful for identifying sources of contamination in emission testing samples. Field bias blank train results greater than 5 times the method detection limit may be considered problematic.

10. *Calibration and Standardization* Same as Method 5, Section 5.

11. *Analytical Procedures.*

11.1 Analysis. Same as Method 5, Sections 11.1—11.2.4, with the following exceptions:

11.1.1 Container No. 1. Same as Method 5, Section 11.2.1, with the following exception: Use disposable gloves to remove each of the filter holder assemblies from the desiccator, transport container, or sample oven (after appropriate cooling).

11.1.2 Container No. 2. Same as Method 5, Section 11.2.2, with the following exception: It is recommended that the contents of Container No. 2 be transferred to a 250 ml beaker with a Teflon liner or similar container that has a minimal tare weight before bringing to dryness.

12. *Data Analysis and Calculations.*

12.1 Particulate Emissions. The analytical results cannot be blank corrected for residual acetone found in any of the blanks. All other sample calculations are identical to Method 5.

12.2 Paired Trains Outliers. a. Outliers are identified through the determination of precision and any systemic bias of the paired trains. Data that do not meet this criteria should be flagged as a data quality problem. The primary reason for performing dual train sampling is to generate information to quantify the precision of the Reference Method data. The relative standard deviation (RSD) of paired data is the parameter used to quantify data precision. RSD for two simultaneously gathered data points is determined according to:

$$RSD = 100\% * \left|(C_a - C_b)\right| / (C_a + C_b)$$

where, Ca and Cb are concentration values determined from trains A and B respectively. For RSD calculation, the concentration units are unimportant so long as they are consistent.

b. A minimum precision criteria for Reference Method PM data is that RSD for any data pair must be less than 10% as long as the mean PM concentration is greater than 10 mg/unit volume. If the mean PM concentration is less than 10 mg/unit volume higher RSD values are acceptable. At mean PM concentration of 1 mg/unit volume acceptable RSD for paired trains is 25%. Between 1 and 10 mg/unit volume acceptable RSD criteria should be linearly scaled from 25% to 10%. Pairs of manual method data exceeding these RSD criteria should be eliminated from the data set used to develop a PM CEMS correlation or to assess RCA.

13. *Method Performance. [Reserved]*

14. *Pollution Prevention. [Reserved]*

15. *Waste Management. [Reserved]*

16. *Alternative Procedures.* Same as Method 5.

17. *Bibliography.* Same as Method 5.

18. *Tables, Diagrams, Flowcharts and Validation Data.* Figure 5I–1 is a schematic of the sample train.

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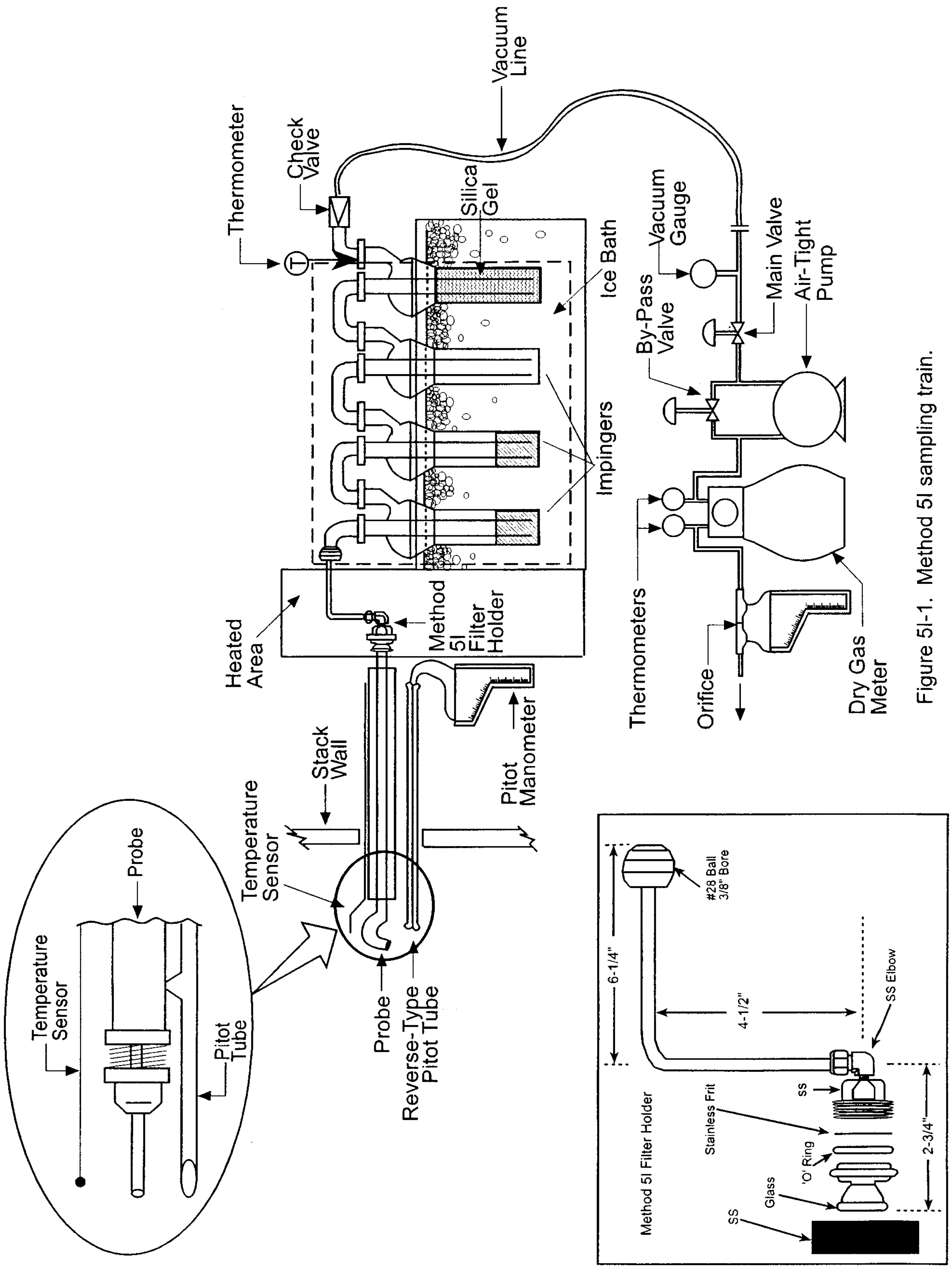

Figure 5I-1. Method 5I sampling train.

3. Appendix B to part 60 is amended by adding Performance Specifications 4B and 8A in numerical order to read as follows:

Appendix B—Performance Specifications

* * * * *

Performance Specification 4B—-Specifications and test procedures for carbon monoxide and oxygen continuous monitoring systems in stationary sources

a. Applicability and Principle

1.1 Applicability. a. This specification is to be used for evaluating the acceptability of carbon monoxide (CO) and oxygen (O_2) continuous emission monitoring systems (CEMS) at the time of or soon after installation and whenever specified in the regulations. The CEMS may include, for certain stationary sources, (a) flow monitoring equipment to allow measurement of the dry volume of stack effluent sampled, and (b) an automatic sampling system.

b. This specification is not designed to evaluate the installed CEMS' performance over an extended period of time nor does it identify specific calibration techniques and auxiliary procedures to assess the CEMS' performance. The source owner or operator, however, is responsible to properly calibrate, maintain, and operate the CEMS. To evaluate the CEMS' performance, the Administrator may require, under section 114 of the Act, the operator to conduct CEMS performance evaluations at times other than the initial test.

c. The definitions, installation and measurement location specifications, test procedures, data reduction procedures, reporting requirements, and bibliography are the same as in PS 3 (for O_2) and PS 4A (for CO) except as otherwise noted below.

1.2 Principle. Installation and measurement location specifications, performance specifications, test procedures, and data reduction procedures are included in this specification. Reference method tests, calibration error tests, calibration drift tests, and interferant tests are conducted to determine conformance of the CEMS with the specification.

b. Definitions

2.1 *Continuous Emission Monitoring System (CEMS).* This definition is the same as PS 2 Section 2.1 with the following addition. A continuous monitor is one in which the sample to be analyzed passes the measurement section of the analyzer without interruption.

2.2 *Response Time.* The time interval between the start of a step change in the system input and when the pollutant analyzer output reaches 95 percent of the final value.

2.3 *Calibration Error (CE).* The difference between the concentration indicated by the CEMS and the known concentration generated by a calibration source when the entire CEMS, including the sampling interface is challenged. A CE test procedure is performed to document the accuracy and linearity of the CEMS over the entire measurement range.

3. Installation and Measurement Location Specifications

3.1 *The CEMS Installation and Measurement Location.* This specification is the same as PS 2 Section 3.1 with the following additions. Both the CO and O_2 monitors should be installed at the same general location. If this is not possible, they may be installed at different locations if the effluent gases at both sample locations are not stratified and there is no in-leakage of air between sampling locations.

3.1.1 *Measurement Location.* Same as PS 2 Section 3.1.1.

3.1.2 *Point CEMS.* The measurement point should be within or centrally located over the centroidal area of the stack or duct cross section.

3.1.3 *Path CEMS.* The effective measurement path should: (1) Have at least 70 percent of the path within the inner 50 percent of the stack or duct cross sectional area, or (2) be centrally located over any part of the centroidal area.

3.2 *Reference Method (RM) Measurement Location and Traverse Points.* This specification is the same as PS 2 Section 3.2 with the following additions. When pollutant concentration changes are due solely to diluent leakage and CO and O_2 are simultaneously measured at the same location, one half diameter may be used in place of two equivalent diameters.

3.3 *Stratification Test Procedure.* Stratification is defined as the difference in excess of 10 percent between the average concentration in the duct or stack and the concentration at any point more than 1.0 meter from the duct or stack wall. To determine whether effluent stratification exists, a dual probe system should be used to determine the average effluent concentration while measurements at each traverse point are being made. One probe, located at the stack or duct centroid, is used as a stationary reference point to indicate change in the effluent concentration over time. The second probe is used for sampling at the traverse points specified in Method 1 (40 CFR part 60 appendix A). The monitoring system samples sequentially at the reference and traverse points throughout the testing period for five minutes at each point.

d. Performance and Equipment Specifications

4.1 Data Recorder Scale. For O_2, same as specified in PS 3, except that the span must be 25 percent. The span of the O_2 may be higher if the O_2 concentration at the sampling point can be greater than 25 percent. For CO, same as specified in PS 4A, except that the low-range span must be 200 ppm and the high range span must be 3000 ppm. In addition, the scale for both CEMS must record all readings within a measurement range with a resolution of 0.5 percent.

4.2 *Calibration Drift.* For O_2, same as specified in PS 3. For CO, the same as specified in PS 4A except that the CEMS calibration must not drift from the reference value of the calibration standard by more than 3 percent of the span value on either the high or low range.

4.3 *Relative Accuracy (RA).* For O_2, same as specified in PS 3. For CO, the same as specified in PS 4A.

4.4 *Calibration Error (CE).* The mean difference between the CEMS and reference values at all three test points (see Table I) must be no greater than 5 percent of span value for CO monitors and 0.5 percent for O_2 monitors.

4.5 *Response Time.* The response time for the CO or O_2 monitor must not exceed 2 minutes.

e. Performance Specification Test Procedure

5.1 *Calibration Error Test and Response Time Test Periods.* Conduct the CE and response time tests during the CD test period.

F. The CEMS Calibration Drift and Response Time Test Procedures

The response time test procedure is given in PS 4A, and must be carried out for both the CO and O_2 monitors.

7. Relative Accuracy and Calibration Error Test Procedures

7.1 *Calibration Error Test Procedure.* Challenge each monitor (both low and high range CO and O_2) with zero gas and EPA Protocol 1 cylinder gases at three measurement points within the ranges specified in Table I.

TABLE I. CALIBRATION ERROR CONCENTRATION RANGES

Measurement point	CO Low range (ppm)	CO High range (ppm)	O_2 (%)
1	0–40	0–600	0–2
2	60–80	900–1200	8–10
3	140–160	2100–2400	14–16

Operate each monitor in its normal sampling mode as nearly as possible. The calibration gas must be injected into the sample system as close to the sampling probe outlet as practical and should pass through all CEMS components used during normal sampling. Challenge the CEMS three non-consecutive times at each measurement point and record the responses. The duration of each gas injection should be sufficient to ensure that the CEMS surfaces are conditioned.

7.1.1 *Calculations.* Summarize the results on a data sheet. Average the differences between the instrument response and the certified cylinder gas value for each gas. Calculate the CE results according to:

$$CE = |d/FS| \times 100 \qquad (1)$$

where *d* is the mean difference between the CEMS response and the known reference concentration and *FS* is the span value.

7.2 *Relative Accuracy Test Procedure.* Follow the RA test procedures in PS 3 (for O_2) section 3 and PS 4A (for CO) section 4.

7.3 *Alternative RA Procedure.* Under some operating conditions, it may not be possible to obtain meaningful results using the RA test procedure. This includes conditions where consistent, very low CO emission or low CO emissions interrupted periodically by short duration, high level spikes are observed. It may be appropriate in these circumstances to waive the RA test and substitute the following procedure.

Conduct a complete CEMS status check following the manufacturer's written instructions. The check should include operation of the light source, signal receiver, timing mechanism functions, data acquisition and data reduction functions, data recorders, mechanically operated functions, sample filters, sample line heaters, moisture traps, and other related functions of the CEMS, as applicable. All parts of the CEMS must be functioning properly before the RA requirement can be waived. The instrument must also successfully passed the CE and CD specifications. Substitution of the alternate procedure requires approval of the Regional Administrator.

8. Bibliography

1. 40 CFR Part 266, Appendix IX, Section 2, ''Performance Specifications for Continuous Emission Monitoring Systems.''

* * * * *

Performance Specification 8A—Specifications and test procedures for total hydrocarbon continuous monitoring systems in stationary sources

1. Applicability and Principle

1.1 *Applicability.* These performance specifications apply to hydrocarbon (HC) continuous emission monitoring systems (CEMS) installed on stationary sources. The specifications include procedures which are intended to be used to evaluate the acceptability of the CEMS at the time of its installation or whenever specified in regulations or permits. The procedures are not designed to evaluate CEMS performance over an extended period of time. The source owner or operator is responsible for the proper calibration, maintenance, and operation of the CEMS at all times.

1.2 *Principle.* A gas sample is extracted from the source through a heated sample line and heated filter to a flame ionization detector (FID). Results are reported as volume concentration equivalents of propane. Installation and measurement location specifications, performance and equipment specifications, test and data reduction procedures, and brief quality assurance guidelines are included in the specifications. Calibration drift, calibration error, and response time tests are conducted to determine conformance of the CEMS with the specifications.

2. Definitions

2.1 *Continuous Emission Monitoring System (CEMS).* The total equipment used to acquire data, which includes sample extraction and transport hardware, analyzer, data recording and processing hardware, and software. The system consists of the following major subsystems:

2.1.1 *Sample Interface.* That portion of the system that is used for one or more of the following: Sample acquisition, sample transportation, sample conditioning, or protection of the analyzer from the effects of the stack effluent.

2.1.2 *Organic Analyzer.* That portion of the system that senses organic concentration and generates an output proportional to the gas concentration.

2.1.3 *Data Recorder.* That portion of the system that records a permanent record of the measurement values. The data recorder may include automatic data reduction capabilities.

2.2 *Instrument Measurement Range.* The difference between the minimum and maximum concentration that can be measured by a specific instrument. The minimum is often stated or assumed to be zero and the range expressed only as the maximum.

2.3 *Span or Span Value.* Full scale instrument measurement range. The span value must be documented by the CEMS manufacturer with laboratory data.

2.4 *Calibration Gas.* A known concentration of a gas in an appropriate diluent gas.

2.5 *Calibration Drift (CD).* The difference in the CEMS output readings from the established reference value after a stated period of operation during which no unscheduled maintenance, repair, or adjustment takes place. A CD test is performed to demonstrate the stability of the CEMS calibration over time.

2.6 *Response Time.* The time interval between the start of a step change in the system input (e.g., change of calibration gas) and the time when the data recorder displays 95 percent of the final value.

2.7 *Accuracy.* A measurement of agreement between a measured value and an accepted or true value, expressed as the percentage difference between the true and measured values relative to the true value. For these performance specifications, accuracy is checked by conducting a calibration error (CE) test.

2.8 *Calibration Error (CE).* The difference between the concentration indicated by the CEMS and the known concentration of the cylinder gas. A CE test procedure is performed to document the accuracy and linearity of the monitoring equipment over the entire measurement range.

2.9 *Performance Specification Test (PST) Period.* The period during which CD, CE, and response time tests are conducted.

2.10 *Centroidal Area.* A concentric area that is geometrically similar to the stack or duct cross section and is no greater than 1 percent of the stack or duct cross-sectional area.

3. Installation and Measurement Location Specifications

3.1 *CEMS Installation and Measurement Locations.* The CEMS must be installed in a location in which measurements representative of the source's emissions can be obtained. The optimum location of the sample interface for the CEMS is determined by a number of factors, including ease of access for calibration and maintenance, the degree to which sample conditioning will be required, the degree to which it represents total emissions, and the degree to which it represents the combustion situation in the firebox (where applicable). The location should be as free from in-leakage influences as possible and reasonably free from severe flow disturbances. The sample location should be at least two equivalent duct diameters downstream from the nearest control device, point of pollutant generation, or other point at which a change in the pollutant concentration or emission rate occurs and at least 0.5 diameter upstream from the exhaust or control device. The equivalent duct diameter is calculated as per 40 CFR part 60, appendix A, method 1, section 2.1. If these criteria are not achievable or if the location is otherwise less than optimum, the possibility of stratification should be investigated as described in section 3.2. The measurement point must be within the centroidal area of the stack or duct cross section.

3.2 *Stratification Test Procedure.* Stratification is defined as a difference in excess of 10 percent between the average concentration in the duct or stack and the concentration at any point more than 1.0 meter from the duct or stack wall. To determine whether effluent stratification exists, a dual probe system should be used to determine the average effluent concentration while measurements at each traverse point are being made. One probe, located at the stack or duct centroid, is used as a stationary reference point to indicate the change in effluent concentration over time. The second probe is used for sampling at the traverse points specified in 40 CFR part 60 appendix A, method 1. The monitoring system samples sequentially at the reference and traverse points throughout the testing period for five minutes at each point.

4. CEMS Performance and Equipment Specifications

If this method is applied in highly explosive areas, caution and care must be exercised in choice of equipment and installation.

4.1 *Flame Ionization Detector (FID) Analyzer.* A heated FID analyzer capable of meeting or exceeding the requirements of these specifications. Heated systems must maintain the temperature of the sample gas between 150 °C (300 °F) and 175 °C (350 °F) throughout the system. This requires all system components such as the probe, calibration valve, filter, sample lines, pump, and the FID to be kept heated at all times such that no moisture is condensed out of the system. The essential components of the measurement system are described below:

4.1.1 *Sample Probe.* Stainless steel, or equivalent, to collect a gas sample from the centroidal area of the stack cross-section.

4.1.2 *Sample Line.* Stainless steel or Teflon tubing to transport the sample to the analyzer.

Note: Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

4.1.3 *Calibration Valve Assembly.* A heated three-way valve assembly to direct the zero and calibration gases to the analyzer is recommended. Other methods, such as quick-connect lines, to route calibration gas to the analyzers are applicable.

4.1.4 *Particulate Filter.* An in-stack or out-of-stack sintered stainless steel filter is recommended if exhaust gas particulate loading is significant. An out-of-stack filter must be heated.

4.1.5 *Fuel.* The fuel specified by the manufacturer (e.g., 40 percent hydrogen/60 percent helium, 40 percent hydrogen/60 percent nitrogen gas mixtures, or pure hydrogen) should be used.

4.1.6 *Zero Gas.* High purity air with less than 0.1 parts per million by volume (ppm) HC as methane or carbon equivalent or less than 0.1 percent of the span value, whichever is greater.

4.1.7 *Calibration Gases.* Appropriate concentrations of propane gas (in air or nitrogen). Preparation of the calibration gases should be done according to the procedures in EPA Protocol 1. In addition, the manufacturer of the cylinder gas should provide a recommended shelf life for each calibration gas cylinder over which the concentration does not change by more than ±2 percent from the certified value.

4.2 *CEMS Span Value.* 100 ppm propane. The span value must be documented by the CEMS manufacturer with laboratory data.

4.3 *Daily Calibration Gas Values.* The owner or operator must choose calibration gas concentrations that include zero and high-level calibration values.

4.3.1 The zero level may be between zero and 0.1 ppm (zero and 0.1 percent of the span value).

4.3.2 The high-level concentration must be between 50 and 90 ppm (50 and 90 percent of the span value).

4.4 *Data Recorder Scale.* The strip chart recorder, computer, or digital recorder must be capable of recording all readings within the CEMS' measurement range and must have a resolution of 0.5 ppm (0.5 percent of span value).

4.5 *Response Time.* The response time for the CEMS must not exceed 2 minutes to achieve 95 percent of the final stable value.

4.6 *Calibration Drift.* The CEMS must allow the determination of CD at the zero and high-level values. The CEMS calibration response must not differ by more than ±3 ppm (±3 percent of the span value) after each 24-hour period of the 7-day test at both zero and high levels.

4.7 *Calibration Error.* The mean difference between the CEMS and reference values at all three test points listed below must be no greater than 5 ppm (±5 percent of the span value).

4.7.1 *Zero Level.* Zero to 0.1 ppm (0 to 0.1 percent of span value).

4.7.2 *Mid-Level.* 30 to 40 ppm (30 to 40 percent of span value).

4.7.3 *High-Level.* 70 to 80 ppm (70 to 80 percent of span value).

4.8 *Measurement and Recording Frequency.* The sample to be analyzed must pass through the measurement section of the analyzer without interruption. The detector must measure the sample concentration at least once every 15 seconds. An average emission rate must be computed and recorded at least once every 60 seconds.

4.9 *Hourly Rolling Average Calculation.* The CEMS must calculate every minute an hourly rolling average, which is the arithmetic mean of the 60 most recent 1-minute average values.

4.10 *Retest.* If the CEMS produces results within the specified criteria, the test is successful. If the CEMS does not meet one or more of the criteria, necessary corrections must be made and the performance tests repeated.

5. Performance Specification Test (PST) Periods

5.1 *Pretest Preparation Period.* Install the CEMS, prepare the PTM test site according to the specifications in section 3, and prepare the CEMS for operation and calibration according to the manufacturer's written instructions. A pretest conditioning period similar to that of the 7-day CD test is recommended to verify the operational status of the CEMS.

5.2 *Calibration Drift Test Period.* While the facility is operating under normal conditions, determine the magnitude of the CD at 24-hour intervals for seven consecutive days according to the procedure given in section 6.1. All CD determinations must be made following a 24-hour period during which no unscheduled maintenance, repair, or adjustment takes place. If the combustion unit is taken out of service during the test period, record the onset and duration of the downtime and continue the CD test when the unit resumes operation.

5.3 *Calibration Error Test and Response Time Test Periods.* Conduct the CE and response time tests during the CD test period.

6. Performance Specification Test Procedures

6.1 *Relative Accuracy Test Audit (RATA) and Absolute Calibration Audits (ACA).* The test procedures described in this section are in lieu of a RATA and ACA.

6.2 *Calibration Drift Test.*

6.2.1 *Sampling Strategy.* Conduct the CD test at 24-hour intervals for seven consecutive days using calibration gases at the two daily concentration levels specified in section 4.3. Introduce the two calibration gases into the sampling system as close to the sampling probe outlet as practical. The gas must pass through all CEM components used during normal sampling. If periodic automatic or manual adjustments are made to the CEMS zero and calibration settings, conduct the CD test immediately before these adjustments, or conduct it in such a way that the CD can be determined. Record the CEMS response and subtract this value from the reference (calibration gas) value. To meet the specification, none of the differences may exceed 3 percent of the span of the CEM.

6.2.2 *Calculations.* Summarize the results on a data sheet. An example is shown in Figure 1. Calculate the differences between the CEMS responses and the reference values.

6.3 *Response Time.* The entire system including sample extraction and transport, sample conditioning, gas analyses, and the data recording is checked with this procedure.

6.3.1 Introduce the calibration gases at the probe as near to the sample location as possible. Introduce the zero gas into the system. When the system output has stabilized (no change greater than 1 percent of full scale for 30 sec), switch to monitor stack effluent and wait for a stable value. Record the time (upscale response time) required to reach 95 percent of the final stable value.

6.3.2 Next, introduce a high-level calibration gas and repeat the above procedure. Repeat the entire procedure three times and determine the mean upscale and downscale response times. The longer of the two means is the system response time.

6.4 *Calibration Error Test Procedure.*

6.4.1 *Sampling Strategy.* Challenge the CEMS with zero gas and EPA Protocol 1 cylinder gases at measurement points within the ranges specified in section 4.7.

6.4.1.1 The daily calibration gases, if Protocol 1, may be used for this test.

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SOURCE:	DATE:
MONITOR:	LOCATION:
SERIAL NUMBER:	SPAN:

	DAY	DATE	TIME	CALIBRATION VALUE	MONITOR RESPONSE	DIFFE RENCE	PERCENT OF SPAN[1]
ZERO/ LOW LEVEL	1						
	2						
	3						
	4						
	5						
	6						
	7						
HIGH LEVEL	1						
	2						
	3						
	4						
	5						
	6						
	7						

1/ = Acceptance Criteria: ≤ 3% of span each day for seven days.

FIGURE 1: Calibration Drift Determination

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6.4.1.2 Operate the CEMS as nearly as possible in its normal sampling mode. The calibration gas should be injected into the sampling system as close to the sampling probe outlet as practical and must pass through all filters, scrubbers, conditioners, and other monitor components used during normal sampling. Challenge the CEMS three non-consecutive times at each measurement point and record the responses. The duration of each gas injection should be for a sufficient period of time to ensure that the CEMS surfaces are conditioned.

6.4.2 *Calculations.* Summarize the results on a data sheet. An example data sheet is shown in Figure 2. Average the differences between the instrument response and the certified cylinder gas value for each gas. Calculate three CE results according to Equation 1. No confidence coefficient is used in CE calculations.

7. Equations

Calibration Error. Calculate CE using Equation 1.

$$CE = \left| d / FS \right| \times 100 \qquad \text{(Eq. 1)}$$

Where:

d= Mean difference between CEMS response and the known reference concentration, determined using Equation 2.

$$d = \frac{1}{n} \sum_{i=1}^{n} d_i \qquad \text{(Eq. 2)}$$

Where:

d_i = Individual difference between CEMS response and the known reference concentration.

8. Reporting

At a minimum, summarize in tabular form the results of the CD, response time, and CE test, as appropriate. Include all data sheets, calculations, CEMS data records, and cylinder gas or reference material certifications.

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SOURCE:	DATE:
MONITOR:	LOCATION:
SERIAL NUMBER:	SPAN:

RUN NUMBER	CALIBRATION VALUE	MONITOR RESPONSE	DIFFERENCE		
			Zero/Low	Mid	High
1 - Zero					
2 - Mid					
3 - High					
4 - Mid					
5 - Zero					
6 - High					
7 - Zero					
8 - Mid					
9 - High					
		Mean Difference =			
		Calibration Error =	%	%	%

FIGURE 2: Calibration Error Determination

BILLING CODE 6560–50–C

9. References

1. Measurement of Volatile Organic Compounds-Guideline Series. U.S. Environmental Protection Agency, Research Triangle Park, North Carolina, 27711, EPA–450/2–78–041, June 1978.

2. Traceability Protocol for Establishing True Concentrations of Gases Used for Calibration and Audits of Continuous Source Emission Monitors (Protocol No. 1). U.S. Environmental Protection Agency ORD/EMSL, Research Triangle Park, North Carolina, 27711, June 1978.

3. Gasoline Vapor Emission Laboratory Evaluation-Part 2. U.S. Environmental Protection Agency, OAQPS, Research Triangle Park, North Carolina, 27711, EMB Report No. 76–GAS–6, August 1975.

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PART 63—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR SOURCE CATEGORIES

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

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

2. Part 63, subpart EEE, is revised to read as follows:

Subpart EEE—National Emission Standards for Hazardous Air Pollutants from Hazardous Waste Combustors

General

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63.1202 [Reserved]

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Subpart EEE—National Emission Standards for Hazardous Air Pollutants from Hazardous Waste Combustors General

§ 63.1200 Who is subject to these regulations?

The provisions of this subpart apply to all hazardous waste combustors: hazardous waste incinerators, hazardous waste burning cement kilns, and hazardous waste burning lightweight aggregate kilns, except as provided in Table 1 of this section. Hazardous waste combustors are also subject to applicable requirements under parts 260–270 of this chapter.

(a) *What if I am an area source?* (1) Both area sources and major sources are subject to this subpart.

(2) Both area sources and major sources, not previously subject to title V, are immediately subject to the requirement to apply for and obtain a title V permit in all States, and in areas covered by part 71 of this chapter.

(b) These regulations in this subpart do not apply to sources that meet the criteria in Table 1 of this Section, as follows:

TABLE 1 TO § 63.1200.— HAZARDOUS WASTE COMBUSTORS EXEMPT FROM SUBPART EEE

If	And if	Then
(1) You are a previously affected source	(i) You ceased feeding hazardous waste for a period of time greater than the hazardous waste residence time (*i.e.,* hazardous waste no longer resides in the combustion chamber);. (ii) You are in compliance with the closure requirements of subpart G, parts 264 or 265 of this chapter;. (iii) You begin complying with the requirements of all other applicable standards of this part (Part 63); and. (iv) You notify the Administrator in writing that you are no longer an affected source under this subpart (Subpart EEE).	You are no longer subject to this subpart (Subpart EEE).
(2) You are a research, development, and demonstration source.	You operate for no longer than one year after first burning hazardous waste (Note that the Administrator can extent this one-year restriction on a case-by-case basis upon your written request documenting when you first burned hazardous waste and the justification for needing additional time to perform research, development, or demonstration operations.).	You are not subject to this subpart (Subpart EEE). This exemption applies even if there is a hazardous waste combustor at the plant site that is regulated under this subpart. You still, however, remain subject to § 270.65 of this chapter.
(3) The only hazardous wastes you burn are exempt from regulation under § 266.100(b) of this chapter.	....	You are not subject to the requirements of this subpart (Subpart EEE).

(c) Table 1 of this section specifies the provisions of subpart A (General Provisions, §§ 63.1–63.15) that apply and those that do not apply to sources affected by this subpart.

§ 63.1201 Definitions and acronyms used in this subpart.

(a) The terms used in this subpart are defined in the Act, in subpart A of this part, or in this section as follows:

Air pollution control system means the equipment used to reduce the release of particulate matter and other pollutants to the atmosphere.

Automatic waste feed cutoff (AWFCO) system means a system comprised of cutoff valves, actuator, sensor, data manager, and other necessary components and electrical circuitry designed, operated and maintained to stop the flow of hazardous waste to the combustion unit automatically and immediately (except as provided by § 63.1206(c)(2)(viii)) when any operating requirement is exceeded.

By-pass duct means a device which diverts a minimum of 10 percent of a cement kiln's off gas, or a device which the Administrator determines on a case-by-case basis diverts a sample of kiln gas that contains levels of carbon monoxide or hydrocarbons representative of the levels in the kiln.

Combustion chamber means the area in which controlled flame combustion of hazardous waste occurs.

Continuous monitor means a device which continuously samples the regulated parameter specified in § 63.1209 without interruption, evaluates the detector response at least once every 15 seconds, and computes and records the average value at least every 60 seconds, except during allowable periods of calibration and except as defined otherwise by the CEMS Performance Specifications in appendix B, part 60 of this chapter.

Dioxin/furan and dioxins and furans mean tetra-, penta-, hexa-, hepta-, and octa-chlorinated dibenzo dioxins and furans.

Existing source means any affected source that is not a new source.

Feedrate operating limits means limits on the feedrate of materials (*e.g.,* metals, chlorine) to the combustor that are established based on comprehensive performance testing. The limits are established and monitored by knowing the concentration of the limited material (*e.g.,* chlorine) in each feedstream and the flowrate of each feedstream.

Feedstream means any material fed into a hazardous waste combustor, including, but not limited to, any pumpable or nonpumpable solid, liquid, or gas.

Flowrate means the rate at which a feedstream is fed into a hazardous waste combustor.

Hazardous waste is defined in § 261.3 of this chapter.

Hazardous waste burning cement kiln means a rotary kiln and any associated preheater or precalciner devices that produce clinker by heating limestone and other materials for subsequent production of cement for use in commerce, and that burns hazardous waste at any time.

Hazardous waste combustor means a hazardous waste incinerator, hazardous waste burning cement kiln, or hazardous waste burning lightweight aggregate kiln.

Hazardous waste incinerator means a device defined as an incinerator in § 260.10 of this chapter and that burns hazardous waste at any time.

Hazardous waste lightweight aggregate kiln means a rotary kiln that produces clinker by heating materials such as slate, shale and clay for subsequent production of lightweight aggregate used in commerce, and that burns hazardous waste at any time.

Hazardous waste residence time means the time elapsed from cutoff of the flow of hazardous waste into the combustor (including, for example, the time required for liquids to flow from the cutoff valve into the combustor) until solid, liquid, and gaseous materials from the hazardous waste, excluding residues that may adhere to combustion chamber surfaces, exit the combustion chamber. For combustors with multiple firing systems whereby the residence time may vary for the firing systems, the hazardous waste residence time for purposes of complying with this subpart means the longest residence time for any firing system in use at the time of waste cutoff.

Initial comprehensive performance test means the comprehensive performance test that is used as the basis for initially demonstrating compliance with the standards.

In-line kiln raw mill means a hazardous waste burning cement kiln design whereby kiln gas is ducted through the raw material mill for portions of time to facilitate drying and heating of the raw material.

Instantaneous monitoring means continuously sampling, detecting, and recording the regulated parameter without use of an averaging period.

Monovent means an exhaust configuration of a building or emission control device (*e.g.* positive pressure fabric filter) that extends the length of the structure and has a width very small in relation to its length (*i.e.,* length to width ratio is typically greater than 5:1). The exhaust may be an open vent with or without a roof, louvered vents, or a combination of such features.

MTEC means maximum theoretical emissions concentration of metals or HCl/Cl, expressed as µg/dscm, and is calculated by dividing the feedrate by the gas flowrate.

New source means any affected source the construction or reconstruction of which is commenced after April 19, 1996.

One-minute average means the average of detector responses calculated at least every 60 seconds from responses obtained at least every 15 seconds.

Operating record means a documentation retained at the facility for ready inspection by authorized officials of all information required by the standards to document and maintain compliance with the applicable regulations, including data and information, reports, notifications, and communications with regulatory officials.

Operating requirements means operating terms or conditions, limits, or operating parameter limits developed under this subpart that ensure compliance with the emission standards.

Raw material feed means the prepared and mixed materials, which include but are not limited to materials such as limestone, clay, shale, sand, iron ore, mill scale, cement kiln dust and flyash, that are fed to a cement or lightweight aggregate kiln. Raw material feed does not include the fuels used in the kiln to produce heat to form the clinker product.

Research, development, and demonstration source means a source engaged in laboratory, pilot plant, or prototype demonstration operations:

(1) Whose primary purpose is to conduct research, development, or short-term demonstration of an innovative and experimental hazardous waste treatment technology or process; and

(2) Where the operations are under the close supervision of technically-trained personnel.

Rolling average means the average of all one-minute averages over the averaging period.

Run means the net period of time during which an air emission sample is collected under a given set of operating conditions. Three or more runs constitutes a test. Unless otherwise specified, a run may be either intermittent or continuous.

Run average means the average of the one-minute average parameter values for a run.

TEQ means toxicity equivalence, the international method of relating the toxicity of various dioxin/furan congeners to the toxicity of 2,3,7,8-tetrachlorodibenzo-p-dioxin.

You means the owner or operator of a hazardous waste combustor.

(b) The acronyms used in this subpart refer to the following:

AWFCO means automatic waste feed cutoff.

CAS means chemical abstract services registry.

CEMS means continuous emissions monitoring system.

CMS means continuous monitoring system.

DRE means destruction and removal efficiency.

MACT means maximum achievable control technology.

MTEC means maximum theoretical emissions concentration.

NIC means notification of intent to comply.

§ 63.1202 [Reserved]

Emissions Standards and Operating Limits

§ 63.1203 What are the standards for hazardous waste incinerators?

(a) *Emission limits for existing sources* You must not discharge or cause combustion gasses to be emitted into the atmosphere that contain:

(1) For dioxins and furans:

(i) Emissions in excess of 0.20 ng TEQ/dscm corrected to 7 percent oxygen; or

(ii) Emissions in excess of 0.40 ng TEQ/dscm corrected to 7 percent oxygen provided that the combustion gas temperature at the inlet to the initial particulate matter control device is 400°F or lower based on the average of the test run average temperatures; [1]

(2) Mercury in excess of 130 μg/dscm corrected to 7 percent oxygen;

(3) Lead and cadmium in excess of 240 ‘‘g/dscm, combined emissions, corrected to 7 percent oxygen;

(4) Arsenic, beryllium, and chromium in excess of 97 ‘‘g/dscm, combined emissions, corrected to 7 percent oxygen;

(5) For carbon monoxide and hydrocarbons, either:

(i) Carbon monoxide in excess of 100 parts per million by volume, over an hourly rolling average (monitored continuously with a continuous emissions monitoring system), dry basis and corrected to 7 percent oxygen, and hydrocarbons in excess of 10 parts per million by volume over an hourly rolling average (monitored continuously with a continuous emissions monitoring system), dry basis, corrected to 7 percent oxygen, and reported as propane, at any time during the destruction and removal efficiency (DRE) test runs or their equivalent as provided by § 63.1206(b)(7); or

(ii) Hydrocarbons in excess of 10 parts per million by volume, over an hourly rolling average (monitored continuously with a continuous emissions monitoring system), dry basis, corrected to 7 percent oxygen, and reported as propane;

(6) Hydrochloric acid and chlorine gas in excess of 77 parts per million by volume, combined emissions, expressed as hydrochloric acid equivalents, dry basis and corrected to 7 percent oxygen; and

(7) Particulate matter in excess of 34 mg/dscm corrected to 7 percent oxygen.

(b) *Emission limits for new sources.* You must not discharge or cause combustion gases to be emitted into the atmosphere that contain:

(1) Dioxins and furans in excess of 0.20 ng TEQ/dscm, corrected to 7 percent oxygen;

(2) Mercury in excess of 45 μg/dscm corrected to 7 percent oxygen;

(3) Lead and cadmium in excess of 24 μg/dscm, combined emissions, corrected to 7 percent oxygen;

(4) Arsenic, beryllium, and chromium in excess of 97 μg/dscm, combined emissions, corrected to 7 percent oxygen;

(5) For carbon monoxide and hydrocarbons, either:

(i) Carbon monoxide in excess of 100 parts per million by volume, over an hourly rolling average (monitored continuously with a continuous emissions monitoring system), dry basis and corrected to 7 percent oxygen, and hydrocarbons in excess of 10 parts per million by volume over an hourly rolling average (monitored continuously with a continuous emissions monitoring system), dry basis, corrected to 7 percent oxygen, and reported as propane, at any time during the destruction and removal efficiency (DRE) test runs or their equivalent as provided by § 63.1206(b)(7); or

(ii) Hydrocarbons in excess of 10 parts per million by volume, over an hourly rolling average (monitored continuously with a continuous emissions monitoring system), dry basis, corrected to 7 percent oxygen, and reported as propane;

(6) Hydrochloric acid and chlorine gas in excess of 21 parts per million by volume, combined emissions, expressed as hydrochloric acid equivalents, dry basis and corrected to 7 percent oxygen; and

(7) Particulate matter in excess of 34 mg/dscm corrected to 7 percent oxygen.

(c) *Destruction and removal efficiency (DRE) standard.* (1) *99.99% DRE.* Except as provided in paragraph (c)(2) of this section, you must achieve a destruction and removal efficiency (DRE) of 99.99% for each principle organic hazardous constituent (POHC) designated under paragraph (c)(3) of this section. You must calculate DRE for each POHC from the following equation:

$$DRE = \left[1 - \left(W_{out} / W_{in}\right)\right] \times 100\%$$

Where:

W_{in}=mass feedrate of one principal organic hazardous constituent (POHC) in a waste feedstream; and

W_{out}=mass emission rate of the same POHC present in exhaust emissions prior to release to the atmosphere

(2) *99.9999% DRE.* If you burn the dioxin-listed hazardous wastes FO20, FO21, FO22, FO23, FO26, or FO27 (see § 261.31 of this chapter), you must achieve a destruction and removal efficiency (DRE) of 99.9999% for each principle organic hazardous constituent (POHC) that you designate under paragraph (c)(3) of this section. You must demonstrate this DRE performance on POHCs that are more difficult to incinerate than tetro-, penta-, and hexachlorodibenzo-p-dioxins and dibenzofurans. You must use the equation in paragraph (c)(1) of this section calculate DRE for each POHC. In addition, you must notify the Administrator of your intent to incinerate hazardous wastes FO20, FO21, FO22, FO23, FO26, or FO27.

(3) *Principal organic hazardous constituents (POHCs).* (i) You must treat the Principal Organic Hazardous Constituents (POHCs) in the waste feed that you specify under paragraph (c)(3)(ii) of this section to the extent required by paragraphs (c)(1) and (c)(2) of this section.

(ii) You must specify one or more POHCs from the list of hazardous air pollutants established by 42 U.S.C. 7412(b)(1), excluding caprolactam (CAS number 105602) as provided by § 63.60, for each waste to be burned. You must base this specification on the degree of difficulty of incineration of the organic constituents in the waste and on their concentration or mass in the waste feed, considering the results of waste analyses or other data and information.

(d) *Significant figures.* The emission limits provided by paragraphs (a) and (b) of this section are presented with two significant figures. Although you must perform intermediate calculations using at least three significant figures, you may round the resultant emission levels to two significant figures to document compliance.

[1] For purposes of compliance, operation of a wet particulate control device is presumed to meet the 400°F or lower requirement.

(e) *Air emission standards for equipment leaks, tanks, surface impoundments, and containers.* You are subject to the air emission standards of subparts BB and CC, part 264, of this chapter.

§ 63.1204 What are the standards for hazardous waste burning cement kilns?

(a) *Emission limits for existing sources.* You must not discharge or cause combustion gases to be emitted into the atmosphere that contain:

(1) For dioxins and furans:

(i) Emissions in excess of 0.20 ng TEQ/dscm corrected to 7 percent oxygen; or

(ii) Emissions in excess of 0.40 ng TEQ/dscm corrected to 7 percent oxygen provided that the combustion gas temperature at the inlet to the initial dry particulate matter control device is 400°F or lower based on the average of the test run average temperatures;

(2) Mercury in excess of 120 µg/dscm corrected to 7 percent oxygen;

(3) Lead and cadmium in excess of 240 µg/dscm, combined emissions, corrected to 7 percent oxygen;

(4) Arsenic, beryllium, and chromium in excess of 56 µg/dscm, combined emissions, corrected to 7 percent oxygen;

(5) Carbon monoxide and hydrocarbons. (i) For kilns equipped with a by-pass duct or midkiln gas sampling system, either:

(A) Carbon monoxide in the by-pass duct or midkiln gas sampling system in excess of 100 parts per million by volume, over an hourly rolling average (monitored continuously with a continuous emissions monitoring system), dry basis and corrected to 7 percent oxygen, and hydrocarbons in the by-pass duct in excess of 10 parts per million by volume over an hourly rolling average (monitored continuously with a continuous emissions monitoring system), dry basis, corrected to 7 percent oxygen, and reported as propane, at any time during the destruction and removal efficiency (DRE) test runs or their equivalent as provided by § 63.1206(b)(7); or

(B) Hydrocarbons in the by-pass duct or midkiln gas sampling system in excess of 10 parts per million by volume, over an hourly rolling average (monitored continuously with a continuous emissions monitoring system), dry basis, corrected to 7 percent oxygen, and reported as propane;

(ii) For kilns not equipped with a by-pass duct or midkiln gas sampling system, either:

(A) Hydrocarbons in the main stack in excess of 20 parts per million by volume, over an hourly rolling average (monitored continuously with a continuous emissions monitoring system), dry basis, corrected to 7 percent oxygen, and reported as propane; or

(B) Carbon monoxide in the main stack in excess of 100 parts per million by volume, over an hourly rolling average (monitored continuously with a continuous emissions monitoring system), dry basis and corrected to 7 percent oxygen, and hydrocarbons in the main stack in excess of 20 parts per million by volume over an hourly rolling average (monitored continuously with a continuous emissions monitoring system), dry basis, corrected to 7 percent oxygen, and reported as propane, at any time during the destruction and removal efficiency (DRE) test runs or their equivalent as provided by § 63.1206(b)(7).

(6) Hydrochloric acid and chlorine gas in excess of 130 parts per million by volume, combined emissions, expressed as hydrochloric acid equivalents, dry basis, corrected to 7 percent oxygen; and

(7) Particulate matter in excess of 0.15 kg/Mg dry feed and opacity greater than 20 percent.

(i) You must use suitable methods to determine the kiln raw material feedrate.

(ii) Except as provided in paragraph (a)(7)(iii) of this section, you must compute the particulate matter emission rate, E, from the following equation:

$$E = (C_s \times Q_{sd}) / P$$

where:

E = emission rate of particulate matter, kg/Mg of kiln raw material feed;

C_s = concentration of particulate matter, kg/dscm;

Q_{sd} = volumetric flowrate of effluent gas, dscm/hr;

P = total kiln raw material feed (dry basis), Mg/hr.

(iii) If you operate a preheater or preheater/precalciner kiln with dual stacks, you must test simultaneously and compute the combined particulate matter emission rate, E_c, from the following equation:

$$E_c = (C_{sk} \times Q_{sdk} + C_{sb} \times Q_{sdb}) / P$$

where:

E_c = the combined emission rate of particulate matter from the kiln and bypass stack, kg/Mg of kiln raw material feed;

C_{sk} = concentration of particulate matter in the kiln effluent, kg/dscm;

Q_{sdk} = volumetric flowrate of kiln effluent gas, dscm/hr;

C_{sb} = concentration of particulate matter in the bypass stack effluent, kg/dscm;

Q_{sdb} = volumetric flowrate of bypass stack effluent gas, dscm/hr;

P = total kiln raw material feed (dry basis), Mg/hr.

(b) *Emission limits for new sources.* You must not discharge or cause combustion gases to be emitted into the atmosphere that contain:

(1) For dioxins and furans:

(i) Emissions in excess of 0.20 ng TEQ/dscm corrected to 7 percent oxygen; or

(ii) Emissions in excess of 0.40 ng TEQ/dscm corrected to 7 percent oxygen provided that the combustion gas temperature at the inlet to the initial dry particulate matter control device is 400 °F or lower based on the average of the test run average temperatures;

(2) Mercury in excess of 56 µg/dscm corrected to 7 percent oxygen;

(3) Lead and cadmium in excess of 180 µg/dscm, combined emissions, corrected to 7 percent oxygen;

(4) Arsenic, beryllium, and chromium in excess of 54 µg/dscm, combined emissions, corrected to 7 percent oxygen;

(5) Carbon monoxide and hydrocarbons. (i) For kilns equipped with a by-pass duct or midkiln gas sampling system, carbon monoxide and hydrocarbons emissions are limited in both the bypass duct or midkiln gas sampling system and the main stack as follows:

(A) Emissions in the by-pass or midkiln gas sampling system are limited to either:

(*1*) Carbon monoxide in excess of 100 parts per million by volume, over an hourly rolling average (monitored continuously with a continuous emissions monitoring system), dry basis and corrected to 7 percent oxygen, and hydrocarbons in excess of 10 parts per million by volume over an hourly rolling average (monitored continuously with a continuous emissions monitoring system), dry basis, corrected to 7 percent oxygen, and reported as propane, at any time during the destruction and removal efficiency (DRE) test runs or their equivalent as provided by § 63.1206(b)(7); or

(*2*) Hydrocarbons in the by-pass duct or midkiln gas sampling system in excess of 10 parts per million by volume, over an hourly rolling average (monitored continuously with a continuous emissions monitoring system), dry basis, corrected to 7 percent oxygen, and reported as propane; and

(B) Hydrocarbons in the main stack are limited, if construction of the kiln commenced after April 19, 1996 at a plant site where a cement kiln (whether burning hazardous waste or not) did not previously exist, to 50 parts per million by volume, over a 30-day block average (monitored continuously with a continuous monitoring system), dry basis, corrected to 7 percent oxygen, and reported as propane.

(ii) For kilns not equipped with a by-pass duct or midkiln gas sampling system, hydrocarbons and carbon monoxide are limited in the main stack to either:

(A) Hydrocarbons not exceeding 20 parts per million by volume, over an hourly rolling average (monitored continuously with a continuous emissions monitoring system), dry basis, corrected to 7 percent oxygen, and reported as propane; or

(B) (*1*) Carbon monoxide not exceeding 100 part per million by volume, over an hourly rolling average (monitored continuously with a continuous emissions monitoring system), dry basis, corrected to 7 percent oxygen; and

(*2*) Hydrocarbons not exceeding 20 parts per million by volume, over an hourly rolling average (monitored continuously with a continuous monitoring system), dry basis, corrected to 7 percent oxygen, and reported as propane at any time during the destruction and removal efficiency (DRE) test runs or their equivalent as provided by § 63.1206(b)(7); and

(*3*) If construction of the kiln commenced after April 19, 1996 at a plant site where a cement kiln (whether burning hazardous waste or not) did not previously exist, hydrocarbons are limited to 50 parts per million by volume, over a 30-day block average (monitored continuously with a continuous monitoring system), dry basis, corrected to 7 percent oxygen, and reported as propane.

(6) Hydrochloric acid and chlorine gas in excess of 86 parts per million, combined emissions, expressed as hydrochloric acid equivalents, dry basis and corrected to 7 percent oxygen; and

(7) Particulate matter in excess of 0.15 kg/Mg dry feed and opacity greater than 20 percent.

(i) You must use suitable methods to determine the kiln raw material feedrate.

(ii) Except as provided in paragraph (a)(7)(iii) of this section, you must compute the particulate matter emission rate, E, from the equation specified in paragraph (a)(7)(ii) of this section.

(iii) If you operate a preheater or preheater/precalciner kiln with dual stacks, you must test simultaneously and compute the combined particulate matter emission rate, Ec, from the equation specified in paragraph (a)(7)(iii) of this section.

(c) *Destruction and removal efficiency (DRE) standard*—(1) *99.99% DRE.* Except as provided in paragraph (c)(2) of this section, you must achieve a destruction and removal efficiency (DRE) of 99.99% for each principle organic hazardous constituent (POHC) designated under paragraph (c)(3) of this section. You must calculate DRE for each POHC from the following equation:

$$DRE = \left[1 - \left(W_{out} / W_{in}\right)\right] \times 100\%$$

Where:

W_{in}=mass feedrate of one principal organic hazardous constituent (POHC) in a waste feedstream; and

W_{out}=mass emission rate of the same POHC present in exhaust emissions prior to release to the atmosphere

(2) *99.9999% DRE.* If you burn the dioxin-listed hazardous wastes FO20, FO21, FO22, FO23, FO26, or FO27 (see § 261.31 of this chapter), you must achieve a destruction and removal efficiency (DRE) of 99.9999% for each principle organic hazardous constituent (POHC) that you designate under paragraph (c)(3) of this section. You must demonstrate this DRE performance on POHCs that are more difficult to incinerate than tetro-, penta-, and hexachlorodibenzo-p-dioxins and dibenzofurans. You must use the equation in paragraph (c)(1) of this section calculate DRE for each POHC. In addition, you must notify the Administrator of your intent to burn hazardous wastes FO20, FO21, FO22, FO23, FO26, or FO27.

(3) *Principal organic hazardous constituents (POHCs).* (i) You must treat the Principal Organic Hazardous Constituents (POHCs) in the waste feed that you specify under paragraph (c)(3)(ii) of this section to the extent required by paragraphs (c)(1) and (c)(2) of this section.

(ii) You must specify one or more POHCs from the list of hazardous air pollutants established by 42 U.S.C. 7412(b)(1), excluding caprolactam (CAS number 105602) as provided by § 63.60, for each waste to be burned. You must base this specification on the degree of difficulty of incineration of the organic constituents in the waste and on their concentration or mass in the waste feed, considering the results of waste analyses or other data and information.

(d) *Cement kilns with in-line kiln raw mills*—(1) *General.* (i) You must conduct performance testing when the raw mill is on-line and when the mill is off-line to demonstrate compliance with the emission standards, and you must establish separate operating parameter limits under § 63.1209 for each mode of operation, except as provided by paragraph (d)(1)(iv) of this section.

(ii) You must document in the operating record each time you change from one mode of operation to the alternate mode and begin complying with the operating parameter limits for that alternate mode of operation.

(iii) You must establish rolling averages for the operating parameter limits anew (*i.e.,* without considering previous recordings) when you begin complying with the operating limits for the alternate mode of operation.

(iv) If your in-line kiln raw mill has dual stacks, you may assume that the dioxin/furan emission levels in the by-pass stack and the operating parameter limits determined during performance testing of the by-pass stack when the raw mill is off-line are the same as when the mill is on-line.

(2) *Emissions averaging.* You may comply with the mercury, semivolatile metal, low volatile metal, and hydrochloric acid/chlorine gas emission standards on a time-weighted average basis under the following procedures:

(i) *Averaging methodology.* You must calculate the time-weighted average emission concentration with the following equation:

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

Where:

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

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

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

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

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

(ii) *Compliance.* (A) If you use this emission averaging provision, you must document in the operating record compliance with the emission standards on an annual basis by using the equation provided by paragraph (d)(2) of this section.

(B) Compliance is based on one-year block averages beginning on the day you submit the initial notification of compliance.

(iii) *Notification.* (A) If you elect to document compliance with one or more emission standards using this emission averaging provision, you must notify the Administrator in the initial comprehensive performance test plan submitted under § 63.1207(e).

(B) You must include historical raw mill operation data in the performance test plan to estimate future raw mill down-time and document in the performance test plan that estimated emissions and estimated raw mill down-time will not result in an exceedance of an emission standard on an annual basis.

(C) You must document in the notification of compliance submitted under § 63.1207(j) that an emission standard will not be exceeded based on the documented emissions from the performance test and predicted raw mill down-time.

(e) *Preheater or preheater/precalciner kilns with dual stacks.*—(1) *General.* You must conduct performance testing on each stack to demonstrate compliance with the emission standards, and you must establish operating parameter limits under § 63.1209 for each stack, except as provided by paragraph (d)(1)(iv) of this section for dioxin/furan emissions testing and operating parameter limits for the by-pass stack of in-line raw mills.

(2) *Emissions averaging.* You may comply with the mercury, semivolatile metal, low volatile metal, and hydrochloric acid/chlorine gas emission standards specified in this section on a gas flowrate-weighted average basis under the following procedures:

(i) *Averaging methodology.* You must calculate the gas flowrate-weighted average emission concentration using the following equation:

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

Where

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

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

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

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

Q_{bypass}=volumetric flowrate of bypass effluent gas

(ii) *Compliance.* (A) You must demonstrate compliance with the emission standard(s) using the emission concentrations determined from the performance tests and the equation provided by paragraph (e)(1) of this section; and

(B) You must develop operating parameter limits for bypass stack and main stack flowrates that ensure the emission concentrations calculated with the equation in paragraph (e)(1) of this section do not exceed the emission standards on a 12-hour rolling average basis. You must include these flowrate limits in the Notification of Compliance.

(iii) *Notification.* If you elect to document compliance under this emissions averaging provision, you must:

(A) Notify the Administrator in the initial comprehensive performance test plan submitted under § 63.1207(e). The performance test plan must include, at a minimum, information describing the flowrate limits established under paragraph (e)(2)(ii)(B) of this section; and

(B) Document in the Notification of Compliance submitted under § 63.1207(j) the demonstrated gas flowrate-weighted average emissions that you calculate with the equation provided by paragraph (e)(2) of this section.

(f) *Significant figures.* The emission limits provided by paragraphs (a) and (b) of this section are presented with two significant figures. Although you must perform intermediate calculations using at least three significant figures, you may round the resultant emission levels to two significant figures to document compliance.

(g) *Air emission standards for equipment leaks, tanks, surface impoundments, and containers.* You are subject to the air emission standards of subparts BB and CC, part 264, of this chapter.

(h) When you comply with the particulate matter requirements of paragraphs (a)(7) or (b)(7) of this section, you are exempt from the New Source Performance Standard for particulate matter and opacity under § 60.60 of this chapter.

§ 63.1205 What are the standards for hazardous waste burning lightweight aggregate kilns?

(a) *Emission limits for existing sources.* You must not discharge or cause combustion gases to be emitted into the atmosphere that contain:

(1) For dioxins and furans:

(i) Emissions in excess of 0.20 ng TEQ/dscm corrected to 7 percent oxygen; or

(ii) Emissions in excess of 0.40 ng TEQ/dscm corrected to 7 percent oxygen provided that the combustion gas temperature at the exit of the (last) combustion chamber (or exit of any waste heat recovery system) is rapidly quenched to 400°F or lower based on the average of the test run average temperatures;

(2) Mercury in excess of 47 µg/dscm corrected to 7 percent oxygen;

(3) Lead and cadmium in excess of 250 µg/dscm, combined emissions, corrected to 7 percent oxygen;

(4) Arsenic, beryllium, and chromium in excess of 110 µg/dscm, combined emissions, corrected to 7 percent oxygen;

(5) Carbon monoxide and hydrocarbons. (i) Carbon monoxide in excess of 100 parts per million by volume, over an hourly rolling average (monitored continuously with a continuous emissions monitoring system), dry basis and corrected to 7 percent oxygen, and hydrocarbons in excess of 20 parts per million by volume over an hourly rolling average (monitored continuously with a continuous emissions monitoring system), dry basis, corrected to 7 percent oxygen, and reported as propane, at any time during the destruction and removal efficiency (DRE) test runs or their equivalent as provided by § 63.1206(b)(7); or

(ii) Hydrocarbons in excess of 20 parts per million by volume, over an hourly rolling average, dry basis, corrected to 7 percent oxygen, and reported as propane;

(6) Hydrochloric acid and chlorine gas in excess of 230 parts per million by volume, combined emissions, expressed as hydrochloric acid equivalents, dry

basis and corrected to 7 percent oxygen; and

(7) Particulate matter in excess of 57 mg/dscm corrected to 7 percent oxygen.

(b) *Emission limits for new sources.* You must not discharge or cause combustion gases to be emitted into the atmosphere that contain:

(1) For dioxins and furans:

(i) Emissions in excess of 0.20 ng TEQ/dscm corrected to 7 percent oxygen; or

(ii) Emissions in excess of 0.40 ng TEQ/dscm corrected to 7 percent oxygen provided that the temperature at the exit of the (last) combustion chamber (or exit of any waste heat recovery system) is rapidly quenched to 400°F or lower based on the average of the test run average temperatures;

(2) Mercury in excess of 33 µg/dscm corrected to 7 percent oxygen;

(3) Lead and cadmium in excess of 43 µg/dscm, combined emissions, corrected to 7 percent oxygen;

(4) Arsenic, beryllium, and chromium in excess of 110 µg/dscm, combined emissions, corrected to 7 percent oxygen;

(5) Carbon monoxide in excess of 100 parts per million by volume, over an hourly rolling average (monitored continuously with a continuous emissions monitoring system), dry basis and corrected to 7 percent oxygen, and hydrocarbons in excess of 20 parts per million by volume over an hourly rolling average (monitored continuously with a continuous emissions monitoring system), dry basis, corrected to 7 percent oxygen, and reported as propane, at any time during the destruction and removal efficiency (DRE) test runs or their equivalent as provided by § 63.1206(b)(7); or

(ii) Hydrocarbons in excess of 20 parts per million by volume, over an hourly rolling average, dry basis, corrected to 7 percent oxygen, and reported as propane;

(6) Hydrochloric acid and chlorine gas in excess of 41 parts per million by volume, combined emissions, expressed as hydrochloric acid equivalents, dry basis and corrected to 7 percent oxygen; and

(7) Particulate matter in excess of 57 mg/dscm corrected to 7 percent oxygen.

(c) *Destruction and removal efficiency (DRE) standard*—(1) *99.99% DRE.* Except as provided in paragraph (c)(2) of this section, you must achieve a destruction and removal efficiency (DRE) of 99.99% for each principal organic hazardous constituent (POHC) designated under paragraph (c)(3) of this section. You must calculate DRE for each POHC from the following equation:

$$DRE = \left[1 - \left(W_{out} / W_{in}\right)\right] \times 100\%$$

Where:

W_{in}=mass feedrate of one principal organic hazardous constituent (POHC) in a waste feedstream; and

W_{out}=mass emission rate of the same POHC present in exhaust emissions prior to release to the atmosphere

(2) *99.9999% DRE.* If you burn the dioxin-listed hazardous wastes FO20, FO21, FO22, FO23, FO26, or FO27 (see § 261.31 of this chapter), you must achieve a destruction and removal efficiency (DRE) of 99.9999% for each principal organic hazardous constituent (POHC) that you designate under paragraph (c)(3) of this section. You must demonstrate this DRE performance on POHCs that are more difficult to incinerate than tetro-, penta-, and hexachlorodibenzo-dioxins and dibenzofurans. You must use the equation in paragraph (c)(1) of this section calculate DRE for each POHC. In addition, you must notify the Administrator of your intent to burn hazardous wastes FO20, FO21, FO22, FO23, FO26, or FO27.

(3) *Principal organic hazardous constituents (POHCs).* (i) You must treat the Principal Organic Hazardous Constituents (POHCs) in the waste feed that you specify under paragraph (c)(3)(ii) of this section to the extent required by paragraphs (c)(1) and (c)(2) of this section.

(ii) You must specify one or more POHCs from the list of hazardous air pollutants established by 42 U.S.C. 7412(b)(1), excluding caprolactam (CAS number 105602) as provided by § 63.60, for each waste to be burned. You must base this specification on the degree of difficulty of incineration of the organic constituents in the waste and on their concentration or mass in the waste feed, considering the results of waste analyses or other data and information.

(d) *Significant figures.* The emission limits provided by paragraphs (a) and (b) of this section are presented with two significant figures. Although you must perform intermediate calculations using at least three significant figures, you may round the resultant emission levels to two significant figures to document compliance.

(e) *Air emission standards for equipment leaks, tanks, surface impoundments, and containers.* You are subject to the air emission standards of subparts BB and CC, part 264, of this chapter.

Monitoring and Compliance Provisions

§ 63.1206 When and how must you comply with the standards and operating requirements?

(a) *Compliance dates*— (1) *Compliance date for existing sources.* You must comply with the standards of this subpart no later than September 30, 2002 unless the Administrator grants you an extension of time under § 63.6(i) or § 63.1213, or you comply with the requirements of paragraph (a)(2) of this section for sources that do not intend to comply with the emission standards.

(2) *Sources that do not intend to comply.* Except for those sources meeting the requirements of § 63.1210(b)(1)(iv), sources:

(i) That signify in their Notification of Intent to Comply (NIC) an intent not to comply with the requirements of this subpart, must stop burning hazardous waste on or before October 1, 2001.

(ii) That do not intend to comply with this subpart must include in their NIC a schedule that includes key dates for the steps to be taken to stop burning hazardous waste. Key dates include the date for submittal of RCRA closure documents required under subpart G, part 264, of this chapter.

(3) *New or reconstructed sources.* (i) If you commenced construction or reconstruction of your hazardous waste combustor after April 19, 1996, you must comply with this subpart by the later of September 30, 1999 or the date the source starts operations, except as provided by paragraph (a)(3)(ii) of this section.

(ii) For a standard in this subpart that is more stringent than the standard proposed on April 19, 1996, you may achieve compliance no later than September 30, 2002 if you comply with the standard proposed on April 19, 1996 after September 30, 1999. This exception does not apply, however, to new or reconstructed area source hazardous waste combustors that become major sources after September 30, 1999. As provided by § 63.6(b)(7), such sources must comply with this subpart at startup.

(b) *Compliance with standards*—(1) *Applicability.* The emission standards and operating requirements set forth in this subpart apply at all times except:

(i) During startup, shutdown, and malfunction, provided that hazardous waste is not in the combustion chamber (*i.e.*, the hazardous waste feed to the combustor has been cutoff for a period of time not less than the hazardous waste residence time) during those periods of operation, as provided by paragraph (c)(2)(ii) of this section; and

(ii) When hazardous waste is not in the combustion chamber (i.e., the hazardous waste feed to the combustor has been cutoff for a period of time not less than the hazardous waste residence time), and you have:

(A) Submitted a written, one-time notice to the Administrator documenting compliance with all applicable requirements and standards promulgated under authority of the Clean Air Act, including sections 112 and 129; and

(B) Documented in the operating record that you are complying with such applicable requirements in lieu of the emission standards and operating requirements of this subpart.

(2) *Methods for determining compliance.* The Administrator will determine compliance with the emission standards of this subpart as provided by § 63.6(f)(2). Conducting performance testing under operating conditions representative of the extreme range of normal conditions is consistent with the requirements of §§ 63.6(f)(2)(iii)(B) and 63.7(e)(1) to conduct performance testing under representative operating conditions.

(3) *Finding of compliance.* The Administrator will make a finding concerning compliance with the emission standards and other requirements of this subpart as provided by § 63.6(f)(3).

(4) *Extension of compliance with emission standards.* The Administrator may grant an extension of compliance with the emission standards of this subpart as provided by §§ 63.6(i) and 63.1213.

(5) *Changes in design, operation, or maintenance*—(i) *Changes that may adversely affect compliance.* If you plan to change (as defined in paragraph (b)(6)(iii) of this section) the design, operation, or maintenance practices of the source in a manner that may adversely affect compliance with any emission standard that is not monitored with a CEMS:

(A) *Notification.* You must notify the Administrator at least 60 days prior to the change, unless you document circumstances that dictate that such prior notice is not reasonably feasible. The notification must include:

(*1*) A description of the changes and which emission standards may be affected; and

(*2*) A comprehensive performance test schedule and test plan under the requirements of § 63.1207(f) that will document compliance with the affected emission standard(s);

(B) *Performance test.* You must conduct a comprehensive performance test under the requirements of §§ 63.1207(f)(1) and (g)(1) to document compliance with the affected emission standard(s) and establish operating parameter limits as required under § 63.1209, and submit to the Administrator a Notification of Compliance under §§ 63.1207(j) and 63.1210(d); and

(C) *Restriction on waste burning.* (*1*) Except as provided by paragraph (b)(5)(i)(C)(*2*) of this section, after the change and prior to submitting the notification of compliance, you must not burn hazardous waste for more than a total of 720 hours and only for purposes of pretesting or comprehensive performance testing.

(*2*) You may petition the Administrator to obtain written approval to burn hazardous waste in the interim prior to submitting a Notification of Compliance for purposes other than testing or pretesting. You must specify operating requirements, including limits on operating parameters, that you determine will ensure compliance with the emission standards of this subpart based on available information. The Administrator will review, modify as necessary, and approve if warranted the interim operating requirements.

(ii) *Changes that will not affect compliance.* If you determine that a change will not adversely affect compliance with the emission standards or operating requirements, you must document the change in the operating record upon making such change. You must revise as necessary the performance test plan, Documentation of Compliance, Notification of Compliance, and start-up, shutdown, and malfunction plan to reflect these changes.

(iii) *Definition of ''change''.* For purposes of paragraph (b)(6) of this section, ''change'' means any change in design, operation, or maintenance practices that were documented in the comprehensive performance test plan, Notification of Compliance, or startup, shutdown, and malfunction plan.

(6) *Compliance with the carbon monoxide and hydrocarbon emission standards.* This paragraph applies to sources that elect to comply with the carbon monoxide and hydrocarbon emissions standards under §§ 63.1203 through 63.1205 by documenting continuous compliance with the carbon monoxide standard using a continuous emissions monitoring system and documenting compliance with the hydrocarbon standard during the destruction and removal efficiency (DRE) performance test or its equivalent.

(i) If a DRE test performed after March 30, 1998 is acceptable as documentation of compliance with the DRE standard, you may use the highest hourly rolling average hydrocarbon level achieved during those DRE test runs to document compliance with the hydrocarbon standard. An acceptable DRE test is a test that was used to support successful issuance or reissuance of an operating permit under part 270 of this chapter.

(ii) If during this acceptable DRE test you did not obtain hydrocarbon emissions data sufficient to document compliance with the hydrocarbon standard, you must either:

(A) Perform, as part of the performance test, an ''equivalent DRE test'' to document compliance with the hydrocarbon standard. An equivalent DRE test is comprised of a minimum of three runs each with a minimum duration of one hour during which you operate the combustor as close as reasonably possible to the operating parameter limits that you established based on the initial DRE test. You must use the highest hourly rolling average hydrocarbon emission level achieved during the equivalent DRE test to document compliance with the hydrocarbon standard; or (B) Perform a DRE test as part of the performance test.

(7) *Compliance with the DRE standard.* (i) Except as provided in paragraphs (b)(7)(ii) and (b)(7)(iii) of this section:

(A) You must document compliance with the Destruction and Removal Efficiency (DRE) standard under §§ 63.1203 through 63.1205 only once provided that you do not modify the source after the DRE test in a manner that could affect the ability of the source to achieve the DRE standard; and

(B) You may use DRE testing performed after March 30, 1998 for purposes of issuance or reissuance of a RCRA permit under part 270 of this chapter to document conformance with the DRE standard if you have not modified the design or operation of the source since the DRE test in a manner that could affect the ability of the source to achieve the DRE standard.

(ii) For sources that feed hazardous waste at a location in the combustion system other than the normal flame zone:

(A) You must demonstrate compliance with the DRE standard during each comprehensive performance test; and

(B) You may use DRE testing performed after March 30, 1998 for purposes of issuance or reissuance of a RCRA permit under part 270 of this chapter to document conformance with the DRE standard in lieu of DRE testing during the initial comprehensive performance test if you have not modified the design or operation of the source since the DRE test in a manner that could affect the ability of the source to achieve the DRE standard.

(iii) For sources that do not use DRE testing performed prior to the compliance date to document conformance with the DRE standard, you must perform DRE testing during the initial comprehensive performance test.

(8) *Applicability of particulate matter and opacity standards during particulate matter CEMS correlation tests.* (i) Any particulate matter and opacity standards of parts 60, 61, 63, 264, 265, and 266 of this chapter (*i.e.*, any title 40 particulate or opacity standards) applicable to a hazardous waste combustor do not apply while you conduct particulate matter continuous emissions monitoring system (CEMS) correlation tests (*i.e.*, correlation with manual stack methods) under the conditions of paragraphs (b)(8)(iii) through (vii) of this section.

(ii) Any permit or other emissions or operating parameter limits or conditions, including any limitation on workplace practices, that are applicable to hazardous waste combustors to ensure compliance with any particulate matter and opacity standards of parts 60, 61, 63, 264, 265, and 266 of this chapter (*i.e.*, any title 40 particulate or opacity standards) do not apply while you conduct particulate matter CEMS correlation tests under the conditions of paragraphs (b)(8)(iii) through (vii) of this section.

(iii) For the provisions of this section to apply, you must:

(A) Develop a particulate matter CEMS correlation test plan that includes the following information. This test plan may be included as part of the comprehensive performance test plan required under §§ 63.1207(e) and (f):

(*1*) Number of test conditions and number of runs for each test condition;

(*2*) Target particulate matter emission level for each test condition;

(*3*) How you plan to modify operations to attain the desired particulate matter emission levels; and

(*4*) Anticipated normal particulate matter emission levels; and

(B) Submit the test plan to the Administrator for approval at least 90 calendar days before the correlation test is scheduled to be conducted.

(iv) The Administrator will review and approve/disapprove the correlation test plan under the procedures for review and approval of the site-specific test plan provided by § 63.7(c)(3)(i) and (iii). If the Administrator fails to approve or disapprove the correlation test plan within the time period specified by § 63.7(c)(3)(i), the plan is considered approved, unless the Administrator has requested additional information.

(v) The particulate matter and opacity standards and associated operating limits and conditions will not be waived for more than 96 hours, in the aggregate, for a correlation test, including all runs of all test conditions.

(vi) The stack sampling team must be on-site and prepared to perform correlation testing no later than 24 hours after you modify operations to attain the desired particulate matter emissions concentrations, unless you document in the correlation test plan that a longer period of conditioning is appropriate.

(vii) You must return to operating conditions indicative of compliance with the applicable particulate matter and opacity standards as soon as possible after correlation testing is completed.

(9) *Alternative standards for existing or new hazardous waste burning lightweight aggregate kilns using MACT.* (i) You may petition the Administrator to recommend alternative semivolatile metal, low volatile metal, mercury, or hydrochloric acid/chlorine gas emission standards if:

(A) You cannot achieve one or more of these standards while using maximum achievable control technology (MACT) because of the raw material contribution to emissions of the regulated metals or hydrochloric acid/chlorine gas; or

(B) You determine that mercury is not present at detectable levels in your raw material.

(ii) The alternative standard that you recommend under paragraph (b)(9)(i)(A) of this section may be an operating requirement, such as a hazardous waste feedrate limitation for metals and/or chlorine, and/or an emission limitation.

(iii) The alternative standard must include a requirement to use MACT, or better, applicable to the standard for which the source is seeking relief, as defined in paragraphs (b)(9)(viii) and (ix) of this section.

(iv) *Documentation required.* (A) The alternative standard petition you submit under paragraph (b)(9)(i)(A) of this section must include data or information documenting that raw material contributions to emissions of the regulated metals or hydrochloric acid/chlorine gas prevent you from complying with the emission standard even though the source is using MACT, as defined in paragraphs (b)(9)(viii) and (ix) of this section, for the standard for which you are seeking relief.

(B) Alternative standard petitions that you submit under paragraph (b)(9)(i)(B) of this section must include data or information documenting that mercury is not present at detectable levels in raw materials.

(v) You must include data or information with semivolatile metal and low volatility metal alternative standard petitions that you submit under paragraph (b)(9)(i)(A) of this section documenting that increased chlorine feedrates associated with the burning of hazardous waste, when compared to non-hazardous waste operations, do not significantly increase metal emissions attributable to raw materials.

(vi) You must include data or information with semivolatile metal, low volatile metal, and hydrochloric acid/chlorine gas alternative standard petitions that you submit under paragraph (b)(9)(i)(A) of this section documenting that semivolatile metal, low volatile metal, and hydrochloric acid/chlorine gas emissions attributable to the hazardous waste only will not exceed the emission standards in § 63.1205(a) and (b).

(vii) You must not operate pursuant to your recommended alternative standards in lieu of emission standards specified in § 63.1205(a) and (b):

(A) Unless the Administrator approves the provisions of the alternative standard petition request or establishes other alternative standards; and

(B) Until you submit a revised Notification of Compliance that incorporates the revised standards.

(viii) For purposes of this alternative standard provision, MACT for existing hazardous waste burning lightweight aggregate kilns is defined as:

(A) For mercury, a hazardous waste feedrate corresponding to an MTEC of 24µg/dscm or less;

(B) For semivolatile metals, a hazardous waste feedrate corresponding to an MTEC of 280,000 µg/dscm or less, and use of a particulate matter control device that achieves particulate matter emissions of 57 mg/dscm or less;

(C) For low volatile metals, a hazardous waste feedrate corresponding to an MTEC of 120,000 µg/dscm or less, and use of a particulate matter control device that achieves particulate matter emissions of 57 mg/dscm or less; and

(D) For hydrochloric acid/chlorine gas, a hazardous waste chlorine feedrate corresponding to an MTEC of 2,000,000 µg/dscm or less, and use of an air pollution control device with a hydrochloric acid/chlorine gas removal efficiency of 85 percent or greater.

(ix) For purposes of this alternative standard provision, MACT for new hazardous waste burning lightweight aggregate kilns is defined as:

(A) For mercury, a hazardous waste feedrate corresponding to an MTEC of 4 µg/dscm or less;

(B) For semivolatile metals, a hazardous waste feedrate corresponding to an MTEC of 280,000 µg/dscm or less, and use of a particulate matter control device that achieves particulate matter emissions of 57 mg/dscm or less;

(C) For low volatile metals, a hazardous waste feedrate corresponding to an MTEC of 46,000 µg/dscm or less, and use of a particulate matter control device that achieves particulate matter emissions of 57 mg/dscm or less;

(D) For hydrochloric acid/chlorine gas, a hazardous waste chlorine feedrate corresponding to an MTEC of 14,000,000 µg/dscm or less, and use of a wet scrubber with a hydrochloric acid/chlorine gas removal efficiency of 99.6 percent or greater.

(10) *Alternative standards for existing or new hazardous waste burning cement kilns using MACT.* (i) You may petition the Administrator to recommend alternative semivolatile, low volatile metal, mercury, and/or hydrochloric acid/chlorine gas emission standards if:

(A) You cannot achieve one or more of these standards while using maximum achievable control technology (MACT) because of raw material contributions to emissions of the regulated metals or hydrochloric acid/chlorine gas; or (B) You determine that mercury is not present at detectable levels in your raw material.

(ii) The alternative standard that you recommend under paragraph (b)(10)(i)(A) of this section may be an operating requirement, such as a hazardous waste feedrate limitation for metals and/or chlorine, and/or an emission limitation.

(iii) The alternative standard must include a requirement to use MACT, or better, applicable to the standard for which the source is seeking relief, as defined in paragraphs (b)(10)(viii) and (ix) of this section.

(iv) *Documentation required.* (A) The alternative standard petition you submit under paragraph (b)(10)(i)(A) of this section must include data or information documenting that raw material contributions to emissions prevent you from complying with the emission standard even though the source is using MACT, as defined in paragraphs (b)(10)(viii) and (ix) of this section, for the standard for which you are seeking relief.

(B) Alternative standard petitions that you submit under paragraph (b)(10)(i)(B) of this section must include data or information documenting that mercury is not present at detectable levels in raw materials.

(v) You must include data or information with semivolatile metal and low volatile metal alternative standard petitions that you submit under paragraph (b)(10)(i)(A) of this section documenting that increased chlorine feedrates associated with the burning of hazardous waste, when compared to non-hazardous waste operations, do not significantly increase metal emissions attributable to raw materials.

(vi) You must include data or information with semivolatile metal, low volatile metal, and hydrochloric acid/chlorine gas alternative standard petitions that you submit under paragraph (b)(10)(i)(A) of this section documenting that emissions of the regulated metals and hydrochloric acid/chlorine gas attributable to the hazardous waste only will not exceed the emission standards in § 63.1204(a) and (b).

(vii) You must not operate pursuant to your recommended alternative standards in lieu of emission standards specified in § 63.1204(a) and (b):

(A) Unless the Administrator approves the provisions of the alternative standard petition request or establishes other alternative standards; and

(B) Until you submit a revised Notification of Compliance that incorporates the revised standards.

(viii) For purposes of this alternative standard provision, MACT for existing hazardous waste burning cement kilns is defined as:

(A) For mercury, a hazardous waste feedrate corresponding to an MTEC of 88µg/dscm or less;

(B) For semivolatile metals, a hazardous waste feedrate corresponding to an MTEC of 31,000 µg/dscm or less, and use of a particulate matter control device that achieves particulate matter emissions of 0.15 kg/Mg dry feed or less;

(C) For low volatile metals, a hazardous waste feedrate corresponding to an MTEC of 54,000 µg/dscm or less, and use of a particulate matter control device that achieves particulate matter emissions of 0.15 kg/Mg dry feed or less; and

(D) For hydrochloric acid/chlorine gas, a hazardous waste chlorine feedrate corresponding to an MTEC of 720,000 µg/dscm or less.

(ix) For purposes of this alternative standard provision, MACT for new hazardous waste burning cement kilns is defined as:

(A) For mercury, a hazardous waste feedrate corresponding to an MTEC of 7 µg/dscm or less;

(B) For semivolatile metals, a hazardous waste feedrate corresponding to an MTEC of 31,000 µg/dscm or less, and use of a particulate matter control device that achieves particulate matter emissions of 0.15 kg/Mg dry feed or less;

(C) For low volatile metals, a hazardous waste feedrate corresponding to an MTEC of 15,000 µg/dscm or less, and use of a particulate matter control device that achieves particulate matter emissions of 0.15 kg/Mg dry feed or less;

(D) For hydrochloric acid/chlorine gas, a hazardous waste chlorine feedrate corresponding to an MTEC of 420,000 µg/dscm or less.

(11) *Calculation of hazardous waste residence time.* You must calculate the hazardous waste residence time and include the calculation in the performance test plan under § 63.1207(f) and the operating record. You must also provide the hazardous waste residence time in the Documentation of Compliance under § 63.1211(d) and the Notification of Compliance under §§ 63.1207(j) and 63.1210(d).

(12) *Documenting compliance with the standards based on performance testing.* (i) You must conduct a minimum of three runs of a performance test required under § 63.1207 to document compliance with the emission standards of this subpart.

(ii) You must document compliance with the emission standards based on the arithmetic average of the emission results of each run, except that you must document compliance with the destruction and removal efficiency standard for each run of the comprehensive performance test individually.

(13) *Cement kilns and lightweight aggregate kilns that feed hazardous waste at a location other than the end where products are normally discharged and where fuels are normally fired.* (i) Cement kilns that feed hazardous waste at a location other than the end where products are normally discharged and where fuels are normally fired must comply with the hydrocarbon standards of § 63.1204 as follows:

(A) Existing sources must comply with the 20 parts per million by volume hydrocarbon standard in the main stack under § 63.1204(a)(5)(ii)(A);

(B) New sources must comply with the 20 parts per million by volume hydrocarbon standard in the main stack under § 63.1204(b)(5)(ii)(A).

(ii) Lightweight aggregate kilns that feed hazardous waste at a location other than the end where products are normally discharged and where fuels are normally fired must comply with the hydrocarbon standards of § 63.1205 as follows:

(A) Existing sources must comply with the 20 parts per million by volume hydrocarbon standard under § 63.1205(a)(5)(ii);

(B) New sources must comply with the 20 parts per million by volume hydrocarbon standard under § 63.1205(b)(5)(ii).

(14) *Alternative particulate matter standard for incinerators with de minimis metals.* (i) *General.* You may petition the Administrator for an alternative particulate matter standard of 68 mg/dscm, corrected to 7% oxygen, if you meet the *de minimis* metals criteria of paragraph (b)(14)(ii) of this section.

(ii) *Documentation required.* The alternative standard petition you submit under paragraph (b)(14)(i) of this section must include data or information documenting that:

(A) Your feedstreams do not contain detectable levels of antimony, cobalt, manganese, nickel, selenium, lead, cadmium, chromium, arsenic and beryllium;

(B) Your combined uncontrolled lead, cadmium and selenium emissions, when assuming these metals are present in your feedstreams at one-half the detection limit, are below 240 ug/dscm, corrected to 7% oxygen.

(C) Your combined uncontrolled antimony, cobalt, manganese, nickel, chromium, arsenic and beryllium emissions, when assuming these metals are present in your feedstreams at one-half the detection limit, are below 97 ug/dscm, corrected to 7% oxygen.

(iii) *Frequency of analysis.* You must sample and analyze your feedstreams at least annually to document that you meet the de minimis criteria in paragraph (b)(14)(ii) of this section.

(iv) You must not operate pursuant to this alternative standard unless the Administrator determines and provides written confirmation that you meet the eligibility requirements in paragraph (b)(14)(ii) of this section.

(c) *Operating requirements.*—(1) *General.* (i) You must operate only under the operating requirements specified in the Documentation of Compliance under § 63.1211(d) or the Notification of Compliance under §§ 63.1207(j) and 63.1210(d), except:

(A) During performance tests under approved test plans according to § 63.1207(e), (f), and (g), and

(B) Under the conditions of paragraph (b)(1)(i) or (ii) of this section;

(ii) The Documentation of Compliance and the Notification of Compliance must contain operating requirements including, but not limited to, the operating requirements in this section and § 63.1209

(iii) Failure to comply with the operating requirements is failure to ensure compliance with the emission standards of this subpart;

(iv) Operating requirements in the Notification of Compliance are applicable requirements for purposes of parts 70 and 71 of this chapter;

(v) The operating requirements specified in the Notification of Compliance will be incorporated in the title V permit.

(2) *Startup, shutdown, and malfunction plan.* (i) Except as provided by paragraph (c)(2)(ii) of this section, you are subject to the startup, shutdown, and malfunction plan requirements of § 63.6(e)(3).

(ii) Even if you follow the startup and shutdown procedures and the corrective measures upon a malfunction that are prescribed in the startup, shutdown, and malfunction plan, the emission standards and operating requirements of this subpart apply if hazardous waste is in the combustion chamber (*i.e.,* if you are feeding hazardous waste or if startup, shutdown, or a malfunction occurs before the hazardous waste residence time has transpired after hazardous waste cutoff).

(iii) You must identify in the plan a projected oxygen correction factor based on normal operations to use during periods of startup and shutdown.

(iv) You must record the plan in the operating record.

(3) *Automatic waste feed cutoff (AWFCO).*— (i) *General.* Upon the compliance date, you must operate the hazardous waste combustor with a functioning system that immediately and automatically cuts off the hazardous waste feed, except as provided by paragraph (c)(3)(viii) of this section:

(A) When any of the following are exceeded: Operating parameter limits specified under § 63.1209; an emission standard monitored by a CEMS; and the allowable combustion chamber pressure;

(B) When the span value of any CMS detector, except a CEMS, is met or exceeded;

(C) Upon malfunction of a CMS monitoring an operating parameter limit specified under § 63.1209 or an emission level; or

(D) When any component of the automatic waste feed cutoff system fails.

(ii) *Ducting of combustion gases.* During an AWFCO, you must continue to duct combustion gasses to the air pollution control system while hazardous waste remains in the combustion chamber (*i.e.*, if the hazardous waste residence time has not transpired since the hazardous waste feed cutoff system was activated).

(iii) *Restarting waste feed.* You must continue to monitor during the cutoff the operating parameters for which limits are established under § 63.1209 and the emissions required under that section to be monitored by a CEMS, and you must not restart the hazardous waste feed until the operating parameters and emission levels are within the specified limits.

(iv) *Failure of the AWFCO system.* If the AWFCO system fails to automatically and immediately cutoff the flow of hazardous waste upon exceedance of parameter required to be interlocked with the AWFCO system under paragraph (c)(3)(i) of this section, you have failed to comply with the AWFCO requirements of paragraph (c)(3) of this section.

(v) *Corrective measures.* If, after any AWFCO, there is an exceedance of an emission standard or operating requirement, irrespective of whether the exceedance occurred while hazardous waste remained in the combustion chamber (*i.e.*, whether the hazardous waste residence time has transpired since the hazardous waste feed cutoff system was activated), you must investigate the cause of the AWFCO, take appropriate corrective measures to minimize future AWFCOs, and record the findings and corrective measures in the operating record.

(vi) *Excessive exceedance reporting.* (A) For each set of 10 exceedances of an emission standard or operating requirement while hazardous waste remains in the combustion chamber (*i.e.*, when the hazardous waste residence time has not transpired since the hazardous waste feed was cutoff) during a 60-day block period, you must submit to the Administrator a written report within 5 calendar days of the 10th exceedance documenting the exceedances and results of the investigation and corrective measures taken.

(B) On a case-by-case basis, the Administrator may require excessive exceedance reporting when fewer than 10 exceedances occur during a 60-day block period.

(vii) *Testing.* The AWFCO system and associated alarms must be tested at least weekly to verify operability, unless you document in the operating record that weekly inspections will unduly restrict or upset operations and that less frequent inspection will be adequate. At a minimum, you must conduct operability testing at least monthly. You must document and record in the operating record AWFCO operability test procedures and results.

(viii) *Ramping down waste feed.* (A) You may ramp down the waste feedrate of pumpable hazardous waste over a period not to exceed one minute, except as provided by paragraph (c)(3)(viii)(B) of this section. If you elect to ramp down the waste feed, you must document ramp down procedures in the operating and maintenance plan. The procedures must specify that the ramp down begins immediately upon initiation of automatic waste feed cutoff and the procedures must prescribe a bona fide ramping down. If an emission standard or operating limit is exceeded during the ramp down, you have failed to comply with the emission standards or operating requirements of this subpart.

(B) If the automatic waste feed cutoff is triggered by an exceedance of any of the following operating limits, you may not ramp down the waste feed cutoff: Minimum combustion chamber temperature, maximum hazardous waste feedrate, or any hazardous waste firing system operating limits that may be established for your combustor.

(4) *ESV openings.*—(i) *Failure to meet standards.* If an emergency safety vent (ESV) opens when hazardous waste remains in the combustion chamber (*i.e.*, when the hazardous waste residence time has not transpired since the hazardous waste feed cutoff system was activated) such that combustion gases are not treated as during the most recent comprehensive performance test (*e.g.*, if the combustion gas by-passes any emission control device that was operating during the performance test), it is evidence of your failure to comply with the emission standards of this subpart.

(ii) *ESV operating plan.* (A) You must develop an ESV operating plan, comply with the operating plan, and keep the plan in the operating record.

(B) The ESV operating plan must provide detailed procedures for rapidly stopping the waste feed, shutting down the combustor, and maintaining temperature and negative pressure in the combustion chamber during the hazardous waste residence time, if feasible. The plan must include calculations and information and data documenting the effectiveness of the plan's procedures for ensuring that combustion chamber temperature and negative pressure are maintained as is reasonably feasible.

(iii) *Corrective measures.* After any ESV opening that results in a failure to meet the emission standards as defined in paragraph (c)(4)(i) of this section, you must investigate the cause of the ESV opening, take appropriate corrective measures to minimize such future ESV openings, and record the findings and corrective measures in the operating record.

(iv) *Reporting requirement.* You must submit to the Administrator a written report within 5 days of an ESV opening that results in failure to meet the emission standards of this subpart (as defined in paragraph (c)(4)(i) of this section) documenting the result of the investigation and corrective measures taken.

(5) *Combustion system leaks.* (i) Combustion system leaks of hazardous air pollutants must be controlled by:

(A) Keeping the combustion zone sealed to prevent combustion system leaks; or

(B) Maintaining the maximum combustion zone pressure lower than ambient pressure using an instantaneous monitor; or

(C) Upon prior written approval of the Administrator, an alternative means of control to provide control of combustion system leaks equivalent to maintenance of combustion zone pressure lower than ambient pressure; and

(ii) You must specify in the operating record the method used for control of combustion system leaks.

(6) *Operator training and certification.* (i) You must establish a training and certification program for each person who has responsibilities affecting operations that may affect emissions of hazardous air pollutants from the source. Such persons include, but are not limited to, chief facility operators, control room operators, continuous monitoring system operators, persons that sample and analyze feedstreams, persons that manage and charge feedstreams to the combustor, persons that operate emission control devices, ash and waste handlers, and maintenance personnel.

(ii) You must ensure that the source is operated and maintained at all times by persons who are trained and certified to perform these and any other duties that may affect emissions of hazardous air pollutants.

(iii) For hazardous waste incinerators, the training and certification program must conform to a state-approved training and certification program or, if there is no such state program, to the American Society of Mechanical Engineers Standard Number QHO–1–1994.

(iv) For hazardous waste burning cement and lightweight aggregate kilns, the training and certification program must be approved by the state or the Administrator, and must be complete and reliable and conform to principles of good operator and operating practices (including training and certification).

(v) You must record the operator training and certification program in the operating record.

(7) *Operation and maintenance plan.*—(i) *General.* (A) You must prepare and at all times operate according to an operation and maintenance plan that describes in detail procedures for operation, inspection, maintenance, and corrective measures for all components of the combustor, including associated pollution control equipment, that could affect emissions of regulated hazardous air pollutants.

(B) The plan must prescribe how you will operate and maintain the combustor in a manner consistent with good air pollution control practices for minimizing emissions at least to the levels achieved during the comprehensive performance test.

(C) This plan ensures compliance with the operation and maintenance requirements of § 63.6(e) and minimizes emissions of pollutants, automatic waste feed cutoffs, and malfunctions.

(D) You must record the plan in the operating record.

(ii) *Requirements for baghouses at lightweight aggregate kilns and incinerators.* If you own or operate a hazardous waste incinerator or hazardous waste burning lightweight aggregate kiln equipped with a baghouse (fabric filter), you must prepare and at all times operate according to an operations and maintenance plan that describes in detail procedures for inspection, maintenance, and bag leak detection and corrective measures for each baghouse used to comply with the standards under this subpart.

(A) The operation and maintenance plan for baghouses must be submitted to the Administrator with the initial comprehensive performance test plan for review and approval.

(B) The procedures specified in the operations and maintenance plan for inspections and routine maintenance of a baghouse must, at a minimum, include the following requirements:

(*1*) Daily visual observation of baghouse discharge or stack;

(*2*) Daily confirmation that dust is being removed from hoppers through visual inspection, or equivalent means of ensuring the proper functioning of removal mechanisms;

(*3*) Daily check of compressed air supply for pulse-jet baghouses;

(*4*) Daily visual inspection of isolation dampers for proper operation;

(*5*) An appropriate methodology for monitoring cleaning cycles to ensure proper operation;

(*6*) Weekly check of bag cleaning mechanisms for proper functioning through visual inspection or equivalent means;

(*7*) Weekly check of bag tension on reverse air and shaker-type baghouses. Such checks are not required for shaker-type baghouses using self-tensioning (spring loaded) devices;

(*8*) Monthly confirmation of the physical integrity of the baghouse through visual inspection of the baghouse interior for air leaks;

(*9*) Monthly inspection of bags and bag connections;

(*10*) Quarterly inspection of fans for wear, material buildup, and corrosion through visual inspection, vibration detectors, or equivalent means; and

(*11*) Continuous operation of a bag leak detection system as a continuous monitor.

(C) The procedures for maintenance specified in the operation and maintenance plan must, at a minimum, include a preventative maintenance schedule that is consistent with the baghouse manufacturer's instructions for routine and long-term maintenance.

(D) The bag leak detection system required by paragraph (c)(7)(ii)(B)(*11*) of this section must meet the following specifications and requirements:

(*1*) The bag leak detection system must be certified by the manufacturer to be capable of continuously detecting and recording particulate matter emissions at concentrations of 1.0 milligram per actual cubic meter or less;

(*2*) The bag leak detection system sensor must provide output of relative particulate matter loadings;

(*3*) The bag leak detection system must be equipped with an alarm system that will sound an audible alarm when an increase in relative particulate loadings is detected over a preset level;

(*4*) The bag leak detection system shall be installed and operated in a manner consistent with available written guidance from the U.S. Environmental Protection Agency or, in the absence of such written guidance, the manufacturer's written specifications and recommendations for installation, operation, and adjustment of the system;

(*5*) The initial adjustment of the system shall, at a minimum, consist of establishing the baseline output by adjusting the sensitivity (range) and the averaging period of the device, and establishing the alarm set points and the alarm delay time;

(*6*) Following initial adjustment, you must not adjust the sensitivity or range, averaging period, alarm set points, or alarm delay time, except as detailed in the operation and maintenance plan required under paragraph (c)(7)(ii)(A) of this section. You must not increase the sensitivity by more than 100 percent or decrease the sensitivity by more than 50 percent over a 365 day period unless such adjustment follows a complete baghouse inspection which demonstrates the baghouse is in good operating condition;

(*7*) For negative pressure or induced air baghouses, and positive pressure baghouses that are discharged to the atmosphere through a stack, the bag leak detector must be installed downstream of the baghouse and upstream of any wet acid gas scrubber; and

(*8*) Where multiple detectors are required, the system's instrumentation and alarm system may be shared among the detectors.

(E) The operation and maintenance plan required by paragraph (c)(7)(ii) of this section must include a corrective measures plan that specifies the procedures you will follow in the case of a bag leak detection system alarm. The corrective measures plan must include, at a minimum, the procedures used to determine and record the time and cause of the alarm as well as the corrective measures taken to correct the control device malfunction or minimize emissions as specified below. Failure to initiate the corrective measures required by this paragraph is failure to ensure compliance with the emission standards in this subpart.

(*1*) You must initiate the procedures used to determine the cause of the alarm within 30 minutes of the time the alarm first sounds; and

(*2*) You must alleviate the cause of the alarm by taking the necessary corrective measure(s) which may include, but are not to be limited to, the following measures:

(i) Inspecting the baghouse for air leaks, torn or broken filter elements, or any other malfunction that may cause an increase in emissions;

(ii) Sealing off defective bags or filter media;

(iii) Replacing defective bags or filter media, or otherwise repairing the control device;

(iv) Sealing off a defective baghouse compartment;

(v) Cleaning the bag leak detection system probe, or otherwise repairing the bag leak detection system; or

(vi) Shutting down the combustor.

§ 63.1207 What are the performance testing requirements?

(a) *General.* The provisions of § 63.7 apply, except as noted below.

(b) *Types of performance tests*—(1) *Comprehensive performance test.* You must conduct comprehensive performance tests to demonstrate compliance with the emission standards provided by §§ 63.1203, 63.1204, and 63.1205, establish limits for the operating parameters provided by § 63.1209, and demonstrate compliance with the performance specifications for continuous monitoring systems.

(2) *Confirmatory performance test.* You must conduct confirmatory performance tests to:

(i) Demonstrate compliance with the dioxin/furan emission standard when the source operates under normal operating conditions; and

(ii) Conduct a performance evaluation of continuous monitoring systems required for compliance assurance with the dioxin/furan emission standard under § 63.1209(k).

(c) *Initial comprehensive performance test*—(1) *Test date.* Except as provided by paragraph (c)(2) of this section, you must commence the initial comprehensive performance test not later than six months after the compliance date.

(2) *Data in lieu of the initial comprehensive performance test.* (i) You may request that previous emissions test data serve as documentation of conformance with the emission standards of this subpart provided that the previous testing was:

(A) Initiated after March 30, 1998;

(B) For the purpose of demonstrating emissions under a RCRA permit issuance or reissuance proceeding under part 270 of this chapter;

(C) In conformance with the requirements of paragraph (g)(1) of this section; and

(D) Sufficient to establish the applicable operating parameter limits under § 63.1209.

(ii) You must submit data in lieu of the initial comprehensive performance test in lieu of (i.e., if the data are in lieu of all performance testing) or with the notification of performance test required under paragraph (e) of this section.

(d) *Frequency of testing.* You must conduct testing periodically as prescribed in paragraphs (d)(1) through (3) of this section. The date of commencement of the initial comprehensive performance test is the basis for establishing the deadline to commence the initial confirmatory performance test and the next comprehensive performance test. You may conduct performance testing at any time prior to the required date. The deadline for commencing subsequent confirmatory and comprehensive performance testing is based on the date of commencement of the previous comprehensive performance test. Unless the Administrator grants a time extension under paragraph (i) of this section, you must conduct testing as follows:

(1) *Comprehensive performance testing.* You must commence testing no later than 61 months after the date of commencing the previous comprehensive performance test. If you submit data in lieu of the initial performance test, you must commence the subsequent comprehensive performance test within 61 months of the date six months after the compliance date.

(2) *Confirmatory performance testing.* You must commence confirmatory performance testing no later than 31 months after the date of commencing the previous comprehensive performance test. If you submit data in lieu of the initial performance test, you must commence the initial confirmatory performance test within 31 months of the date six months after the compliance date. To ensure that the confirmatory test is conducted approximately midway between comprehensive performance tests, the Administrator will not approve a test plan that schedules testing within 18 months of commencing the previous comprehensive performance test.

(3) *Duration of testing.* You must complete performance testing within 60 days after the date of commencement, unless the Administrator determines that a time extension is warranted based on your documentation in writing of factors beyond your control that prevent you from meeting the 60-day deadline.

(e) *Notification of performance test and CMS performance evaluation, and approval of test plan and CMS performance evaluation plan.* (1) The provisions of § 63.7(b) and (c) and § 63.8(e) apply, except:

(i) *Comprehensive performance test.* You must submit to the Administrator a notification of your intention to conduct a comprehensive performance test and CMS performance evaluation and a site-specific test plan and CMS performance evaluation plan at least one year before the performance test and performance evaluation are scheduled to begin.

(A) The Administrator will notify you of approval or intent to deny approval of the test plan and CMS performance evaluation plan within 9 months after receipt of the original plan.

(B) You must submit to the Administrator a notification of your intention to conduct the comprehensive performance test at least 60 calendar days before the test is scheduled to begin.

(ii) *Confirmatory performance test.* You must submit to the Administrator a notification of your intention to conduct a confirmatory performance test and CMS performance evaluation and a test plan and CMS performance evaluation plan at least 60 calendar days before the performance test is scheduled to begin. The Administrator will notify you of approval or intent to deny approval of the test and CMS performance evaluation plans within 30 calendar days after receipt of the original plans.

(2) After the Administrator has approved the test and CMS performance evaluation plans, you must make the plans available to the public for review. You must issue a public notice announcing the approval of the plans and the location where the plans are available for review.

(f) *Content of performance test plan.* The provisions of §§ 63.7(c)(2)(i)–(iii) and (v) regarding the content of the test plan apply. In addition, you must include the following information in the test plan:

(1) *Content of comprehensive performance test plan.* (i) An analysis of each feedstream, including hazardous waste, other fuels, and industrial furnace feedstocks, as fired, that includes:

(A) Heating value, levels of ash (for hazardous waste incinerators only), levels of semivolatile metals, low volatile metals, mercury, and total chlorine (organic and inorganic); and

(B) Viscosity or description of the physical form of the feedstream;

(ii) For organic hazardous air pollutants established by 42 U.S.C. 7412(b)(1), excluding caprolactam (CAS number 105602) as provided by § 63.60:

(A) An identification of such organic hazardous air pollutants that are present in the feedstream, except that you need not analyze for organic hazardous air pollutants that would reasonably not be expected to be found in the feedstream. You must identify any constituents you exclude from analysis and explain the basis for excluding them. You must conduct the feedstream analysis according to § 63.1208(g);

(B) An approximate quantification of such identified organic hazardous air pollutants in the feedstreams, within the precision produced by the analytical procedures of § 63.1208(g); and

(C) A description of blending procedures, if applicable, prior to firing the feedstream, including a detailed analysis of the materials prior to blending, and blending ratios;

(iii) A detailed engineering description of the hazardous waste combustor, including:

(A) Manufacturer's name and model number of the hazardous waste combustor;

(B) Type of hazardous waste combustor;

(C) Maximum design capacity in appropriate units;

(D) Description of the feed system for each feedstream;

(E) Capacity of each feed system;

(F) Description of automatic hazardous waste feed cutoff system(s);

(G) Description of the design, operation, and maintenance practices for any air pollution control system; and

(H) Description of the design, operation, and maintenance practices of any stack gas monitoring and pollution control monitoring systems;

(iv) A detailed description of sampling and monitoring procedures including sampling and monitoring locations in the system, the equipment to be used, sampling and monitoring frequency, and planned analytical procedures for sample analysis;

(v) A detailed test schedule for each hazardous waste for which the performance test is planned, including date(s), duration, quantity of hazardous waste to be burned, and other relevant factors;

(vi) A detailed test protocol, including, for each hazardous waste identified, the ranges of hazardous waste feedrate for each feed system, and, as appropriate, the feedrates of other fuels and feedstocks, and any other relevant parameters that may affect the ability of the hazardous waste combustor to meet the emission standards;

(vii) A description of, and planned operating conditions for, any emission control equipment that will be used;

(viii) Procedures for rapidly stopping the hazardous waste feed and controlling emissions in the event of an equipment malfunction;

(ix) A determination of the hazardous waste residence time;

(x) If you are requesting to extrapolate metal feedrate limits from comprehensive performance test levels:

(A) A description of the extrapolation methodology and rationale for how the approach ensures compliance with the emission standards;

(B) Documentation of the historical range of normal (*i.e.*, other than during compliance testing) metals feedrates for each feedstream;

(C) Documentation that the level of spiking recommended during the performance test will mask sampling and analysis imprecision and inaccuracy to the extent that extrapolation of feedrates and emission rates from performance test data will be as accurate and precise as if full spiking were used;

(xi) If you do not continuously monitor regulated constituents in natural gas, process air feedstreams, and feedstreams from vapor recovery systems, you must include documentation of the expected levels of regulated constituents in those feedstreams;

(xii) Documentation justifying the duration of system conditioning required to ensure the combustor has achieved steady-state operations under performance test operating conditions, as provided by paragraph (g)(1)(iii) of this section; and

(xiii) Such other information as the Administrator reasonably finds necessary to determine whether to approve the performance test plan.

(2) *Content of confirmatory test plan.* (i) A description of your normal hydrocarbon or carbon monoxide operating levels, as specified in paragraph (g)(2)(i) of this section, and an explanation of how these normal levels were determined;

(ii) A description of your normal applicable operating parameter levels, as specified in paragraph (g)(2)(ii) of this section, and an explanation of how these normal levels were determined;

(iii) A description of your normal chlorine operating levels, as specified in paragraph (g)(2)(iii) of this section, and an explanation of how these normal levels were determined;

(iv) If you use carbon injection or a carbon bed, a description of your normal cleaning cycle of the particulate matter control device, as specified in paragraph (g)(2)(iv) of this section, and an explanation of how these normal levels were determined;

(v) A detailed description of sampling and monitoring procedures including sampling and monitoring locations in the system, the equipment to be used, sampling and monitoring frequency, and planned analytical procedures for sample analysis;

(vi) A detailed test schedule for each hazardous waste for which the performance test is planned, including date(s), duration, quantity of hazardous waste to be burned, and other relevant factors;

(vii) A detailed test protocol, including, for each hazardous waste identified, the ranges of hazardous waste feedrate for each feed system, and, as appropriate, the feedrates of other fuels and feedstocks, and any other relevant parameters that may affect the ability of the hazardous waste combustor to meet the dioxin/furan emission standard;

(viii) A description of, and planned operating conditions for, any emission control equipment that will be used;

(ix) Procedures for rapidly stopping the hazardous waste feed and controlling emissions in the event of an equipment malfunction; and

(x) Such other information as the Administrator reasonably finds necessary to determine whether to approve the confirmatory test plan.

(g) *Operating conditions during testing.* You must comply with the provisions of § 63.7(e). Conducting performance testing under operating conditions representative of the extreme range of normal conditions is consistent with the requirement of § 63.7(e)(1) to conduct performance testing under representative operating conditions.

(1) *Comprehensive performance testing.*—(i) *Operations during testing.* For the following parameters, you must operate the combustor during the performance test under normal conditions (or conditions that will result in higher than normal emissions):

(A) *Chlorine feedrate.* You must feed normal (or higher) levels of chlorine during the dioxin/furan performance test;

(B) *Ash feedrate.* For hazardous waste incinerators, you must conduct the following tests when feeding normal (or higher) levels of ash: The semivolatile metal and low volatile metal performance tests; and the dioxin/furan and mercury performance tests if activated carbon injection or a carbon bed is used; and

(C) *Cleaning cycle of the particulate matter control device.* You must conduct the following tests when the particulate matter control device undergoes its normal (or more frequent) cleaning cycle: The particulate matter, semivolatile metal, and low volatile metal performance tests; and the dioxin/furan and mercury performance tests if activated carbon injection or a carbon bed is used.

(ii) *Modes of operation.* Given that you must establish limits for the applicable operating parameters specified in § 63.1209 based on operations during the comprehensive performance test, you may conduct testing under two or more operating modes to provide operating flexibility.

(iii) *Steady-state conditions.* (A) Prior to obtaining performance test data, you must operate under performance test conditions until you reach steady-state operations with respect to emissions of pollutants you must measure during the performance test and operating parameters under § 63.1209 for which you must establish limits. During system conditioning, you must ensure that each operating parameter for which you must establish a limit is held at the level planned for the performance test. You must include documentation in the performance test plan under paragraph (f) of this section justifying the duration of system conditioning.

(B) If you own or operate a hazardous waste cement kiln that recycles collected particulate matter (*i.e.,* cement kiln dust) into the kiln, you must sample and analyze the recycled particulate matter prior to obtaining performance test data for levels of selected metals that must be measured during performance testing to document that the system has reached steady-state conditions (*i.e.,* that metals levels have stabilized). You must document the rationale for selecting metals that are indicative of system equilibrium and include the information in the performance test plan under paragraph (f) of this section. To determine system equilibrium, you must sample and analyze the recycled particulate matter hourly for each selected metal, unless you submit in the performance test plan a justification for reduced sampling and analysis and the Administrator approves in writing a reduced sampling and analysis frequency.

(2) *Confirmatory performance testing.* You must conduct confirmatory performance testing for dioxin/furan under normal operating conditions for the following parameters:

(i) Carbon monoxide (or hydrocarbon) CEMS emission levels must be within the range of the average value to the maximum value allowed. The average value is defined as the sum of the hourly rolling average values recorded (each minute) over the previous 12 months divided by the number of rolling averages recorded during that time;

(ii) Each operating limit (specified in § 63.1209) established to maintain compliance with the dioxin/furan emission standard must be held within the range of the average value over the previous 12 months and the maximum or minimum, as appropriate, that is allowed. The average value is defined as the sum of the rolling average values recorded over the previous 12 months divided by the number of rolling averages recorded during that time. The average value must not include calibration data, malfunction data, and data obtained when not burning hazardous waste;

(iii) You must feed chlorine at normal feedrates or greater; and (iv) If the combustor is equipped with carbon injection or carbon bed, normal cleaning cycle of the particulate matter control device.

(h) *Operating conditions during subsequent testing.* (1) Current operating parameter limits established under § 63.1209 are waived during subsequent comprehensive performance testing under an approved test plan.

(2) Current operating parameter limits are also waived during pretesting prescribed in the approved test plan prior to comprehensive performance testing for an aggregate time not to exceed 720 hours of operation. Pretesting means:

(i) Operations when stack emissions testing for dioxin/furan, mercury, semivolatile metals, low volatile metals, particulate matter, or hydrochloric acid/chlorine gas is being performed; and

(ii) Operations to reach steady-state operating conditions prior to stack emissions testing under paragraph (g)(1)(iii) of this section.

(i) *Time extension for subsequent performance tests.* After the initial comprehensive performance test, you may request up to a one-year time extension for conducting a comprehensive or confirmatory performance test to consolidate performance testing with other state or federally required emission testing, or for other reasons deemed acceptable by the Administrator. If the Administrator grants a time extension for a comprehensive performance test, the deadlines for commencing the next comprehensive and confirmatory tests are based on the date that the subject comprehensive performance test commences.

(1) You must submit in writing to the Administrator any request under this paragraph for a time extension for conducting a performance test.

(2) You must include in the request for an extension for conducting a performance test the following:

(i) A description of the reasons for requesting the time extension;

(ii) The date by which you will commence performance testing.

(3) The Administrator will notify you in writing of approval or intention to deny approval of your request for an extension for conducting a performance test within 30 calendar days after receipt of sufficient information to evaluate your request. The 30-day approval or denial period will begin after you have been notified in writing that your application is complete. The Administrator will notify you in writing whether the application contains sufficient information to make a determination within 30 calendar days after receipt of the original application and within 30 calendar days after receipt of any supplementary information that you submit.

(4) When notifying you that your application is not complete, the Administrator will specify the information needed to complete the application. The Administrator will also provide notice of opportunity for you to present, in writing, within 30 calendar days after notification of the incomplete application, additional information or arguments to the Administrator to enable further action on the application.

(5) Before denying any request for an extension for performance testing, the Administrator will notify you in writing of the Administrator's intention to issue the denial, together with:

(i) Notice of the information and findings on which the intended denial is based; and

(ii) Notice of opportunity for you to present in writing, within 15 calendar days after notification of the intended denial, additional information or arguments to the Administrator before further action on the request.

(6) The Administrator's final determination to deny any request for an extension will be in writing and will set forth specific grounds upon which the denial is based. The final determination will be made within 30 calendar days after the presentation of additional information or argument (if the application is complete), or within 30 calendar days after the final date specified for the presentation if no presentation is made.

(j) *Notification of compliance.*—(1) *Comprehensive performance test.* (i) Except as provided by paragraph (j)(4) of this section, within 90 days of completion of a comprehensive performance test, you must postmark a Notification of Compliance documenting compliance or noncompliance with the emission standards and continuous monitoring system requirements, and identifying operating parameter limits under § 3.1209.

(ii) Upon postmark of the Notification of Compliance, you must comply with all operating requirements specified in the Notification of Compliance in lieu of the limits specified in the Documentation of Compliance required under § 63.1211(d).

(2) *Confirmatory performance test.* Except as provided by paragraph (j)(4) of this section, within 90 days of completion of a confirmatory performance test, you must postmark a Notification of Compliance documenting compliance or noncompliance with the applicable dioxin/furan emission standard.

(3) See §§ 63.7(g), 63.9(h), and 63.1210(d) for additional requirements pertaining to the Notification of Compliance (e.g., you must include results of performance tests in the Notification of Compliance).

(4) *Time extension.* You may submit a written request to the Administrator for a time extension documenting that, for reasons beyond your control, you may not be able to meet the 90-day deadline for submitting the Notification of Compliance after completion of testing. The Administrator will determine whether a time extension is warranted.

(k) *Failure to submit a timely notification of compliance.* (1) If you fail to postmark a Notification of Compliance by the specified date, you must cease hazardous waste burning immediately.

(2) Prior to submitting a revised Notification of Compliance as provided by paragraph (k)(3) of this section, you may burn hazardous waste only for the purpose of pretesting or comprehensive performance testing and only for a maximum of 720 hours (renewable at the discretion of the Administrator).

(3) You must submit to the Administrator a Notification of Compliance subsequent to a new comprehensive performance test before resuming hazardous waste burning.

(l) *Failure of performance test.*—(1) *Comprehensive performance test.* (i) If you determine (based on CEM recordings, results of analyses of stack samples, or results of CMS performance evaluations) that you have exceeded any emission standard during a comprehensive performance test for a mode of operation, you must cease hazardous waste burning immediately under that mode of operation. You must make this determination within 90 days following completion of the performance test.

(ii) If you have failed to demonstrate compliance with the emission standards for any mode of operation:

(A) Prior to submitting a revised Notification of Compliance as provided by paragraph (l)(1)(ii)(C) of this section, you may burn hazardous waste only for the purpose of pretesting or comprehensive performance testing under revised operating conditions, and only for a maximum of 720 hours (renewable at the discretion of the Administrator), except as provided by paragraph (l)(3) of this section;

(B) You must conduct a comprehensive performance test under revised operating conditions following the requirements for performance testing of this section; and

(C) You must submit to the Administrator a Notification of Compliance subsequent to the new comprehensive performance test.

(2) *Confirmatory performance test.* If you determine (based on CEM recordings, results of analyses of stack samples, or results of CMS performance evaluations) that you have failed the dioxin/furan emission standard during a confirmatory performance test, you must cease burning hazardous waste immediately. You must make this determination within 90 days following completion of the performance test. To burn hazardous waste in the future:

(i) You must submit to the Administrator for review and approval a test plan to conduct a comprehensive performance test to identify revised limits on the applicable dioxin/furan operating parameters specified in § 63.1209(k);

(ii) You must submit to the Administrator a Notification of Compliance with the dioxin/furan emission standard under the provisions of paragraphs (j) and (k) of this section and this paragraph (l). You must include in the Notification of Compliance the revised limits on the applicable dioxin/furan operating parameters specified in § 63.1209(k); and

(iii) Until the Notification of Compliance is submitted, you must not burn hazardous waste except for purposes of pretesting or confirmatory performance testing, and for a maximum of 720 hours (renewable at the discretion of the Administrator), except as provided by paragraph (l)(3) of this section.

(3) You may petition the Administrator to obtain written approval to burn hazardous waste in the interim prior to submitting a Notification of Compliance for purposes other than testing or pretesting. You must specify operating requirements, including limits on operating parameters, that you determine will ensure compliance with the emission standards of this subpart based on available information including data from the failed performance test. The Administrator will review, modify as necessary, and approve if warranted the interim operating requirements. An approval of interim operating requirements will include a schedule for submitting a Notification of Compliance.

(m) *Waiver of performance test.* (1) The waiver provision of this paragraph applies in addition to the provisions of § 63.7(h).

(2) You are not required to conduct performance tests to document compliance with the mercury, semivolatile metal, low volatile metal or hydrochloric acid/chlorine gas emission standards under the conditions specified below. You are deemed to be in compliance with an emission standard if the twelve-hour rolling average maximum theoretical emission concentration (MTEC) determined as specified below does not exceed the emission standard:

(i) Determine the feedrate of mercury, semivolatile metals, low volatile metals, or total chlorine and chloride from all feedstreams;

(ii) Determine the stack gas flowrate; and

(iii) Calculate a MTEC for each standard assuming all mercury, semivolatile metals, low volatile metals, or total chlorine (organic and inorganic) from all feedstreams is emitted;

(3) To document compliance with this provision, you must:

(i) Monitor and record the feedrate of mercury, semivolatile metals, low volatile metals, and total chlorine and chloride from all feedstreams according to § 63.1209(c);

(ii) Monitor with a CMS and record in the operating record the gas flowrate (either directly or by monitoring a surrogate parameter that you have correlated to gas flowrate);

(iii) Continuously calculate and record in the operating record the MTEC under the procedures of paragraph (m)(2) of this section; and

(iv) Interlock the MTEC calculated in paragraph (m)(2)(iii) of this section to the AWFCO system to stop hazardous waste burning when the MTEC exceeds the emission standard.

(4) In lieu of the requirement in paragraphs (m)(3)(iii) and (iv) of this section, you may:

(i) Identify in the notification of compliance a minimum gas flowrate limit and a maximum feedrate limit of mercury, semivolatile metals, low volatile metals, and/or total chlorine and chloride from all feedstreams that ensures the MTEC as calculated in paragraph (m)(2)(iii) of this section is below the applicable emission standard; and

(ii) Interlock the minimum gas flowrate limit and maximum feedrate limit in paragraph (m)(3)(iv) of this section to the AWFCO system to stop hazardous waste burning when the gas flowrate or mercury, semivolatile metals, low volatile metals, and/or total chlorine and chloride feedrate exceeds the limit in paragraph (m)(4)(i) of this section.

(5) When you determine the feedrate of mercury, semivolatile metals, low volatile metals, or total chlorine and chloride for purposes of this provision, except as provided by paragraph (m)(6) of this section, you must assume that the analyte is present at the full detection limit when the feedstream analysis determines that the analyte is not detected in the feedstream.

(6) Owners and operators of hazardous waste burning cement kilns and lightweight aggregate kilns may assume that mercury is present in raw material at half the detection limit when the raw material feedstream analysis determines that mercury is not detected.

(7) You must state in the site-specific test plan that you submit for review and approval under paragraph (e) of this section that you intend to comply with the provisions of this paragraph. You must include in the test plan documentation that any surrogate that is proposed for gas flowrate adequately correlates with the gas flowrate.

(n) *Feedrate limits for nondetectable constituents.* (1) You must establish separate semivolatile metal, low volatile metal, mercury, and total chlorine (organic and inorganic), and/or ash feedrate limits for each feedstream for which the comprehensive performance test feedstream analysis determines that these constituents are not present at detectable levels.

(2) You must define the feedrate limits established under paragraph (n)(1) of this section as nondetect at the full detection limit achieved during the performance test.

(3) You will not be deemed to be in violation of the feedrate limit established in paragraph (n)(2) of this section when detectable levels of the constituent are measured, whether at levels above or below the full detection limit achieved during the performance test, provided that:

(i) Your total feedrate for that constituent, including the detectable levels in the feedstream which is limited to nondetect levels, is below your feedrate limit for that constituent; or

(ii) Except for ash, your maximum theoretical emission concentration (MTEC) for the constituent (*i.e.*, semivolatile metal, low volatile metal, mercury, and/or hydrochloric acid/chlorine gas) calculated according to paragraph (m) of this section, and considering the contribution from all feedstreams including the detectable levels in the feedstream which is limited to nondetect levels, is below the emission standard in §§ 63.1203, 63.1204, and 63.1205.

§ 63.1208 What are the test methods?

(a) *References.* When required in subpart EEE of this part, the following publication is incorporated by reference, ''Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,'' EPA Publication SW–846 Third Edition (November 1986), as amended by Updates I (July 1992), II (September 1994), IIA (August 1993), IIB (January 1995), and III (December 1996). The Third Edition of SW–846 and Updates I, II, IIA, IIB, and III (document number 955–001–00000–1) are available for the Superintendent of Document, U.S. Government Printing Office, Washington, DC 20402, (202) 512–1800. Copies of the Third Edition and its updates are also available from the National Technical Information Services (NTIS), 5285 Port Royal Road, Springfield, VA 22161, (703) 487–4650. Copies may be inspected at the Library, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460; or at the Office of the Federal Register, 800 North Capitol Street, NW, Suite 700, Washington, DC.

(b) *Test methods.* You must use the following test methods to determine compliance with the emissions standards of this subpart:

(1) *Dioxins and furans.* (i) You must use Method 0023A, Sampling Method for Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans emissions from Stationary Sources, EPA Publication SW–846, as incorporated by reference in paragraph (a) of this section, to determine compliance with the emission standard for dioxins and furans;

(ii) You must sample for a minimum of three hours, and you must collect a minimum sample volume of 2.5 dscm;

(iii) You may assume that nondetects are present at zero concentration.

(2) *Mercury.* You must use Method 29, provided in appendix A, part 60 of this chapter, to demonstrate compliance with emission standard for mercury.

(3) *Cadmium and lead.* You must use Method 29, provided in appendix A, part 60 of this chapter, to determine compliance with the emission standard for cadmium and lead (combined).

(4) *Arsenic, beryllium, and chromium.* You must use Method 29, provided in appendix A, part 60 of this chapter, to determine compliance with the emission standard for arsenic, beryllium, and chromium (combined).

(5) *Hydrochloric acid and chlorine gas.* You may use Methods 26A, 320, or 321 provided in appendix A, part 60 of this chapter, to determine compliance with the emission standard for hydrochloric acid and chlorine gas (combined). You may use Methods 320 or 321 to make major source determinations under § 63.9(b)(2)(v).

(6) *Particulate matter.* You must use Methods 5 or 5I, provided in appendix A, part 60 of this chapter, to demonstrate compliance with the emission standard for particulate matter.

(7) *Other Test Methods.* You may use applicable test methods in EPA Publication SW-846, as incorporated by reference in paragraph (a) of this section, as necessary to demonstrate compliance with requirements of this subpart, except as otherwise specified in paragraphs (b)(2)–(b)(6) of this section.

(8) *Feedstream analytical methods.* You may use any reliable analytical method to determine feedstream concentrations of metals, chlorine, and other constituents. It is your responsibility to ensure that the sampling and analysis procedures are unbiased, precise, and that the results are representative of the feedstream. For each feedstream, you must demonstrate that:

(i) Each analyte is not present above the reported level at the 80% upper confidence limit around the mean; and

(ii) The analysis could have detected the presence of the constituent at or below the reported level at the 80% upper confidence limit around the mean. (See Guidance for Data Quality Assessment—Practical Methods for Data Analysis, EPA QA/G–9, January 1998, EPA/600/R–96/084).

(9) *Opacity.* If you determine compliance with the opacity standard under the monitoring requirements of §§ 63.1209(a)(1)(iv) and (a)(1)(v), you must use Method 9, provided in appendix A, part 60 of this chapter.

§ 63.1209 What are the monitoring requirements?

(a) *Continuous emissions monitoring systems (CEMS) and continuous opacity monitoring systems (COMS).* (1)(i) You must use a CEMS to demonstrate and monitor compliance with the carbon monoxide and hydrocarbon standards under this subpart. You must also use an oxygen CEMS to continuously correct the carbon monoxide and hydrocarbon levels to 7 percent oxygen.

(ii) For cement kilns, except as provided by paragraphs (a)(1)(iv) and (a)(1)(v) of this section, you must use a COMS to demonstrate and monitor compliance with the opacity standard under §§ 63.1204(a)(7) and (b)(7) at each point where emissions are vented from these affected sources including the bypass stack of a preheater or preheater/precalciner kiln with dual stacks.

(A) You must maintain and operate each COMS in accordance with the requirements of § 63.8(c) except for the requirements under § 63.8(c)(3). The requirements of § 63.1211(d) shall be complied with instead of § 63.8(c)(3); and

(B) Compliance is based on six-minute block average.

(iii) You must install, calibrate, maintain, and operate a particulate matter CEMS to demonstrate and monitor compliance with the particulate matter standards under this subpart. However, compliance with the requirements in their section to install, calibrate, maintain and operate the PM CEMS is not required until such time that the Agency promulgates all performance specifications and operational requirements applicable to PM CEMS.

(iv) If you operate a cement kiln subject to the provisions of this subpart and use a fabric filter with multiple stacks or an electrostatic precipitator with multiple stacks, you may, in lieu of installing the COMS required by paragraph (a)(1)(ii) of this section, comply with the opacity standard in accordance with the procedures of Method 9 to part 60 of this chapter:

(A) You must conduct the Method 9 test while the affected source is operating at the highest load or capacity level reasonably expected to occur within the day;

(B) The duration of the Method 9 test shall be at least 30 minutes each day;

(C) You must use the Method 9 procedures to monitor and record the average opacity for each six-minute block period during the test; and

(D) To remain in compliance, all six-minute block averages must not exceed the opacity standard under §§ 63.1204(a)(7) and (b)(7).

(v) If you operate a cement kiln subject to the provisions of this subpart and use a particulate matter control device that exhausts through a monovent, or if the use of a COMS in accordance with the installation specification of Performance Specification 1 (PS–1) of appendix B to part 60 of this chapter is not feasible, you may, in lieu of installing the COMS required by paragraph (a)(1)(ii) of this section, comply with the opacity standard in accordance with the procedures of Method 9 to part 60 of this chapter:

(A) You must conduct the Method 9 test while the affected source is operating at the highest load or capacity level reasonably expected to occur within the day;

(B) The duration of the Method 9 test shall be at least 30 minutes each day;

(C) You must use the Method 9 procedures to monitor and record the average opacity for each six-minute block period during the test; and

(D) To remain in compliance, all six-minute block averages must not exceed the opacity standard under §§ 63.1204(a)(7) and (b)(7).

(2) *Performance specifications.* You must install, calibrate, maintain, and continuously operate the CEMS and COMS in compliance with the quality assurance procedures provided in the appendix to this subpart and Performance Specifications 1 (opacity), 4B (carbon monoxide and oxygen), and 8A (hydrocarbons) in appendix B, part 60 of this chapter.

(3) *Carbon monoxide readings exceeding the span.* (i) Except as provided by paragraph (a)(3)(ii) of this section, if a carbon monoxide CEMS detects a response that results in a one-minute average at or above the 3,000 ppmv span level required by Performance Specification 4B in appendix B, part 60 of this chapter, the one-minute average must be recorded as 10,000 ppmv. The one-minute 10,000 ppmv value must be used for calculating the hourly rolling average carbon monoxide level.

(ii) Carbon monoxide CEMS that use a span value of 10,000 ppmv when one-minute carbon monoxide levels are equal to or exceed 3,000 ppmv are not subject to paragraph (a)(3)(i) of this section. Carbon monoxide CEMS that use a span value of 10,000 are subject to the same CEMS performance and equipment specifications when operating in the range of 3,000 ppmv to 10,000 ppmv that are provided by Performance Specification 4B for other carbon monoxide CEMS, except:

(A) Calibration drift must be less than 300 ppmv; and

(B) Calibration error must be less than 500 ppmv.

(4) *Hydrocarbon readings exceeding the span.* (i) Except as provided by paragraph (a)(4)(ii) of this section, if a hydrocarbon CEMS detects a response that results in a one-minute average at or above the 100 ppmv span level required by Performance Specification 8A in appendix B, part 60 of this chapter, the one-minute average must be recorded as 500 ppmv. The one-minute 500 ppmv value must be used for calculating the hourly rolling average HC level.

(ii) Hydrocarbon CEMS that use a span value of 500 ppmv when one-minute hydrocarbon levels are equal to or exceed 100 ppmv are not subject to paragraph (a)(4)(i) of this section. Hydrocarbon CEMS that use a span value of 500 ppmv are subject to the same CEMS performance and equipment specifications when operating in the range of 100 ppmv to 500 ppmv that are provided by Performance Specification 8A for other hydrocarbon CEMS, except:

(A) The zero and high-level calibration gas must have a hydrocarbon level of between 0 and 100 ppmv, and between 250 and 450 ppmv, respectively;

(B) The strip chart recorder, computer, or digital recorder must be capable of recording all readings within the CEM measurement range and must have a resolution of 2.5 ppmv;

(C) The CEMS calibration must not differ by more than ±15 ppmv after each 24-hour period of the seven day test at both zero and high levels;

(D) The calibration error must be no greater than 25 ppmv; and

(E) The zero level, mid-level, and high level calibration gas used to determine calibration error must have a hydrocarbon level of 0–200 ppmv, 150–200 ppmv, and 350–400 ppmv, respectively.

(5) *Petitions to use CEMS for other standards.* You may petition the Administrator to use CEMS for compliance monitoring for particulate matter, mercury, semivolatile metals, low volatile metals, and hydrochloric acid/chlorine gas under § 63.8(f) in lieu of compliance with the corresponding operating parameter limits under this section.

(6) *Calculation of rolling averages.*— (i) *Calculation of rolling averages initially.* The carbon monoxide and hydrocarbon CEMS must begin recording one-minute average values by 12:01 am and hourly rolling average values by 1:01 am, when 60 one-minute values will be available for calculating the initial hourly rolling average.

(ii) *Calculation of rolling averages upon intermittent operations.* You must ignore periods of time when one-minute values are not available for calculating the hourly rolling average. When one-minute values become available again, the first one-minute value is added to the previous 59 values to calculate the hourly rolling average.

(iii) *Calculation of rolling averages when the hazardous waste feed is cutoff.* (A) Except as provided by paragraph (a)(6)(iii)(B) of this section, you must continue to monitoring carbon monoxide and hydrocarbon when the hazardous waste feed is cutoff if the source is operating. You must not resume feeding hazardous waste if the emission levels exceed the standard.

(B) You are not subject to the CEMS requirements of this subpart during periods of time you meet the requirements of § 63.1206(b)(1)(ii) (compliance with emissions standards for nonhazardous waste burning sources when you are not burning hazardous waste).

(7) *Operating parameter limits for hydrocarbons.* If you elect to comply with the carbon monoxide and hydrocarbon emission standards by continuously monitoring carbon monoxide with a CEMS, you must demonstrate that hydrocarbon emissions during the comprehensive performance test do not exceed the hydrocarbon emissions standard. In addition, the limits you establish on the destruction and removal efficiency (DRE) operating parameters required under paragraph (j) of this section also ensure that you maintain compliance with the hydrocarbon emission standard. If you do not conduct the hydrocarbon demonstration and DRE tests concurrently, you must establish separate operating parameter limits under paragraph (j) of this section based on each test and the more restrictive of the operating parameter limits applies.

(b) *Other continuous monitoring systems (CMS).* (1) You must use CMS (e.g., thermocouples, pressure transducers, flow meters) to document compliance with the applicable operating parameter limits under this section.

(2) Except as specified in paragraphs (b)(2)(i) through (ii) of this section, you must install and operate non-CMS in conformance with § 63.8(c)(3) that requires you, at a minimum, to comply with the manufacturer's written specifications or recommendations for installation, operation, and calibration of the system:

(i) *Calibration of thermocouples.* The calibration of a thermocouple or other temperature sensor must be verified at least once every three months; and

(ii) *Accuracy and calibration of weight measurement devices.* The accuracy of weight measurement devices used to monitor flowrate of a feedstream (e.g., activated carbon feedrate, sorbent feedrate, nonpumpable waste) must be ± 1 percent of the weight being measured. The calibration of the device must be verified at least once every three months.

(3) CMS must sample the regulated parameter without interruption, and evaluate the detector response at least once each 15 seconds, and compute and record the average values at least every 60 seconds.

(4) The span of the non-CEMS CMS detector must not be exceeded. You must interlock the span limits into the automatic waste feed cutoff system required by § 63.1206(c)(3).

(5) *Calculation of rolling averages.*— (i) *Calculation of rolling averages*

initially. Continuous monitoring systems must begin recording one-minute average values at 12:01 am on the compliance data and begin recording rolling averages when enough one-minute average values are available to calculate the required rolling average (e.g., when 60 one-minute averages are available to calculate an hourly rolling average; when 720 one-minute averages are available to calculate a 12-hour rolling average).

(ii) *Calculation of rolling averages upon intermittent operations.* You must ignore periods of time when one-minute values are not available for calculating rolling averages. When one-minute values become available again, the first one-minute value is added to the previous one-minute values to calculate rolling averages.

(iii) *Calculation of rolling averages when the hazardous waste feed is cutoff.* (A) Except as provided by paragraph (b)(5)(iii)(B) of this section, you must continue to monitoring operating parameter limits with a CMS when the hazardous waste feed is cutoff if the source is operating. You must not resume feeding hazardous waste if an operating parameter exceeds its limit.

(B) You are not subject to the CMS requirements of this subpart during periods of time you meet the requirements of § 63.1206(b)(1)(ii) (compliance with emissions standards for nonhazardous waste burning sources when you are not burning hazardous waste).

(c) *Analysis of feedstreams.*—(1) *General.* Prior to feeding the material, you must obtain an analysis of each feedstream that is sufficient to document compliance with the applicable feedrate limits provided by this section.

(2) *Feedstream analysis plan.* You must develop and implement a feedstream analysis plan and record it in the operating record. The plan must specify at a minimum:

(i) The parameters for which you will analyze each feedstream to ensure compliance with the operating parameter limits of this section;

(ii) Whether you will obtain the analysis by performing sampling and analysis or by other methods, such as using analytical information obtained from others or using other published or documented data or information;

(iii) How you will use the analysis to document compliance with applicable feedrate limits (*e.g.*, if you blend hazardous wastes and obtain analyses of the wastes prior to blending but not of the blended, as-fired, waste, the plan must describe how you will determine the pertinent parameters of the blended waste);

(iv) The test methods which you will use to obtain the analyses;

(v) The sampling method which you will use to obtain a representative sample of each feedstream to be analyzed using sampling methods described in appendix I, part 26, of this chapter, or an equivalent method; and

(vi) The frequency with which you will review or repeat the initial analysis of the feedstream to ensure that the analysis is accurate and up to date.

(3) *Review and approval of analysis plan.* You must submit the feedstream analysis plan to the Administrator for review and approval, if requested.

(4) *Compliance with feedrate limits.* To comply with the applicable feedrate limits of this section, you must monitor and record feedrates as follows:

(i) Determine and record the value of the parameter for each feedstream by sampling and analysis or other method;

(ii) Determine and record the mass or volume flowrate of each feedstream by a CMS. If you determine flowrate of a feedstream by volume, you must determine and record the density of the feedstream by sampling and analysis (unless you report the constituent concentration in units of weight per unit volume (e.g., mg/l)); and

(iii) Calculate and record the mass feedrate of the parameter per unit time.

(5) *Waiver of monitoring of constituents in certain feedstreams.* You are not required to monitor levels of metals or chlorine in the following feedstreams to document compliance with the feedrate limits under this section provided that you document in the comprehensive performance test plan the expected levels of the constituent in the feedstream and account for those assumed feedrate levels in documenting compliance with feedrate limits: natural gas, process air, and feedstreams from vapor recovery systems.

(d) *Performance evaluations.* (1) The requirements of §§ 63.8(d) (Quality control program) and (e) (Performance evaluation of continuous monitoring systems) apply, except that you must conduct performance evaluations of components of the CMS under the frequency and procedures (for example, submittal of performance evaluation test plan for review and approval) applicable to performance tests as provided by § 63.1207.

(2) You must comply with the quality assurance procedures for CEMS prescribed in the appendix to this subpart.

(e) *Conduct of monitoring.* The provisions of § 63.8(b) apply.

(f) *Operation and maintenance of continuous monitoring systems.* The provisions of § 63.8(c) apply except:

(1) *Section 63.8(c)(3).* The requirements of § 63.1211(d), that requires CMSs to be installed, calibrated, and operational on the compliance date, shall be complied with instead of section 63.8(c)(3);

(2) *Section 63.8(c)(4)(ii).* The performance specifications for carbon monoxide, hydrocarbon, and oxygen CEMSs in subpart B, part 60 of this chapter that requires detectors to measure the sample concentration at least once every 15 seconds for calculating an average emission rate once every 60 seconds shall be complied with instead of section 63.8(c)(4)(ii); and

(3) Sections 63.8(c)(4)(i), (c)(5), and (c)(7)(i)(C) pertaining to COMS apply only to owners and operators of hazardous waste burning cement kilns..

(g) *Alternative monitoring requirements other than continuous emissions monitoring systems (CEMS).*—(1) *Requests to use alternative methods.* (i) You may submit an application to the Administrator under this paragraph for approval of alternative monitoring requirements to document compliance with the emission standards of this subpart. For requests to use additional CEMS, however, you must use paragraph (a)(5) of this section and § 63.8(f).

(A) The Administrator will not approve averaging periods for operating parameter limits longer than specified in this section unless you document using data or information that the longer averaging period will ensure that emissions do not exceed levels achieved during the comprehensive performance test over any increment of time equivalent to the time required to conduct three runs of the performance test.

(B) If the Administrator approves the application to use an alternative monitoring requirement, you must continue to use that alternative monitoring requirement until you receive approval under this paragraph to use another monitoring requirement.

(ii) You may submit an application to waive an operating parameter limit specified in this section based on documentation that neither that operating parameter limit nor an alternative operating parameter limit is needed to ensure compliance with the emission standards of this subpart.

(iii) You must comply with the following procedures for applications submitted under paragraphs (g)(1)(i) and (ii) of this section:

(A) *Timing of the application.* You must submit the application to the Administrator not later than with the comprehensive performance test plan.

(B) *Content of the application.* You must include in the application:

(*1*) Data or information justifying your request for an alternative monitoring requirement (or for a waiver of an operating parameter limit), such as the technical or economic infeasibility or the impracticality of using the required approach;

(*2*) A description of the proposed alternative monitoring requirement, including the operating parameter to be monitored, the monitoring approach/technique (*e.g.*, type of detector, monitoring location), the averaging period for the limit, and how the limit is to be calculated; and

(*3*) Data or information documenting that the alternative monitoring requirement would provide equivalent or better assurance of compliance with the relevant emission standard, or that it is the monitoring requirement that best assures compliance with the standard and that is technically and economically practicable.

(C) *Approval of request to use an alternative monitoring requirement or waive an operating parameter limit.* The Administrator will notify you of approval or intention to deny approval of the request within 90 calendar days after receipt of the original request and within 60 calendar days after receipt of any supplementary information that you submit. The Administrator will not approve an alternative monitoring request unless the alternative monitoring requirement provides equivalent or better assurance of compliance with the relevant emission standard, or is the monitoring requirement that best assures compliance with the standard and that is technically and economically practicable. Before disapproving any request, the Administrator will notify you of the Administrator's intention to disapprove the request together with:

(*1*) Notice of the information and findings on which the intended disapproval is based; and

(*2*) Notice of opportunity for you to present additional information to the Administrator before final action on the request. At the time the Administrator notifies you of intention to disapprove the request, the Administrator will specify how much time you will have after being notified of the intended disapproval to submit the additional information.

(D) *Responsibility of owners and operators.* You are responsible for ensuring that you submit any supplementary and additional information supporting your application in a timely manner to enable the Administrator to consider your application during review of the comprehensive performance test plan. Neither your submittal of an application, nor the Administrator's failure to approve or disapprove the application, relieves you of the responsibility to comply with the provisions of this subpart.

(2) *Administrator's discretion to specify additional or alternative requirements.* The Administrator may determine on a case-by-case basis at any time (e.g., during review of the comprehensive performance test plan, during compliance certification review) that you may need to limit additional or alternative operating parameters (e.g., opacity in addition to or in lieu of operating parameter limits on the particulate matter control device) or that alternative approaches to establish limits on operating parameters may be necessary to document compliance with the emission standards of this subpart.

(h) *Reduction of monitoring data.* The provisions of § 63.8(g) apply.

(i) *When an operating parameter is applicable to multiple standards.* Paragraphs (j) through (p) of this section require you to establish limits on operating parameters based on comprehensive performance testing to ensure you maintain compliance with the emission standards of this subpart. For several parameters, you must establish a limit for the parameter to ensure compliance with more than one emission standard. An example is a limit on minimum combustion chamber temperature to ensure compliance with both the DRE standard of paragraph (j) of this section and the dioxin/furan standard of paragraph (k) of this section. If the performance tests for such standards are not performed simultaneously, the most stringent limit for a parameter derived from independent performance tests applies.

(j) *DRE.* To remain in compliance with the destruction and removal efficiency (DRE) standard, you must establish operating limits during the comprehensive performance test (or during a previous DRE test under provisions of § 63.1206(b)(7)) for the following parameters, unless the limits are based on manufacturer specifications, and comply with those limits at all times that hazardous waste remains in the combustion chamber (*i.e.*, the hazardous waste residence time has not transpired since the hazardous waste feed cutoff system was activated):

(1) *Minimum combustion chamber temperature.* (i) You must measure the temperature of each combustion chamber at a location that best represents, as practicable, the bulk gas temperature in the combustion zone. You must document the temperature measurement location in the test plan you submit under § 63.1207(e);

(ii) You must establish a minimum hourly rolling average limit as the average of the test run averages;

(2) *Maximum flue gas flowrate or production rate.* (i) As an indicator of gas residence time in the control device, you must establish and comply with a limit on the maximum flue gas flowrate, the maximum production rate, or another parameter that you document in the site-specific test plan as an appropriate surrogate for gas residence time, as the average of the maximum hourly rolling averages for each run.

(ii) You must comply with this limit on a hourly rolling average basis;

(3) *Maximum hazardous waste feedrate.* (i) You must establish limits on the maximum pumpable and total (i.e., pumpable and nonpumpable) hazardous waste feedrate for each location where hazardous waste is fed.

(ii) You must establish the limits as the average of the maximum hourly rolling averages for each run.

(iii) You must comply with the feedrate limit(s) on a hourly rolling average basis;

(4) *Operation of waste firing system.* You must specify operating parameters and limits to ensure that good operation of each hazardous waste firing system is maintained.

(k) *Dioxins and furans.* You must comply with the dioxin and furans emission standard by establishing and complying with the following operating parameter limits. You must base the limits on operations during the comprehensive performance test, unless the limits are based on manufacturer specifications.

(1) *Gas temperature at the inlet to a dry particulate matter control device.* (i) For hazardous waste burning incinerators and cement kilns, if the combustor is equipped with an electrostatic precipitator, baghouse (fabric filter), or other dry emissions control device where particulate matter is suspended in contact with combustion gas, you must establish a limit on the maximum temperature of the gas at the inlet to the device on an hourly rolling average. You must establish the hourly rolling average limit as the average of the test run averages.

(ii) For hazardous waste burning lightweight aggregate kilns, you must establish a limit on the maximum temperature of the gas at the exit of the (last) combustion chamber (or exit of any waste heat recovery system) on an hourly rolling average. The limit must be established as the average of the test run averages;

(2) *Minimum combustion chamber temperature.* (i) You must measure the temperature of each combustion chamber at a location that best represents, as practicable, the bulk gas temperature in the combustion zone. You must document the temperature measurement location in the test plan you submit under §§ 63.1207(e) and (f);

(ii) You must establish a minimum hourly rolling average limit as the average of the test run averages.

(3) *Maximum flue gas flowrate or production rate.* (i) As an indicator of gas residence time in the control device, you must establish and comply with a limit on the maximum flue gas flowrate, the maximum production rate, or another parameter that you document in the site-specific test plan as an appropriate surrogate for gas residence time, as the average of the maximum hourly rolling averages for each run.

(ii) You must comply with this limit on a hourly rolling average basis;

(4) *Maximum waste feedrate.* (i) You must establish limits on the maximum pumpable and total (pumpable and nonpumpable) waste feedrate for each location where waste is fed.

(ii) You must establish the limits as the average of the maximum hourly rolling averages for each run.

(iii) You must comply with the feedrate limit(s) on a hourly rolling average basis;

(5) *Particulate matter operating limit.* If your combustor is equipped with an activated carbon injection or a carbon bed system, you must limit particulate matter emissions to the level achieved during the comprehensive performance test as prescribed by paragraph (m) of this section;

(6) *Activated carbon injection parameter limits.* If your combustor is equipped with an activated carbon injection system:

(i) *Carbon feedrate.* You must establish a limit on minimum carbon injection rate on an hourly rolling average calculated as the average of the test run averages. If your carbon injection system injects carbon at more than one location, you must establish a carbon feedrate limit for each location.

(ii) *Carrier fluid.* You must establish a limit on minimum carrier fluid (gas or liquid) flowrate or pressure drop as an hourly rolling average based on the manufacturer's specifications. You must document the specifications in the test plan you submit under §§ 63.1207(e) and (f);

(iii) *Carbon specification.* (A) You must specify and use the brand (*i.e.*, manufacturer) and type of carbon used during the comprehensive performance test until a subsequent comprehensive performance test is conducted, unless you document in the site-specific performance test plan required under §§ 63.1207(e) and (f) key parameters that affect adsorption and establish limits on those parameters based on the carbon used in the performance test.

(B) You may substitute at any time a different brand or type of carbon provided that the replacement has equivalent or improved properties compared to the carbon used in the performance test and conforms to the key sorbent parameters you identify under paragraph (k)(6)(iii)(A) of this section. You must include in the operating record documentation that the substitute carbon will provide the same level of control as the original carbon.

(7) *Carbon bed parameter limits.* If your combustor is equipped with a carbon bed system:

(i) *Maximum bed age.* (A) Except as provided by paragraph (k)(7)(i)(C) of this section, the maximum age of the carbon in each segment of the bed before you must replace the carbon is the age of the bed during the comprehensive performance test.

(B) You must measure carbon age in terms of the cumulative volume of combustion gas flow through carbon since its addition. For beds with multiple segments, you must establish the maximum age for each segment.

(C) For the initial comprehensive performance test, you may base the initial limit on maximum age of the carbon in each segment of the bed on manufacturer's specifications. If you use manufacturer's specifications rather than actual bed age to establish the initial limit, you must also recommend in the initial comprehensive performance test plan a schedule for subsequent dioxin/furan emissions testing, prior to the confirmatory performance test, that you will use to document to the Administrator that the initial limit on maximum bed age ensures compliance with the dioxin/furan emission standard. If you fail to confirm compliance with the emission standard during this testing, you must conduct additional testing as necessary to document that a revised lower limit on maximum bed age ensures compliance with the standard.

(ii) *Carbon specification.* (A) You must specify and use the brand (*i.e.*, manufacturer) and type of carbon used during the comprehensive performance test until a subsequent comprehensive performance test is conducted, unless you document in the site-specific performance test plan required under §§ 63.1207(e) and (f) key parameters that affect adsorption and establish limits on those parameters based on the carbon used in the performance test.

(B) You may substitute at any time a different brand or type of carbon provided that the replacement has equivalent or improved properties compared to the carbon used in the performance test. You must include in the operating record documentation that the substitute carbon will provide an equivalent or improved level of control as the original carbon.

(iii) *Maximum temperature.* You must measure the temperature of the carbon bed at either the bed inlet or exit and you must establish a maximum temperature limit on an hourly rolling average as the average of the test run averages.

(8) *Catalytic oxidizer parameter limits.* If your combustor is equipped with a catalytic oxidizer, you must establish limits on the following parameters:

(i) *Minimum flue gas temperature at the entrance of the catalyst.* You must establish a limit on minimum flue gas temperature at the entrance of the catalyst on an hourly rolling average as the average of the test run averages.

(ii) *Maximum time in-use.* You must replace a catalytic oxidizer with a new catalytic oxidizer when it has reached the maximum service time specified by the manufacturer.

(iii) *Catalyst replacement specifications.* When you replace a catalyst with a new one, the new catalyst must be equivalent to or better than the one used during the previous comprehensive test, as measured by:

(A) Catalytic metal loading for each metal;

(B) Space time, expressed in the units s^{-1}, the maximum rated volumetric flow of combustion gas through the catalyst divided by the volume of the catalyst; and

(C) Substrate construction, including materials of construction, washcoat type, and pore density.

(iv) *Maximum flue gas temperature.* You must establish a maximum flue gas temperature limit at the entrance of the catalyst as an hourly rolling average, based on manufacturer's specifications.

(9) *Inhibitor feedrate parameter limits.* If you feed a dioxin/furan inhibitor into the combustion system, you must establish limits for the following parameters:

(i) *Minimum inhibitor feedrate.* You must establish a limit on minimum inhibitor feedrate on an hourly rolling average as the average of the test run averages.

(ii) *Inhibitor specifications.* (A) You must specify and use the brand (*i.e.*, manufacturer) and type of inhibitor used during the comprehensive performance test until a subsequent comprehensive performance test is conducted, unless you document in the site-specific performance test plan required under §§ 63.1207(e) and (f) key parameters that affect the effectiveness of the inhibitor and establish limits on those parameters based on the inhibitor used in the performance test.

(B) You may substitute at any time a different brand or type of inhibitor provided that the replacement has equivalent or improved properties compared to the inhibitor used in the performance test and conforms to the key parameters you identify under paragraph (k)(9)(ii)(A) of this section. You must include in the operating record documentation that the substitute inhibitor will provide the same level of control as the original inhibitor.

(l) *Mercury.* You must comply with the mercury emission standard by establishing and complying with the following operating parameter limits. You must base the limits on operations during the comprehensive performance test, unless the limits are based on manufacturer specifications.

(1) *Feedrate of total mercury.* You must establish a 12-hour rolling average limit for the total feedrate of mercury in all feedstreams as the average of the hourly rolling averages for each run, unless mercury feedrate limits are extrapolated from performance test feedrate levels under the following provisions.

(i) You may request as part of the performance test plan under §§ 63.7(b) and (c) and §§ 63.1207(e) and (f) to use the mercury feedrates and associated emission rates during the comprehensive performance test to extrapolate to higher allowable feedrate limits and emission rates.

(ii) The extrapolation methodology will be reviewed and approved, as warranted, by the Administrator. The review will consider in particular whether:

(A) Performance test metal feedrates are appropriate (*i.e.*, whether feedrates are at least at normal levels; depending on the heterogeneity of the waste, whether some level of spiking would be appropriate; and whether the physical form and species of spiked material is appropriate); and

(B) Whether the extrapolated feedrates you request are warranted considering historical metal feedrate data.

(iii) The Administrator will review the performance test results in making a finding of compliance required by §§ 63.6(f)(3) and 63.1206(b)(3) to ensure that you have interpreted emission test results properly and that the extrapolation procedure is appropriate for your source.

(2) *Wet scrubber.* If your combustor is equipped with a wet scrubber, you must establish operating parameter limits prescribed by paragraph (o)(3) of this section.

(3) *Activated carbon injection.* If your combustor is equipped with an activated carbon injection system, you must establish operating parameter limits prescribed by paragraph (k)(7) of this section.

(4) *Activated carbon bed.* If your combustor is equipped with a carbon bed system, you must establish operating parameter limits prescribed by paragraph (k)(8) of this section.

(m) *Particulate matter.* You must comply with the particulate matter emission standard by establishing and complying with the following operating parameter limits. You must base the limits on operations during the comprehensive performance test, unless the limits are based on manufacturer specifications.

(1) *Control device operating parameter limits (OPLs).* (i) *Wet scrubbers.* For sources equipped with wet scrubbers, including ionizing wet scrubbers, high energy wet scrubbers such as venturi, hydrosonic, collision, or free jet wet scrubbers, and low energy wet scrubbers such as spray towers, packed beds, or tray towers, you must establish limits on the following parameters:

(A) For high energy scrubbers only, minimum pressure drop across the wet scrubber on an hourly rolling average, established as the average of the test run averages;

(B) For all wet scrubbers:

(*1*) To ensure that the solids content of the scrubber liquid does not exceed levels during the performance test, you must either:

(i) Establish a limit on solids content of the scrubber liquid using a CMS or by manual sampling and analysis. If you elect to monitor solids content manually, you must sample and analyze the scrubber liquid hourly unless you support an alternative monitoring frequency in the performance test plan that you submit for review and approval; or

(ii) Establish a minimum blowdown rate using a CMS and either a minimum scrubber tank volume or liquid level using a CMS.

(*2*) For maximum solids content monitored with a CMS, you must establish a limit on a twelve-hour rolling average as the average of the test run averages.

(*3*) For maximum solids content measured manually, you must establish an hourly limit, as measured at least once per hour, unless you support an alternative monitoring frequency in the performance test plan that you submit for review and approval. You must establish the maximum hourly limit as the average of the manual measurement averages for each run.

(*4*) For minimum blowdown rate and either a minimum scrubber tank volume or liquid level using a CMS, you must establish a limit on an hourly rolling average as the average of the test run averages.

(C) For high energy wet scrubbers only, you must establish limits on either the minimum liquid to gas ratio or the minimum scrubber water flowrate and maximum flue gas flowrate on an hourly rolling average. If you establish limits on maximum flue gas flowrate under this paragraph, you need not establish a limit on maximum flue gas flowrate under paragraph (m)(2) of this section. You must establish these hourly rolling average limits as the average of the test run averages; and

(D) You must establish limits on minimum power input for ionizing wet scrubbers on an hourly rolling average as the average of the test run averages.

(ii) *Baghouses.* If your combustor is equipped with a baghouse, you must establish a limit on minimum pressure drop and maximum pressure drop across each baghouse cell based on manufacturer's specifications. You must comply with the limit on an hourly rolling average.

(iii) *Electrostatic precipitators.* If your combustor is equipped with an electrostatic precipitator, you must establish a limit on minimum secondary power input (kVa) for each field on an hourly rolling average as the average of the test run averages. Secondary power is power actually fed to the electrostatic precipitator rather than primary power fed to the transformer-rectifier sets.

(iv) *Other particulate matter control devices.* For each control device that is not a high energy or ionizing wet scrubber, baghouse, or electrostatic precipitator but is operated to comply with the particulate matter emission standards of this subpart, you must ensure that the control device is properly operated and maintained as required by § 63.1206(c)(7) and by monitoring the operation of the control device as follows:

(A) During each comprehensive performance test conducted to demonstrate compliance with the particulate matter emissions standard, you must establish a range of operating values for the control device that is a representative and reliable indicator that the control device is operating within the same range of conditions as during the performance test. You must establish this range of operating values as follows:

(*1*) You must select a set of operating parameters appropriate for the control device design that you determine to be a representative and reliable indicator of the control device performance.

(*2*) You must measure and record values for each of the selected operating parameters during each test run of the performance test. A value for each selected parameter must be recorded using a continuous monitor.

(*3*) For each selected operating parameter measured in accordance with the requirements of paragraph (m)(1)(iv)(A)(*1*) of this section, you must establish a minimum operating parameter limit or a maximum operating parameter limit, as appropriate for the parameter, to define the operating limits within which the control device can operate and still continuously achieve the same operating conditions as during the performance test.

(*4*) You must prepare written documentation to support the operating parameter limits established for the control device and you must include this documentation in the performance test plan that you submit for review and approval. This documentation must include a description for each selected parameter and the operating range and monitoring frequency required to ensure the control device is being properly operated and maintained.

(B) You must install, calibrate, operate, and maintain a monitoring device equipped with a recorder to measure the values for each operating parameter selected in accordance with the requirements of paragraph (m)(1)(iv)(A)(*1*) of this section. You must install, calibrate, and maintain the monitoring equipment in accordance with the equipment manufacturer's specifications. The recorder must record the detector responses at least every 60 seconds, as required in the definition of continuous monitor.

(C) You must regularly inspect the data recorded by the operating parameter monitoring system at a sufficient frequency to ensure the control device is operating properly. An excursion is determined to have occurred any time that the actual value of a selected operating parameter is less than the minimum operating limit (or, if applicable, greater than the maximum operating limit) established for the parameter in accordance with the requirements of paragraph (m)(1)(iv)(A)(3) of this section.

(D) Operating parameters selected in accordance with paragraph (m)(1)(iv) of this section may be based on manufacturer specifications provided you support the use of manufacturer specifications in the performance test plan that you submit for review and approval.

(2) *Maximum flue gas flowrate or production rate.* (i) As an indicator of gas residence time in the control device, you must establish a limit on the maximum flue gas flowrate, the maximum production rate, or another parameter that you document in the site-specific test plan as an appropriate surrogate for gas residence time, as the average of the maximum hourly rolling averages for each run.

(ii) You must comply with this limit on a hourly rolling average basis;

(3) *Maximum ash feedrate.* Owners and operators of hazardous waste incinerators must establish a maximum ash feedrate limit as the average of the highest hourly rolling averages for each run.

(n) *Semivolatile metals and low volatility metals.* You must comply with the semivolatile metal (cadmium and lead) and low volatile metal (arsenic, beryllium, and chromium) emission standards by establishing and complying with the following operating parameter limits. You must base the limits on operations during the comprehensive performance test, unless the limits are based on manufacturer specifications.

(1) *Maximum inlet temperature to dry particulate matter air pollution control device.* You must establish a limit on the maximum inlet temperature to the primary dry metals emissions control device (*e.g.*, electrostatic precipitator, baghouse) on an hourly rolling average basis as the average of the test run averages.

(2) *Maximum feedrate of semivolatile and low volatile metals.* (i) *General.* You must establish feedrate limits for semivolatile metals (cadmium and lead) and low volatile metals (arsenic, beryllium, and chromium) as follows, except as provided by paragraph (n)(2)(ii) of this section:

(A) You must establish a 12-hour rolling average limit for the feedrate of cadmium and lead, combined, in all feedstreams as the average of the average hourly rolling averages for each run;

(B) You must establish a 12-hour rolling average limit for the feedrate of arsenic, beryllium, and chromium, combined, in all feedstreams as the average of the average hourly rolling averages for each run; and

(C) You must establish a 12-hour rolling average limit for the feedrate of arsenic, beryllium, and chromium, combined, in all pumpable feedstreams as the average of the average hourly rolling averages for each run. Dual feedrate limits for both pumpable and total feedstreams are not required, however, if you base the total feedrate limit solely on the feedrate of pumpable feedstreams.

(ii) *Feedrate extrapolation.* (A) You may request as part of the performance test plan under §§ 63.7(b) and (c) and §§ 63.1207(e) and (f) to use the semivolatile metal and low volatile metal feedrates and associated emission rates during the comprehensive performance test to extrapolate to higher allowable feedrate limits and emission rates.

(B) The extrapolation methodology will be reviewed and approved, as warranted, by the Administrator. The review will consider in particular whether:

(*1*) Performance test metal feedrates are appropriate (*i.e.*, whether feedrates are at least at normal levels; depending on the heterogeneity of the waste, whether some level of spiking would be appropriate; and whether the physical form and species of spiked material is appropriate); and

(*2*) Whether the extrapolated feedrates you request are warranted considering historical metal feedrate data.

(C) The Administrator will review the performance test results in making a finding of compliance required by §§ 63.6(f)(3) and 63.1206(b)(3) to ensure that you have interpreted emission test results properly and that the extrapolation procedure is appropriate for your source.

(3) *Control device operating parameter limits (OPLs).* You must establish operating parameter limits on the particulate matter control device as specified by paragraph (m)(1) of this section;

(4) *Maximum total chlorine and chloride feedrate.* You must establish a 12-hour rolling average limit for the feedrate of total chlorine and chloride in all feedstreams as the average of the average hourly rolling averages for each run.

(5) *Maximum flue gas flowrate or production rate.* (i) As an indicator of gas residence time in the control device, you must establish a limit on the maximum flue gas flowrate, the

maximum production rate, or another parameter that you document in the site-specific test plan as an appropriate surrogate for gas residence time, as the average of the maximum hourly rolling averages for each run.

(ii) You must comply with this limit on a hourly rolling average basis.

(o) *Hydrochloric acid and chlorine gas.* You must comply with the hydrogen chloride and chlorine gas emission standard by establishing and complying with the following operating parameter limits. You must base the limits on operations during the comprehensive performance test, unless the limits are based on manufacturer specifications.

(1) *Feedrate of total chlorine and chloride.* You must establish a 12-hour rolling average limit for the total feedrate of chlorine (organic and inorganic) in all feedstreams as the average of the average hourly rolling averages for each run.

(2) *Maximum flue gas flowrate or production rate.* (i) As an indicator of gas residence time in the control device, you must establish a limit on the maximum flue gas flowrate, the maximum production rate, or another parameter that you document in the site-specific test plan as an appropriate surrogate for gas residence time, as the average of the maximum hourly rolling averages for each run.

(ii) You must comply with this limit on a hourly rolling average basis;

(3) *Wet scrubber.* If your combustor is equipped with a wet scrubber:

(i) If your source is equipped with a high energy wet scrubber such as a venturi, hydrosonic, collision, or free jet wet scrubber, you must establish a limit on minimum pressure drop across the wet scrubber on an hourly rolling average as the average of the test run averages;

(ii) If your source is equipped with a low energy wet scrubber such as a spray tower, packed bed, or tray tower, you must establish a minimum pressure drop across the wet scrubber based on manufacturer's specifications. You must comply with the limit on an hourly rolling average;

(iii) If your source is equipped with a low energy wet scrubber, you must establish a limit on minimum liquid feed pressure to the wet scrubber based on manufacturer's specifications. You must comply with the limit on an hourly rolling average;

(iv) You must establish a limit on minimum pH on an hourly rolling average as the average of the test run averages;

(v) You must establish limits on either the minimum liquid to gas ratio or the minimum scrubber water flowrate and maximum flue gas flowrate on an hourly rolling average as the average of the test run averages. If you establish limits on maximum flue gas flowrate under this paragraph, you need not establish a limit on maximum flue gas flowrate under paragraph (o)(2) of this section; and

(vi) You must establish a limit on minimum power input for ionizing wet scrubbers on an hourly rolling average as the average of the test run averages.

(4) *Dry scrubber.* If your combustor is equipped with a dry scrubber, you must establish the following operating parameter limits:

(i) *Minimum sorbent feedrate.* You must establish a limit on minimum sorbent feedrate on an hourly rolling average as the average of the test run averages.

(ii) *Minimum carrier fluid flowrate or nozzle pressure drop.* You must establish a limit on minimum carrier fluid (gas or liquid) flowrate or nozzle pressure drop based on manufacturer's specifications.

(iii) *Sorbent specifications.* (A) You must specify and use the brand (*i.e.*, manufacturer) and type of sorbent used during the comprehensive performance test until a subsequent comprehensive performance test is conducted, unless you document in the site-specific performance test plan required under §§ 63.1207(e) and (f) key parameters that affect adsorption and establish limits on those parameters based on the sorbent used in the performance test.

(B) You may substitute at any time a different brand or type of sorbent provided that the replacement has equivalent or improved properties compared to the sorbent used in the performance test and conforms to the key sorbent parameters you identify under paragraph (o)(4)(iii)(A) of this section. You must record in the operating record documentation that the substitute sorbent will provide the same level of control as the original sorbent.

(p) *Maximum combustion chamber pressure.* If you comply with the requirements for combustion system leaks under § 63.1206(c)(5) by maintaining the maximum combustion chamber zone pressure lower than ambient pressure, you must monitor the pressure instantaneously and the automatic waste feed cutoff system must be engaged when negative pressure is not maintained at any time.

(q) *Operating under different modes of operation.* If you operate under different modes of operation, you must establish operating parameter limits for each mode. You must document in the operating record when you change a mode of operation and begin complying with the operating parameter limits for an alternative mode of operation. You must begin calculating rolling averages anew (*i.e.*, without considering previous recordings) when you begin complying with the operating parameter limits for the alternative mode of operation.

Notification, Reporting and Recordkeeping

§ 63.1210 What are the notification requirements?

(a) *Summary of requirements.* (1) You must submit the following notifications to the Administrator:

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

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

(2) You must submit the following notifications to the Administrator if you request or elect to comply with alternative requirements:

Reference	Notification, request, petition, or application
63.1206(b)(5), 63.1213, 63.6(i), 63.9(c)	You may request an extension of the compliance date for up to one year.
63.9(i)	You may request an adjustment to time periods or postmark deadlines for submittal and review of required information.
63.1209(g)(1)	You may request approval of: (1) alternative monitoring methods, except for standards that you must monitor with a continuous emission monitoring system (CEMS) and except for requests to use a CEMS in lieu of operating parameter limits; or (2) a waiver of an operating parameter limit.
63.1209(a)(5), 63.8(f)	You may request: (1) approval of alternative monitoring methods for compliance with standards that are monitored with a CEMS; and (2) approval to use a CEMS in lieu of operating parameter limits.
63.1204(d)(4)	Notification that you elect to comply with the emission averaging requirements for cement kilns with in-line raw mills.
63.1204(e)(4)	Notification that you elect to comply with the emission averaging requirements for preheater or preheater/precalciner kilns with dual stacks.
63.1206(b)(1)(ii)(A)	Notification that you elect to document compliance with all applicable requirements and standards promulgated under authority of the Clean Air Act, including Sections 112 and 129, in lieu of the requirements of Subpart EEE of this Part when not burning hazardous waste.
63.1206(b)(5)(i)(C)(2)	You may request to burn hazardous waste for more than 720 hours and for purposes other than testing or pretesting after a making a change in the design or operation that could affect compliance with emission standards and prior to submitting a revised Notification of Compliance.
63.1206(b)(9)(iii)(B)	If you elect to conduct particulate matter CEMS correlation testing and wish to have federal particulate matter and opacity standards and associated operating limits waived during the testing, you must notify the Administrator by submitting the correlation test plan for review and approval.
63.1206(b)(10)	Owners and operators of lightweight aggregate kilns may request approval of alternative emission standards for mercury, semivolatile metal, low volatile metal, and hydrochloric acid/chlorine gas under certain conditions.
63.1206(b)(11)	Owners and operators of cement kilns may request approval of alternative emission standards for mercury, semivolatile metal, low volatile metal, and hydrochloric acid/chlorine gas under certain conditions.
63.1206(b)(14)	Owners and operators of incinerators may comply with an alternative particulate matter standard of 68 mg/dscm, corrected to 7% oxygen, under a petition documenting de minimis metals levels in feedstreams.
63.1207(c)(2)	You may request to base initial compliance on data in lieu of a comprehensive performance test.
63.1207(d)(3)	You may request more than 60 days to complete a performance test if additional time is needed for reasons beyond your control.
63.1207(i)	You may request up to a one-year time extension for conducting a performance test (other than the initial comprehensive performance test) to consolidate testing with other state or federally-required testing.
63.1207(j)(4)	You may request more than 90 days to submit a Notification of Compliance after completing a performance test if additional time is needed for reasons beyond your control.
63.1207(l)(3)	After failure of a performance test, you may request to burn hazardous waste for more than 720 hours and for purposes other than testing or pretesting.
63.1209(l)(1)	You may request to extrapolate mercury feedrate limits.
63.1209(n)(2)(ii)	You may request to extrapolate semivolatile and low volatile metal feedrate limits.
63.10(e)(3)(ii)	You may request to reduce the frequency of excess emissions and CMS performance reports.
63.10(f)	You may request to waive recordkeeping or reporting requirements.
63.1211(e)	You may request to use data compression techniques to record data on a less frequent basis than required by § 63.1209.

(b) *Notification of intent to comply (NIC).* (1) You must prepare a Notification of Intent to Comply that includes the following information:

(i) General information:

(A) The name and address of the owner/operator and the source;

(B) Whether the source is a major or an area source;

(C) Waste minimization and emission control technique(s) being considered;

(D) Emission monitoring technique(s) you are considering;

(E) Waste minimization and emission control technique(s) effectiveness;

(F) A description of the evaluation criteria used or to be used to select waste minimization and/or emission control technique(s); and

(G) A statement that you intend to comply with the emission standards of this subpart.

(ii) Information on key activities and estimated dates for these activities that will bring the source into compliance with emission control requirements of this subpart. The submission of key activities and dates is not intended to be static and you may revise them during the period the NIC is in effect. You must submit revisions to the Administrator and make them available to the public. You must include the following key activities and dates:

(A) The dates for beginning and completion of engineering studies to evaluate emission control systems or process changes for emissions;

(B) The date by which you will award contracts for emission control systems or process changes for emission control, or the date by which you will issue orders for the purchase of component parts to accomplish emission control or process changes;

(C) The date by which you will submit construction applications;

(D) The date by which you will initiate on-site construction, installation of emission control equipment, or process change;

(E) The date by which you will complete on-site construction, installation of emission control equipment, or process change; and

(F) The date by which you will achieve final compliance. The individual dates and milestones listed in paragraphs (b)(1)(ii)(A) through (F) of this section as part of the NIC are not requirements and therefore are not enforceable deadlines; the requirements of paragraphs (b)(1)(ii)(A) through (F) of this section must be included as part of the NIC only to inform the public of your intention to comply with the emission standards of this subpart.

(iii) A summary of the public meeting required under paragraph (c) of this section.

(iv) If you do not intent to comply, but will not stop burning hazardous waste by October 1, 2001 a certification that:

(A) You will stop burning hazardous waste on or before September 30, 2002; and

(B) It is necessary to combust the hazardous waste from another on-site source, during the year prior to September 30, 2002 because that other source is:

(*1*) Installing equipment to come into compliance with the emission standards of this subpart; or

(*2*) Installing source reduction modifications to eliminate the need for further combustion of wastes.

(2) You must make a draft of the NIC available for public review no later than 30 days prior to the public meeting required under paragraph (c)(1) of this section.

(3) You must submit the final NIC to the Administrator no later than October 2, 2000.

(c) *NIC public meeting and notice.* (1) Prior to the submission of the NIC to the permitting agency, and no later than July 31, 2000, you must hold at least one informal meeting with the public to discuss anticipated activities described in the draft NIC for achieving compliance with the emission standards of this subpart. You must post a sign-in sheet or otherwise provide a voluntary opportunity for attendees to provide their names and addresses.

(2) You must submit a summary of the meeting, along with the list of attendees and their addresses developed under paragraph (b)(1) of this section, and copies of any written comments or materials submitted at the meeting, to the Administrator as part of the final NIC, in accordance with paragraph (b)(1)(iii) of this section.

(3) You must provide public notice of the NIC meeting at least 30 days prior to the meeting. You must provide public notice in all of the following forms:

(i) *Newspaper advertisement.* You must publish a notice in a newspaper of general circulation in the county or equivalent jurisdiction of your facility. In addition, you must publish the notice in newspapers of general circulation in adjacent counties or equivalent jurisdiction where such publication would be necessary to inform the affected public. You must publish the notice as a display advertisement.

(ii) *Visible and accessible sign.* You must post a notice on a clearly marked sign at or near the source. If you place the sign on the site of the hazardous waste combustor, the sign must be large enough to be readable from the nearest spot where the public would pass by the site.

(iii) *Broadcast media announcement.* You must broadcast a notice at least once on at least one local radio station or television station.

(iv) *Notice to the facility mailing list.* You must provide a copy of the notice to the facility mailing list in accordance with § 124.10(c)(1)(ix) of this chapter.

(4) You must include the following in the notices required under paragraph (c)(3) of this section:

(i) The date, time, and location of the meeting;

(ii) A brief description of the purpose of the meeting;

(iii) A brief description of the source and proposed operations, including the address or a map (e.g., a sketched or copied street map) of the source location;

(iv) A statement encouraging people to contact the source at least 72 hours before the meeting if they need special access to participate in the meeting;

(v) A statement describing how the draft NIC can be obtained; and

(vi) The name, address, and telephone number of a contact person for the NIC.

(d) *Notification of compliance.* (1) The Notification of Compliance status requirements of § 63.9(h) apply, except that:

(i) The notification is a Notification of Compliance, rather than compliance status;

(ii) The notification is required for the initial comprehensive performance test and each subsequent comprehensive and confirmatory performance test; and

(iii) You must postmark the notification before the close of business on the 90th day following completion of relevant compliance demonstration activity specified in this subpart rather than the 60th day as required by § 63.9(h)(2)(ii).

(2) Upon postmark of the Notification of Compliance, the operating parameter limits identified in the Notification of Compliance, as applicable, shall be complied with, the limits identified in the Documentation of Compliance or a previous Notification of Compliance are no longer applicable.

(3) The Notification of Compliance requirements of § 63.1207(j) also apply.

§ 63.1211 What are the recordkeeping and reporting requirements?

(a) *Summary of reporting requirements.* You must submit the following reports to the Administrator:

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

(b) *Compliance progress reports associated with the notification of intent to comply.* (1) General. Not later than October 1, 2001, you must comply with the following, unless you comply with paragraph (b)(2)(ii) of this section:

(i) Complete engineering design for any physical modifications to the source needed to comply with the emission standards of this subpart;

(ii) Submit applicable construction applications to the Administrator; and

(iii) Enter into a binding contractual commitment to purchase, fabricate, and install any equipment, devices, and ancillary structures needed to comply with the emission standards of this subpart.

(2) *Demonstration.* (i) You must submit to the Administrator a progress report on or before October 1, 2001 which contains information demonstrating that you have met the requirements of paragraph (b)(1) of this section. This information will be used by the Administrator to determine if you have made adequate progress towards compliance with the emission standards of this subpart.

(ii) If you intend to comply with the emission standards of this subpart, but can do so without undertaking any of the activities described in paragraph (b)(1) of this section, you must submit documentation either:

(A) Demonstrating that you, at the time of the progress report, are in compliance with the emission standards and operating requirements; or

(B) Specifying the steps that you will take to comply, without undertaking any of the activities listed in paragraphs (b)(1)(i) through (b)(1)(iii) of this section.

(iii) If you do not comply with paragraph (b)(1) or (b)(2)(ii) of this section, you must stop burning hazardous waste on or before October 1, 2001.

(3) *Schedule.* (i) You must include in the progress report a detailed schedule that lists key dates for all projects that will bring the source into compliance with the emission standards and operating requirements of this subpart (i.e., key dates for the activities required under paragraphs (b)(1)(i) through (iii) of this section). Dates must cover the time frame from the progress report through the compliance date of the emission standards and operating requirements of this subpart.

(ii) The schedule must contain the following dates:

(A) Bid and award dates for construction contracts and equipment supply contractors;

(B) Milestones such as ground breaking, completion of drawings and specifications, equipment deliveries, intermediate construction completions, and testing;

(C) The dates on which applications were submitted for or obtained operating and construction permits or licenses;

(D) The dates by which approvals of any permits or licenses are anticipated; and

(E) The projected date by which you will comply with the emission standards and operating requirements of this subpart.

(4) *Notice of intent to comply.* You must include a statement in the progress report that you intend or do not intend to comply with the emission standards and operating requirements of this subpart.

(5) *Sources that do not intend to comply.* (i) If you indicated in your NIC your intent not to comply with the emission standards and operating requirements of this subpart and stop burning hazardous waste prior to submitting a progress report, or if you meet the requirements of § 63.1206(a)(2), you are exempt from the requirements of paragraphs (b)(2) and (b)(3) of this section. However, you must include in your progress report the date on which you stopped burning hazardous waste and the date(s) you submitted RCRA closure documents.

(ii) If you signify in the progress report, submitted not later than October 1, 2001, your intention not to comply with the emission standards and operating requirements of this subpart, you must stop burning hazardous waste on or before October 1, 2001.

(c) *Summary of recordkeeping requirements.* You must retain the following in the operating record:

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

(d) *Documentation of compliance.* (1) By the compliance date, you must develop and include in the operating record a Documentation of Compliance.

(2) The Documentation of Compliance must identify the applicable emission standards under this subpart and the limits on the operating parameters under § 63.1209 that will ensure compliance with those emission standards.

(3) You must include a signed and dated certification in the Documentation of Compliance that:

(i) Required CEMs and CMS are installed, calibrated, and continuously operating in compliance with the requirements of this subpart; and

(ii) Based on an engineering evaluation prepared under your direction or supervision in accordance with a system designed to ensure that qualified personnel properly gathered and evaluated the information and supporting documentation, and considering at a minimum the design, operation, and maintenance characteristics of the combustor and emissions control equipment, the types, quantities, and characteristics of feedstreams, and available emissions data:

(A) You are in compliance with the emission standards of this subpart; and

(B) The limits on the operating parameters under § 63.1209 ensure compliance with the emission standards of this subpart.

(4) You must comply with the emission standards and operating parameter limits specified in the Documentation of Compliance.

(e) *Data compression*. You may submit a written request to the Administrator for approval to use data compression techniques to record data from CMS, including CEMS, on a frequency less than that required by § 63.1209. You must submit the request for review and approval as part of the comprehensive performance test plan.

(1) You must record a data value at least once each ten minutes.

(2) For each CEMS or operating parameter for which you request to use data compression techniques, you must recommend:

(i) A fluctuation limit that defines the maximum permissible deviation of a new data value from a previously generated value without requiring you to revert to recording each one-minute value.

(A) If you exceed a fluctuation limit, you must record each one-minute value for a period of time not less than ten minutes.

(B) If neither the fluctuation limit nor the data compression limit are exceeded during that period of time, you may reinitiate recording data values on a frequency of at least once each ten minutes; and

(ii) A data compression limit defined as the closest level to an operating parameter limit or emission standard at which reduced data recording is allowed.

(A) Within this level and the operating parameter limit or emission standard, you must record each one-minute average.

(B) The data compression limit should reflect a level at which you are unlikely to exceed the specific operating parameter limit or emission standard, considering its averaging period, with the addition of a new one-minute average.

§ 63.1212 What are the other requirements pertaining to the NIC and associated progress reports?

(a) *Certification of intent to comply*. (1) The Notice of Intent to Comply (NIC) and Progress Report must contain the following certification signed and dated by an authorized representative of the source: I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

(2) An authorized representative should be a responsible corporate officer (for a corporation), a general partner (for a partnership), the proprietor (of a sole proprietorship), or a principal executive officer or ranking elected official (for a municipality, State, Federal, or other public agency).

(b) *Sources that begin burning hazardous waste after September 30, 1999*. (1) If you begin to burn hazardous waste after September 30, 1999 but prior to June 30, 2000 you must comply with the requirements of §§ 63.1206(a)(2), 63.1210(b) and (c), 63.1211(b), and paragraph (a) of this section, and associated time frames for public meetings and document submittals.

(2) If you intend to begin burning hazardous waste after June 30, 2000, you must comply with the requirements of §§ 63.1206(a)(2), 63.1210(b) and (c), 63.1211(b), and paragraph (a) of this section prior to burning hazardous waste. In addition:

(i) You must make a draft NIC available to the public, notice the public meeting, conduct a public meeting, and submit a final NIC prior to burning hazardous waste; and

(ii) You must submit your progress report at the time you submit your final NIC.

Other

§ 63.1213 How can the compliance date be extended to install pollution prevention or waste minimization controls?

(a) *Applicability*. You may request from the Administrator or State with an approved Title V program an extension of the compliance data of up to one year. An extension may be granted if you can reasonably document that the installation of pollution prevention or waste minimization measures will significantly reduce the amount and/or toxicity of hazardous wastes entering the feedstream(s) of the hazardous waste combustor(s), and that you could not install the necessary control measures and comply with the emission standards and operating requirements of this subpart within three years after their effective date.

(b) *Requirements for requesting an extension*. (1) You must make your requests for a (up to) one-year extension in writing, and it must be received not later than 12 months before the compliance date. The request must contain the following information:

(i) A description of pollution prevention or waste minimization controls that, when installed, will significantly reduce the amount and/or toxicity of hazardous wastes entering the feedstream(s) of the hazardous waste combustor(s). Pollution prevention or waste minimization measures may include: equipment or technology modifications, reformulation or redesign of products, substitution of raw materials, improvements in work practices, maintenance, training, inventory control, or recycling practices conducted as defined in § 261.1(c) of this chapter;

(ii) A description of other pollution controls to be installed that are necessary to comply with the emission standards and operating requirements;

(iii) A reduction goal or estimate of the annual reductions in quantity and/or toxicity of hazardous waste(s) entering combustion feedstream(s) that you will achieve by installing the proposed pollution prevention or waste minimization measures;

(iv) A comparison of reductions in the amounts and/or toxicity of hazardous wastes combusted after installation of pollution prevention or waste minimization measures to the amounts and/or toxicity of hazardous wastes combusted prior to the installation of these measures. If the difference is less than a fifteen percent reduction, include a comparison to pollution prevention and waste minimization reductions recorded during the previous five years;

(v) Reasonable documentation that installation of the pollution prevention or waste minimization changes will not result in a net increase (except for documented increases in production) of hazardous constituents released to the environment through other emissions, wastes or effluents;

(vi) Reasonable documentation that the design and installation of waste minimization and other measures that are necessary for compliance with the emission standards and operating requirements of this subpart cannot otherwise be installed within the three year compliance period, and

(vii) The information required in § 63.6(i)(6)(i)(B) through (D).

(2) You may enclose documentation prepared under an existing State-required pollution prevention program that contains the information prescribed in paragraph (b) of this section with a request for extension in lieu of complying with the time extension requirements of that paragraph.

(c) *Approval of request for extension of compliance date*. Based on the information provided in any request made under paragraph (a) of this section, the Administrator or State with an approved title V program may grant an extension of the compliance date of this subpart. The extension will be in writing in accordance with §§ 63.6(i)(10)(i) through 63.6(i)(10)(v)(A).

TABLE 1 TO SUBPART EEE.—GENERAL PROVISIONS APPLICABLE TO SUBPART EEE

Reference	Applies to Subparts EEE	Explanation
63.1	Yes.	
63.2	Yes.	
63.3	Yes.	
63.4	Yes.	
63.5	Yes.	
63.6(a), (b), (c), and (d)	Yes.	
63.6(e)	Yes	Except § 63.1206(b)(1) and (c)(2)(ii) require compliance with the emission standards during startup, shutdown, and malfunction if hazardous waste is burned or remains in the combustion chamber during those periods of operation.
63.6(f)(1)	Yes	Same exception that applies to § 63.6(e).
63.6(f)(2)	Yes	Except that the performance test requirements of § 63.1207 apply instead of § 63.6(f)(2)(iii)(B).
63.6(f)(3)	Yes.	
63.6(g)	Yes.	
63.6(h)	Yes	Except only cement kilns are subject to an opacity standard, and § 63.1206(b)(1) requires compliance with the opacity standard at all times that hazardous waste is in the combustion chamber.
63.6(i)	Yes	Section § 63.1213 specifies that the compliance date may also be extended for inability to install necessary emission control equipment by the compliance date because of implementation of pollution prevention or waste minimization controls.
63.6(j)	Yes.	
63.7(a)	Yes.	
63.7(b)	Yes	Except § 63.1207(e) requires you to submit the site-specific test plan for approval at least one year before the comprehensive performance test is scheduled to begin.
63.7(c)	Yes	Except § 63.1207(e) requires you to submit the site-specific test plan (including the quality assurance provisions under § 63.7(c)) for approval at least one year before the comprehensive performance test is scheduled to begin.
63.7(d)	Yes.	
63.7(e)	Yes	Except: (1) § 63.1207 prescribes operations during performance testing; (2) § 63.1209 specifies operating limits that will be established during performance testing (such that testing is likely to be representative of the extreme range of normal performance); and (3) §§ 63.1206(b)(1) and (c)(2) require compliance with the emission standards during startup, shutdown, and malfunction if hazardous waste is burned or remains in the combustion chamber during those periods of operation.
63.7(f)	Yes.	
63.7(g)	Yes	Except that § 63.1207(j) requiring the results of the performance test (and the notification of compliance) to be submitted within 90 days of completing the test, unless the Administrator grants a time extension, applies instead of § 63.7(g)(1).
63.7(h)	Yes	Except § 63.1207(c)(2) allows data in lieu of the initial comprehensive performance test, and § 63.1207(m) provides a waiver of certain performance tests. You must submit requests for these waivers with the site-specific test plan.
63.8(a) and (b)	Yes.	
63.8(c)	Yes	Except: (1) § 63.1211(d) that requires CMS to be installed, calibrated, and operational on the compliance date applies instead of § 63.8(c)(3); (2) the performance specifications for CO, HC, and O_2 CEMS in subpart B, part 60, of this chapter requiring that the detectors measure the sample concentration at least once every 15 seconds for calculating an average emission level once every 60 seconds apply instead of § 63.8(c)(4)(ii); and (3) §§ 63.8(c)(4)(i), (c)(5), and (c)(7)(i)(C) pertaining to COMS apply only to cement kilns.
63.8(d)	Yes.	
63.8(e)	Yes	Except § 63.1207(e) requiring sources to submit the site-specific comprehensive performance test plan and the CMS performance evaluation plan for approval at least one year prior to the planned test date applies instead of §§ 63.8(e)(2) and (3)(iii).
63.8(f)	Yes.	
63.8(g)	Yes	Except § 63.8(g)(2) regarding data reduction for COMS applies only to cement kilns.
63.9(a)	Yes.	
63.9(b)	Yes	NOTE: Section 63.9(b)(1)(ii) pertains to notification requirements for area sources that become a major source, and § 93.9(b)(2)(v) requires a major source determination. Although area sources are subject to all provisions of this subpart (Subpart EEE), these sections nonetheless apply because the major source determination may affect the applicability of part 63 standards or title V permit requirements to other sources (i.e., other than a hazardous waste combustor) of hazardous air pollutants at the facility.
63.9(c) and (d)	Yes.	
63.9(e)	Yes	Except § 63.1207(e) which requires the comprehensive performance test plan to be submitted for approval one year prior to the planned performance test date applies instead of § 63.9(e).
63.9(f)	No.	
63.9(g)	Yes	Except § 63.9(g)(2) pertaining to COMS does not apply.
63.9(h)	Yes	Except § 63.1207(j) requiring the notification of compliance to be submitted within 90 days of completing a performance test unless the Administrator grants a time extension applies instead of § 63.9(h)(2)(ii). *Note:* Even though area sources are subject to this subpart, the major source determination required by § 63.9(h)(2)(i)(E) is applicable to hazardous waste combustors for the reasons discussed above.
63.9(i) and (j)	Yes.	

TABLE 1 TO SUBPART EEE.—GENERAL PROVISIONS APPLICABLE TO SUBPART EEE—Continued

Reference	Applies to Subparts EEE	Explanation
63.10	Yes	Except reports of performance test results required under § 63.10(d)(2) may be submitted up to 90 days after completion of the test.
63.11	No.	
63.12–63.15	Yes.	

Appendix to Subpart EEE of Part 63—Quality Assurance Procedures for Continuous Emissions Monitors Used for Hazardous Waste Combustors

1. Applicability and Principle

1.1 Applicability. a. These quality assurance requirements are used to evaluate the effectiveness of quality control (QC) and quality assurance (QA) procedures and the quality of data produced by continuous emission monitoring systems (CEMS) that are used for determining compliance with the emission standards on a continuous basis as specified in the applicable regulation. The QA procedures specified by these requirements represent the minimum requirements necessary for the control and assessment of the quality of CEMS data used to demonstrate compliance with the emission standards provided under subpart EEE of this part 63. Owners and operators must meet these minimum requirements and are encouraged to develop and implement a more extensive QA program. These requirements superede those found in part 60, appendix F of this chapter. Appendix F does not apply to hazardous waste-burning devices.

b. Data collected as a result of the required QA and QC measures are to be recorded in the operating record. In addition, data collected as a result of CEMS performance evaluations required by Section 5 in conjunction with an emissions performance test are to be submitted to the Administrator as provided by § 63.8(e)(5). These data are to be used by both the Agency and the CEMS operator in assessing the effectiveness of the CEMS QA and QC procedures in the maintenance of acceptable CEMS operation and valid emission data.

1.2 Principle. The QA procedures consist of two distinct and equally important functions. One function is the assessment of the quality of the CEMS data by estimating accuracy. The other function is the control and improvement of the quality of the CEMS data by implementing QC policies and corrective actions. These two functions form a control loop. When the assessment function indicates that the data quality is inadequate, the source must immediately stop burning hazardous waste. The CEM data control effort must be increased until the data quality is acceptable before hazardous waste burning can resume.

a. In order to provide uniformity in the assessment and reporting of data quality, this procedure explicitly specifies the assessment methods for response drift and accuracy. The methods are based on procedures included in the applicable performance specifications provided in appendix B to part 60 of this chapter. These procedures also require the analysis of the EPA audit samples concurrent with certain reference method (RM) analyses as specified in the applicable RM's.

b. Because the control and corrective action function encompasses a variety of policies, specifications, standards, and corrective measures, this procedure treats QC requirements in general terms to allow each source owner or operator to develop a QC system that is most effective and efficient for the circumstances.

2. Definitions

2.1 *Continuous Emission Monitoring System (CEMS).* The total equipment required for the determination of a pollutant concentration. The system consists of the following major subsystems:

2.1.1 *Sample Interface.* That portion of the CEMS used for one or more of the following: sample acquisition, sample transport, and sample conditioning, or protection of the monitor from the effects of the stack effluent.

2.1.2 *Pollutant Analyzer.* That portion of the CEMS that senses the pollutant concentration and generates a proportional output.

2.1.3 *Diluent Analyzer.* That portion of the CEMS that senses the diluent gas (O2) and generates an output proportional to the gas concentration.

2.1.4 *Data Recorder.* That portion of the CEMS that provides a permanent record of the analyzer output. The data recorder may provide automatic data reduction and CEMS control capabilities.

2.2 *Relative Accuracy (RA).* The absolute mean difference between the pollutant concentration determined by the CEMS and the value determined by the reference method (RM) plus the 2.5 percent error confidence coefficient of a series of test divided by the mean of the RM tests or the applicable emission limit.

2.3 *Calibration Drift (CD).* The difference in the CEMS output readings from the established reference value after a stated period of operation during which no unscheduled maintenance, repair, or adjustment took place.

2.4 *Zero Drift (ZD).* The difference in CEMS output readings at the zero pollutant level after a stated period of operation during which no unscheduled maintenance, repair, or adjustment took place.

2.5 *Calibration Standard.* Calibration standards produce a known and unchanging response when presented to the pollutant analyzer portion of the CEMS, and are used to calibrate the drift or response of the analyzer.

2.6 *Relative Accuracy Test Audit (RATA).* Comparison of CEMS measurements to reference method measurements in order to evaluate relative accuracy following procedures and specification given in the appropriate performance specification.

2.7 *Absolute Calibration Audit (ACA).* Equivalent to calibration error (CE) test defined in the appropriate performance specification using NIST traceable calibration standards to challenge the CEMS and assess accuracy.

2.8 *Rolling Average.* The average emissions, based on some (specified) time period, calculated every minute from a one-minute average of four measurements taken at 15-second intervals. CEMS other than carbon monoxide and total hydrocarbon CEMS may have rolling averages calculated every hour from a one-hour average of at least four measurements taken at intervals not exceeding 15 minutes.

c. QA/QC Requirements

3.1 QC Requirements. a. Each owner or operator must develop and implement a QC program. At a minimum, each QC program must include written procedures describing in detail complete, step-by-step procedures and operations for the following activities.

1. Checks for component failures, leaks, and other abnormal conditions.
2. Calibration of CEMS.
3. CD determination and adjustment of CEMS.
4. Integration of CEMS with the automatic waste feed cutoff (AWFCO) system.
5. Preventive Maintenance of CEMS (including spare parts inventory).
6. Data recording, calculations, and reporting.
7. Checks of record keeping.
8. Accuracy audit procedures, including sampling and analysis methods.
9. Program of corrective action for malfunctioning CEMS.
10. Operator training and certification.
11. Maintaining and ensuring current certification or naming of cylinder gasses, metal solutions, and particulate samples used for audit and accuracy tests, daily checks, and calibrations.

b. Whenever excessive inaccuracies occur for two consecutive quarters, the current written procedures must be revised or the CEMS modified or replaced to correct the deficiency causing the excessive inaccuracies. These written procedures must be kept on record and available for inspection by the enforcement agency.

3.2 QA Requirements. Each source owner or operator must develop and implement a QA plan that includes, at a minimum, the following.

1. QA responsibilities (including maintaining records, preparing reports, reviewing reports).
2. Schedules for the daily checks, periodic audits, and preventive maintenance.
3. Check lists and data sheets.
4. Preventive maintenance procedures.
5. Description of the media, format, and location of all records and reports.
6. Provisions for a review of the CEMS data at least once a year. Based on the results of the review, the owner or operator must revise or update the QA plan, if necessary.

d. CD and ZD Assessment and Daily System Audit

4.1 *CD and ZD Requirement.* Owners and operators must check, record, and quantify the ZD and the CD at least once daily (approximately 24 hours) in accordance with the method prescribed by the manufacturer. The CEMS calibration must, at a minimum, be adjusted whenever the daily ZD or CD exceeds the limits in the Performance Specifications. If, on any given ZD and/or CD check the ZD and/or CD exceed(s) two times the limits in the Performance Specifications, or if the cumulative adjustment to the ZD and/or CD (see Section 4.2) exceed(s) three times the limits in the Performance Specifications, hazardous waste burning must immediately cease and the CEMS must be serviced and recalibrated. Hazardous waste burning cannot resume until the owner or operator documents that the CEMS is in compliance with the Performance Specifications by carrying out an ACA.

4.2 *Recording Requirements for Automatic ZD and CD Adjusting Monitors.* Monitors that automatically adjust the data to the corrected calibration values must record the unadjusted concentration measurement prior to resetting the calibration, if performed, or record the amount of the adjustment.

4.3 *Daily System Audit.* The audit must include a review of the calibration check data, an inspection of the recording system, an inspection of the control panel warning lights, and an inspection of the sample transport and interface system (e.g., flowmeters, filters, etc.) as appropriate.

4.4 *Data Recording and Reporting.* All measurements from the CEMS must be retained in the operating record for at least 5 years.

5. Performance Evaluation

Carbon Monoxide (CO), Oxygen (O_2), and Hydrocarbon (HC) CEMS. An Absolute Calibration Audit (ACA) must be conducted quarterly, and a Relative Accuracy Test Audit (RATA) (if applicable, see sections 5.1 and 5.2) must be conducted yearly. An Interference Response Tests must be performed whenever an ACA or a RATA is conducted. When a performance test is also required under § 63.1207 to document compliance with emission standards, the RATA must coincide with the performance test. The audits must be conducted as follows.

5.1 *Relative Accuracy Test Audit (RATA).* This requirement applies to O_2 and CO CEMS. The RATA must be conducted at least yearly. Conduct the RATA as described in the RA test procedure (or alternate procedures section) described in the applicable Performance Specifications. In addition, analyze the appropriate performance audit samples received from the EPA as described in the applicable sampling methods.

5.2 *Absolute Calibration Audit (ACA).* The ACA must be conducted at least quarterly except in a quarter when a RATA (if applicable, see section 5.1) is conducted instead. Conduct an ACA as described in the calibration error (CE) test procedure described in the applicable Performance Specifications.

5.3 *Interference Response Test.* The interference response test must be conducted whenever an ACA or RATA is conducted. Conduct an interference response test as described in the applicable Performance Specifications.

5.4 *Excessive Audit Inaccuracy.* If the RA from the RATA or the CE from the ACA exceeds the criteria in the applicable Performance Specifications, hazardous waste burning must cease immediately. Hazardous waste burning cannot resume until the owner or operator takes corrective measures and audit the CEMS with a RATA to document that the CEMS is operating within the specifications.

6. Other Requirements

6.1 *Performance Specifications.* CEMS used by owners and operators of HWCs must comply with the following performance specifications in appendix B to part 60 of this chapter:

TABLE I: PERFORMANCE SPECIFICATIONS FOR CEMS

CEMS	Performance specification
Carbon monoxide	4B
Oxygen	4B
Total hydrocarbons	8A

6.2 *Downtime due to Calibration.* Facilities may continue to burn hazardous waste for a maximum of 20 minutes while calibrating the CEMS. If all CEMS are calibrated at once, the facility must have twenty minutes to calibrate all the CEMS. If CEMS are calibrated individually, the facility must have twenty minutes to calibrate each CEMS. If the CEMS are calibrated individually, other CEMS must be operational while the individual CEMS is being calibrated.

6.3 Span of the CEMS.

6.3.1 *CO CEMS.* The CO CEM must have two ranges, a low range with a span of 200 ppmv and a high range with a span of 3000 ppmv at an oxygen correction factor of 1. A one-range CEM may be used, but it must meet the performance specifications for the low range in the specified span of the low range.

6.3.2 *O_2* CEMS. The O_2 CEM must have a span of 25 percent. The span may be higher than 25 percent if the O_2 concentration at the sampling point is greater than 25 percent.

6.3.3 *HC CEMS.* The HC CEM must have a span of 100 ppmv, expressed as propane, at an oxygen correction factor of 1.

6.3.4 *CEMS Span Values.* When the Oxygen Correction Factor is Greater than 2. When an owner or operator installs a CEMS at a location of high ambient air dilution, *i.e.*, where the maximum oxygen correction factor as determined by the permitting agency is greater than 2, the owner or operator must install a CEM with a lower span(s), proportionate to the larger oxygen correction factor, than those specified above.

6.3.5 *Use of Alternative Spans.* Owner or operators may request approval to use alternative spans and ranges to those specified. Alternate spans must be approved in writing in advance by the Administrator. In considering approval of alternative spans and ranges, the Administrator will consider that measurements beyond the span will be recorded as values at the maximum span for purposes of calculating rolling averages.

6.3.6 *Documentation of Span Values.* The span value must be documented by the CEMS manufacturer with laboratory data.

6.4.1 *Moisture Correction.* Method 4 of appendix A, part 60 of this chapter, must be used to determine moisture content of the stack gasses.

6.4.2 *Oxygen Correction Factor.* Measured pollutant levels must be corrected for the amount of oxygen in the stack according to the following formula:

$$P_c = P_m \times 14/(E - Y)$$

Where:

P_c = concentration of the pollutant or standard corrected to 7 percent oxygen, dry basis;

P_m = measured concentration of the pollutant, dry basis;

E = volume fraction of oxygen in the combustion air fed into the device, on a dry basis (normally 21 percent or 0.21 if only air is fed);

Y = measured fraction of oxygen on a dry basis at the sampling point.

The oxygen correction factor is:

$$OCF = 14/(E - Y)$$

6.4.3 *Temperature Correction.* Correction values for temperature are obtainable from standard reference materials.

6.5 *Rolling Average.* A rolling average is the arithmetic average of all one-minute averages over the averaging period.

6.5.1 *One-Minute Average for CO and HC CEMS and Operating Parameter Limits.* One-minute averages are the arithmetic average of the four most recent 15-second observations and must be calculated using the following equation:

$$\bar{c} = \sum_{i=1}^{4} \frac{c_i}{4}$$

Where:

$\bar{c}$ = the one minute average

c_i = a fifteen-second observation from the CEM

Fifteen second observations must not be rounded or smoothed. Fifteen-second observations may be disregarded only as a result of a failure in the CEMS and allowed in the source's quality assurance plan at the time of the CMS failure. One-minute averages must not be rounded, smoothed, or disregarded.

6.5.2 Ten Minute Rolling Average Equation. The ten minute rolling average must be calculated using the following equation:

$$C_{RA} = \sum_{i=1}^{10} \frac{\bar{c}_i}{10}$$

Where:

C_{RA} = The concentration of the standard, expressed as a rolling average

$\bar{c}_i$ = a one minute average

6.5.3 *Hourly Rolling Average Equation for CO and THC CEMS and Operating Parameter Limits.* The rolling average, based on a specific number integer of hours, must be calculated using the following equation:

$$C_{RA} = \sum_{i=1}^{60} \frac{\bar{c}_i}{60}$$

Where:

c_{RA} = The concentration of the standard, expressed as a rolling average

$\bar{c}_i$ = a one minute average

6.5.4 Averaging Periods for CEMS other than CO and THC. The averaging period for CEMS other than CO and THC CEMS must be calculated as a rolling average of all one-hour values over the averaging period. An hourly average is comprised of 4 measurements taken at equally spaced time intervals, or at most every 15 minutes. Fewer than 4 measurements might be available within an hour for reasons such as facility downtime or CEMS calibration. If at least two measurements (30 minutes of data) are available, an hourly average must be calculated. The *n*-hour rolling average is calculated by averaging the *n* most recent hourly averages.

6.6 Units of the Standards for the Purposes of Recording and Reporting Emissions. Emissions must be recorded and reported expressed after correcting for oxygen, temperature, and moisture. Emissions must be reported in metric, but may also be reported in the English system of units, at 7 percent oxygen, 20°C, and on a dry basis.

6.7 Rounding and Significant Figures. Emissions must be rounded to two significant figures using ASTM procedure E–29–90 or its successor. Rounding must be avoided prior to rounding for the reported value.

7. Bibliography

1. 40 CFR Part 60, Appendix F, ''Quality Assurance Procedures: Procedure 1. Quality Assurance Requirements for Gas Continuous Emission Monitoring Systems Used For Compliance Determination''.

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

3. Section 63.1350 is amended by revising paragraph (k) to read as follows:

§ 63.1350 Monitoring requirements.

* * * * *

(k) The owner or operator of an affected source subject to a particulate matter standard under § 63.1343 shall install, calibrate, maintain, and operate a particulate matter continuous emission monitoring system (PM CEMS) to measure the particulate matter discharged to the atmosphere. All requirements relating to installation, calibration, maintenance, operation or performance of the PM CEMS and implementation of the PM CEMS requirement are deferred pending further rulemaking.

* * * * *

PART 260—HAZARDOUS WASTE MANAGEMENT SYSTEM: GENERAL

1. The authority citation for part 260 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6921–6927, 6930, 6934, 6935, 6937, 6938, 6939, and 6974.

Subpart B—Definitions

2. Section 260.10 is amended by adding definitions in alphabetical order to read as follows:

§ 260.10 Definitions.

* * * * *

Dioxins and furans (D/F) means tetra, penta, hexa, hepta, and octa-chlorinated dibenzo dioxins and furans.

* * * * *

TEQ means toxicity equivalence, the international method of relating the toxicity of various dioxin/furan congeners to the toxicity of 2,3,7,8-tetrachlorodibenzo-p-dioxin.

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PART 261—IDENTIFICATION AND LISTING OF HAZARDOUS WASTE

1. The authority citation for part 261 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6921, 6922, 6924(y), and 6938.

2. Section 261.38 is amended by revising Table 1 to read as follows:

§ 261.38 Comparable/Syngas Fuel Exclusion.

* * * * *

TABLE 1 TO § 261.38.—DETECTION AND DETECTION LIMIT VALUES FOR COMPARABLE FUEL SPECIFICATION

Chemical name	CAS No.	Composite value (mg/kg)	Heating value (BTU/lb)	Concentration limit (mg/kg at 10,000 BTU/lb)	Minimum required detection limit (mg/kg)
Total Nitrogen as N	NA	9000	18400	4900	....
Total Halogens as Cl	NA	1000	18400	540	....
Total Organic Halogens as Cl	NA	....	....	(1)	....
Polychlorinated biphenyls, total [Arocolors, total]	1336–36–3	ND	....	ND	1.4
Cyanide, total	57–12–5	ND	....	ND	1.0
Metals:					
Antimony, total	7440–36–012	ND	....	0.23	....
Arsenic, total	7440–38–2	ND	....	0.23	....
Barium, total	7440–39–3	ND	....	23	....
Beryllium, total	7440–41–7	ND	....	1.2	....
Cadmium, total	7440–43–9	....	ND	....	1.2
Chromium, total	7440–47–3	ND	....	2.3	....
Cobalt	7440–48–4	ND	....	4.6	....
Lead, total	7439–92–1	57	18100	31	....
Manganese	7439–96–5	ND	....	1.2	....
Mercury, total	7439–97–6	ND	....	0.25	....
Nickel, total	7440–02–0	106	18400	58	....
Selenium, total	7782–49–2	ND	....	0.23	....

TABLE 1 TO § 261.38.—DETECTION AND DETECTION LIMIT VALUES FOR COMPARABLE FUEL SPECIFICATION—Continued

Chemical name	CAS No.	Composite value (mg/kg)	Heating value (BTU/lb)	Concentration limit (mg/kg at 10,000 BTU/lb)	Minimum required detection limit (mg/kg)
Silver, total	7440–22–4	ND	....	2.3	....
Thallium, total	7440–28–0	ND	....	23	....
Hydrocarbons:					
Benzo[a]anthracene	56–55–3	ND	....	2400	....
Benzene	71–43–2	8000	19600	4100	....
Benzo[b]fluoranthene	205–99–2	ND	....	2400	....
Benzo[k]fluoranthene	207–08–9	ND	....	2400	....
Benzo[a]pyrene	50–32–8	ND	....	2400	....
Chrysene	218–01–9	ND	....	2400	....
Dibenzo[a,h]anthracene	53–70–3	ND	....	2400	....
7,12-Dimethylbenz[a]anthracene	57–97–6	ND	....	2400	....
Fluoranthene	206–44–0	ND	....	2400	....
Indeno(1,2,3-cd)pyrene	193–39–5	ND	....	2400	....
3-Methylcholanthrene	56–49–5	ND	....	2400	....
Naphthalene	91–20–3	6200	19400	3200	....
Toluene	108–88–3	69000	19400	36000	....
Oxygenates:					
Acetophenone	98–86–2	ND	....	2400	....
Acrolein	107–02–8	ND	....	39	....
Allyl alcohol	107–18–6	ND	....	30	....
Bis(2-ethylhexyl)phthalate [Di-2-ethylhexyl phthalate]	117–81–7	ND	....	2400	....
Butyl benzyl phthalate	85–68–7	ND	....	2400	....
o-Cresol [2-Methyl phenol]	95–48–7	ND	....	2400	....
m-Cresol [3-Methyl phenol]	108–39–4	ND	....	2400	....
p-Cresol [4-Methyl phenol]	106–44–5	ND	....	2400	....
Di-n-butyl phthalate	84–74–2	ND	....	2400	....
Diethyl phthalate	84–66–2	ND	....	2400	....
2,4-Dimethylphenol	105–67–9	ND	....	2400	....
Dimethyl phthalate	131–11–3	ND	....	2400	....
Di-n-octyl phthalate	117–84–0	ND	....	2400	....
Endothall	145–73–3	ND	....	100	....
Ethyl methacrylate	97–63–2	ND	....	39	....
2-Ethoxyethanol [Ethylene glycol monoethyl ether]	110–80–5	ND	....	100	....
Isobutyl alcohol	78–83–1	ND	....	39	....
Isosafrole	120–58–1	ND	....	2400	....
Methyl ethyl ketone [2-Butanone]	78–93–3	ND	....	39	....
Methyl methacrylate	80–62–6	ND	....	39	....
1,4-Naphthoquinone	130–15–4	ND	....	2400	....
Phenol	108–95–2	ND	....	2400	....
Propargyl alcohol [2-Propyn-1-ol]	107–19–7	ND	....	30	....
Safrole	94–59–7	ND	....	2400	....
Sulfonated Organics:					
Carbon disulfide	75–15–0	ND	....	ND	39
Disulfoton	298–04–4	ND	....	ND	2400
Ethyl methanesulfonate	62–50–0	ND	....	ND	2400
Methyl methanesulfonate	66–27–3	ND	....	ND	2400
Phorate	298–02–2	ND	....	ND	2400
1,3-Propane sultone	1120–71–4	ND	....	ND	100

TABLE 1 TO § 261.38.—DETECTION AND DETECTION LIMIT VALUES FOR COMPARABLE FUEL SPECIFICATION—Continued

Chemical name	CAS No.	Composite value (mg/kg)	Heating value (BTU/lb)	Concentration limit (mg/kg at 10,000 BTU/lb)	Minimum required detection limit (mg/kg)
Tetraethyldithiopyrophosphate [Sulfotepp]	3689–24–5	ND	....	ND	2400
Thiophenol [Benzenethiol]	108–98–5	ND	....	ND	30
O,O,O-Triethyl phosphorothioate	126–68–1	ND	....	ND	2400
Nitrogenated Organics:					
Acetonitrile [Methyl cyanide]	75–05–8	ND	....	ND	39
2-Acetylaminofluorene [2-AAF]	53–96–3	ND	....	ND	2400
Acrylonitrile	107–13–1	ND	....	ND	39
4-Aminobiphenyl	92–67–1	ND	....	ND	2400
4-Aminopyridine	504–24–5	ND	....	ND	100
Aniline	62–53–3	ND	....	ND	2400
Benzidine	92–87–5	ND	....	ND	2400
Dibenz[a,j]acridine	224–42–0	ND	....	ND	2400
O,O-Diethyl O-pyrazinyl phosphorothioate [Thionazin]	297–97–2	ND	....	ND	2400
Dimethoate	60–51–5	ND	....	ND	2400
p-(Dimethylamino) azobenzene [4-Dime thylaminoazobenzene]	60–11–7	ND	....	ND	2400
3,3′-Dimethylbenzidine	119–93–7	ND	....	ND	2400
α,α-Dimethylphenethylamine	122–09–8	ND	....	ND	2400
3,3′-Dimethoxybenzidine	119–90–4	ND	....	ND	100
1,3-Dinitrobenzene [m-Dinitrobenzene]	99–65–0	ND	....	ND	2400
4,6-Dinitro-o-cresol	534–52–1	ND	....	ND	2400
2,4-Dinitrophenol	51–28–5	ND	....	ND	2400
2,4-Dinitrotoluene	121–14–2	ND	....	ND	2400
2,6-Dinitrotoluene	606–20–2	ND	....	ND	2400
Dinoseb [2-sec-Butyl-4,6-dinitrophenol]	88–85–7	ND	....	ND	2400
Diphenylamine	122–39–4	ND	....	ND	2400
Ethyl carbamate [Urethane]	51–79–6	ND	....	ND	100
Ethylenethiourea (2-Imidazolidinethione)	96–45–7	ND	....	ND	110
Famphur	52–85–7	ND	....	ND	2400
Methacrylonitrile	126–98–7	ND	....	ND	39
Methapyrilene	91–80–5	ND	....	ND	2400
Methomyl	16752–77–5	ND	....	ND	57
2-Methyllactonitrile, [Acetone cyanohydrin]	75–86–5	ND	....	ND	100
Methyl parathion	298–00–0	ND	....	ND	2400
MNNG (N-Metyl-N-nitroso-N’-nitroguanidine)	70–25–7	ND	....	ND	110
1-Naphthylamine, [α-Naphthylamine]	134–32–7	ND	....	ND	2400
2-Naphthylamine, [β-Naphthylamine]	91–59–8	ND	....	ND	2400
Nicotine	54–11–5	ND	....	ND	100
4-Nitroaniline, [p-Nitroaniline]	100–01–6	ND	....	ND	2400
Nitrobenzene	98–95–3	ND	....	ND	2400
p-Nitrophenol, [p-Nitrophenol]	100–02–7	ND	....	ND	2400
5-Nitro-o-toluidine	99–55–8	ND	....	ND	2400
N-Nitrosodi-n-butylamine	924–16–3	ND	....	ND	2400
N-Nitrosodiethylamine	55–18–5	ND	....	ND	2400
N-Nitrosodiphenylamine, [Diphenylnitrosamine]	86–30–6	ND	....	ND	2400
N-Nitroso-N-methylethylamine	10595–95–6	ND	....	ND	2400
N-Nitrosomorpholine	59–89–2	ND	....	ND	2400
N-Nitrosopiperidine	100–75–4	ND	....	ND	2400
N-Nitrosopyrrolidine	930–55–2	ND	....	ND	2400
2-Nitropropane	79–46–9	ND	....	ND	30
Parathion	56–38–2	ND	....	ND	2400
Phenacetin	62–44–2	ND	....	ND	2400
1,4-Phenylene diamine, [p-Phenylenediamine]	106–50–3	ND	....	ND	2400
N-Phenylthiourea	103–85–5	ND	....	ND	57
2-Picoline [alpha-Picoline]	109–06–8	ND	....	ND	2400
Propylthioracil, [6-Propyl-2-thiouracil]	51–52–5	ND	....	ND	100
Pyridine	110–86–1	ND	....	ND	2400

TABLE 1 TO § 261.38.—DETECTION AND DETECTION LIMIT VALUES FOR COMPARABLE FUEL SPECIFICATION—Continued

Chemical name	CAS No.	Composite value (mg/kg)	Heating value (BTU/lb)	Concentration limit (mg/kg at 10,000 BTU/lb)	Minimum required detection limit (mg/kg)
Strychnine	57–24–9	ND	....	ND	100
Thioacetamide	62–55–5	ND	....	ND	57
Thiofanox	39196–18–4	ND	....	ND	100
Thiourea	62–56–6	ND	....	ND	57
Toluene-2,4-diamine [2,4-Diaminotoluene]	95–80–7	ND	....	ND	57
Toluene-2,6-diamine [2,6-Diaminotoluene]	823–40–5	ND	....	ND	57
o-Toluidine	95–53–4	ND	....	ND	2400
p-Toluidine	106–49–0	ND	....	ND	100
1,3,5-Trinitrobenzene, [sym-Trinitobenzene]	99–35–4	ND	....	ND	2400
Halogenated Organic:					
Allyl chloride	107–05–1	ND	....	ND	39
Aramite	140–57–8	ND	....	ND	2400
Benzal chloride [Dichloromethyl benzene]	98–87–3	ND	....	ND	100
Benzyl chloride	100–44–77	ND	....	ND	100
bis(2-Chloroethyl)ether [Dichoroethyl ether]	111–44–4	ND	....	ND	2400
Bromoform [Tribromomethane]	75–25–2	ND	....	ND	39
Bromomethane [Methyl bromide]	74–83–9	ND	....	ND	39
4-Bromophenyl phenyl ether [p-Bromo diphenyl ether]	101–55–3	ND	....	ND	2400
Carbon tetrachloride	56–23–5	ND	....	ND	39
Chlordane	57–74–9	ND	....	ND	14
p-Chloroaniline	106–47–8	ND	....	ND	2400
Chlorobenzene	108–90–7	ND	....	ND	39
Chlorobenzilate	510–15–6	ND	....	ND	2400
p-Chloro-m-cresol	59–50–7	ND	....	ND	2400
2-Chloroethyl vinyl ether	110–75–8	ND	....	ND	39
Chloroform	67–66–3	ND	....	ND	39
Chloromethane [Methyl chloride]	74–87–3	ND	....	ND	39
2-Chloronaphthalene [beta-Chloronaphthalene]	91–58–7	ND	....	ND	2400
2-Chlorophenol [o-Chlorophenol]	95–57–8	ND	....	ND	2400
Chloroprene [2-Chloro-1,3-butadiene]	1126–99–8	ND	....	ND	39
2,4-D [2,4-Dichlorophenoxyacetic acid]	94–75–7	ND	....	ND	7.0
Diallate	2303–16–4	ND	....	ND	2400
1,2-Dibromo-3-chloropropane	96–12–8	ND	....	ND	39
1,2-Dichlorobenzene [o-Dichlorobenzene]	95–50–1	ND	....	ND	2400
1,3-Dichlorobenzene [m-Dichlorobenzene]	541–73–1	ND	....	ND	2400
1,4-Dichlorobenzene [p-Dichlorobenzene]	106–46–7	ND	....	ND	2400
3,3′-Dichlorobenzidine	91–94–1	ND	....	ND	2400
Dichlorodifluoromethane [CFC–12]	75–71–8	ND	....	ND	39
1,2-Dichloroethane [Ethylene dichloride]	107–06–2	ND	....	ND	39
1,1-Dichloroethylene [Vinylidene chloride]	75–35–4	ND	....	ND	39
Dichloromethoxy ethane [Bis(2-chloroethoxy)methane	111–91–1	ND	....	ND	2400
2,4-Dichlorophenol	120–83–2	ND	....	ND	2400
2,6-Dichlorophenol	87–65–0	ND	....	ND	2400
1,2-Dichloropropane [Propylene dichloride]	78–87–5	ND	....	ND	39
cis-1,3-Dichloropropylene	10061–01–5	ND	....	ND	39
trans-1,3-Dichloropropylene	10061–02–6	ND	....	ND	39
1,3-Dichloro-2-propanol	96–23–1	ND	....	ND	30
Endosulfan I	959–98–8	ND	....	ND	1.4
Endosulfan II	33213–65–9	ND	....	ND	1.4
Endrin	72–20–8	ND	....	ND	1.4

TABLE 1 TO § 261.38.—DETECTION AND DETECTION LIMIT VALUES FOR COMPARABLE FUEL SPECIFICATION—Continued

Chemical name	CAS No.	Composite value (mg/kg)	Heating value (BTU/lb)	Concentration limit (mg/kg at 10,000 BTU/lb)	Minimum required detection limit (mg/kg)
Endrin aldehyde	7421–93–4	ND	....	ND	1.4
Endrin Ketone	53494–70–5	ND	....	ND	1.4
Epichlorohydrin [1-Chloro-2,3-epoxy propane]	106–89–8	ND	....	ND	30
Ethylidene dichloride [1,1-Dichloroethane]	75–34–3	ND	....	ND	39
2-Fluoroacetamide	640–19–7	ND	....	ND	100
Heptachlor	76–44–8	ND	....	ND	1.4
Heptachlor epoxide	1024–57–3	ND	....	ND	2.8
Hexachlorobenzene	118–74–1	ND	....	ND	2400
Hexachloro-1,3-butadiene [Hexachlorobutadiene]	87–68–3	ND	....	ND	2400
Hexachlorocyclopentadiene	77–47–4	ND	....	ND	2400
Hexachloroethane	67–72–1	ND	....	ND	2400
Hexachlorophene	70–30–4	ND	....	ND	59000
Hexachloropropene [Hexachloropropylene]	1888–71–7	ND	....	ND	2400
Isodrin	465–73–6	ND	....	ND	2400
Kepone [Chlordecone]	143–50–0	ND	....	ND	4700
Lindane [gamma-BHC] [gamma-Hexachlorocyclohexane]	58–89–9	ND	....	ND	1.4
Methylene chloride [Dichloromethane]	75–09–2	ND	....	ND	39
4,4′-Methylene-bis(2-chloroaniline)	101–14–4	ND	....	ND	100
Methyl iodide [Iodomethane]	74–88–4	ND	....	ND	39
Pentachlorobenzene	608–93–5	ND	....	ND	2400
Pentachloroethane	76–01–7	ND	....	ND	39
Pentachloronitrobenzene [PCNB] [Quintobenzene] [Quintozene]	82–68–8	ND	....	ND	2400
Pentachlorophenol	87–86–5	ND	....	ND	2400
Pronamide	23950–58–5	ND	....	ND	2400
Silvex [2,4,5-Trichlorophenoxypropionic acid]	93–72–1	ND	....	ND	7.0
2,3,7,8-Tetrachlorodibenzo-p-dioxin [2,3,7,8-TCDD]	1746–01–6	ND	....	ND	30
1,2,4,5-Tetrachlorobenzene	95–94–3	ND	....	ND	2400
1,1,2,2-Tetrachloroethane	79–34–5	ND	....	ND	39
Tetrachloroethylene [Perchloroethylene]	127–18–4	ND	....	ND	39
2,3,4,6-Tetrachlorophenol	58–90–2	ND	....	ND	2400
1,2,4-Trichlorobenzene	120–82–1	ND	....	ND	2400
1,1,1-Trichloroethane [Methyl chloroform]	71–55–6	ND	....	ND	39
1,1,2-Trichloroethane [Vinyl trichloride]	79–00–5	ND	....	ND	39
Trichloroethylene	79–01–6	ND	....	ND	39
Trichlorofluoromethane [Trichlormonofluoromethane]	75–69–4	ND	....	ND	39
2,4,5-Trichlorophenol	95–95–4	ND	....	ND	2400
2,4,6-Trichlorophenol	88–06–2	ND	....	ND	2400
1,2,3-Trichloropropane	96–18–4	ND	....	ND	39
Vinyl Chloride	75–01–4	ND	....	ND	39

Notes:
NA—Not Applicable.
ND—Nondetect.
[1] 25 or individual halogenated organics listed below.

* * * * *

PART 264—STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

1. The authority citation for part 264 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6924, and 6925.

2. Section 264.340 is amended by redesignating paragraphs (b), (c), and (d) as paragraphs (c), (d), and (e), respectively, and adding paragraph (b), to read as follows:

§ 264.340 Applicability.

* * * * *

(b) *Integration of the MACT standards.* (1) Except as provided by paragraph (b)(2) of this section, the standards of this part no longer apply when an owner or operator demonstrates compliance with the maximum achievable control technology (MACT) requirements of part 63, subpart EEE of this chapter by conducting a comprehensive performance test and submitting to the Administrator a Notification of Compliance under §§ 63.1207(j) and 63.1210(d) of this chapter documenting compliance with the requirements of subpart EEE of part 63 of this Chapter. Nevertheless, even after this demonstration of compliance with the MACT standards, RCRA permit conditions that were based on the standards of this part will continue to be in effect until they are removed from the permit or the permit is terminated or revoked, unless the permit expressly provides otherwise.

(2) The MACT standards do not replace the closure requirements of § 264.351 or the applicable requirements of subparts A through H, BB and CC of this part.

* * * * *

3. Section 264.601 is amended by revising the introductory text to read as follows:

§ 264.601 Environmental performance standards.

A miscellaneous unit must be located, designed, constructed, operated, maintained, and closed in a manner that will ensure protection of human health and the environment. Permits for miscellaneous units are to contain such terms and provisions as necessary to protect human health and the environment, including, but not limited to, as appropriate, design and operating requirements, detection and monitoring requirements, and requirements for responses to releases of hazardous waste or hazardous constituents from the unit. Permit terms and provisions must include those requirements of subparts I through O and subparts AA through CC of this part, part 270, part 63 subpart EEE, and part 146 of this chapter that are appropriate for the miscellaneous unit being permitted. Protection of human health and the environment includes, but is not limited to:

* * * * *

PART 265—INTERIM STATUS STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

1. The authority citation for part 265 continues to read as follows:

Authority: 42 U.S.C. 6905, 6906, 6912, 6922, 6923, 6924, 6925, 6935, 6936 and 6937.

2. Section 265.340 is amended by redesignating paragraph (b) as paragraph (c), and adding paragraph (b), to read as follows:

§ 265.340 Applicability.

* * * * *

(b) *Integration of the MACT standards.* (1) Except as provided by paragraph (b)(2) of this section, the standards of this part no longer apply when an owner or operator demonstrates compliance with the maximum achievable control technology (MACT) requirements of part 63, subpart EEE, of this chapter by conducting a comprehensive performance test and submitting to the Administrator a Notification of Compliance under §§ 63.1207(j) and 63.1210(d) of this chapter documenting compliance with the requirements of part 63, subpart EEE of this chapter.

(2) The following requirements continue to apply even where the owner or operator has demonstrated compliance with the MACT requirements of part 63, subpart EEE of this chapter: § 265.351 (closure) and the applicable requirements of subparts A through H, BB and CC of this part.

* * * * *

PART 266—STANDARDS FOR THE MANAGEMENT OF SPECIFIC HAZARDOUS WASTES AND SPECIFIC TYPES OF HAZARDOUS WASTE MANAGEMENT FACILITIES

1. The authority citation for part 266 continues to read as follows:

Authority: Secs. 1006, 2002 (a), 3004, 6905, 6906, 6912, 6922, 6924, 6925, and 6937.

2. Section 266.100 is amended by redesignating paragraphs (b), (c), (d), (e), and (f) as paragraphs (c), (d), (e), (f), and (g), adding paragraph (b), revising introductory text to newly designated paragraph (d)(1), revising the introductory text to newly designated paragraph (d)(3), and adding paragraph (h), to read as follows:

§ 266.100 Applicability.

* * * * *

(b) *Integration of the MACT standards.* (1) Except as provided by paragraph (b)(2) of this section, the standards of this part no longer apply when an affected source demonstrates compliance with the maximum achievable control technology (MACT) requirements of part 63, subpart EEE, of this chapter by conducting a comprehensive performance test and submitting to the Administrator a Notification of Compliance under §§ 63.1207(j) and 63.1210(d) of this chapter documenting compliance with the requirements of subpart EEE. Nevertheless, even after this demonstration of compliance with the MACT standards, RCRA permit conditions that were based on the standards of this part will continue to be in effect until they are removed from the permit or the permit is terminated or revoked, unless the permit expressly provides otherwise.

(2) The following standards continue to apply:

(i) The closure requirements of §§ 266.102(e)(11) and 266.103(l);

(ii) The standards for direct transfer of § 266.111;

(iii) The standards for regulation of residues of § 266.212; and

(iv) The applicable requirements of subparts A through H, BB and CC of parts 264 and 265 of this chapter.

* * * * *

(d) * * *

(1) To be exempt from §§ 266.102 through 266.111, an owner or operator of a metal recovery furnace or mercury recovery furnace must comply with the following requirements, except that an owner or operator of a lead or a nickel-chromium recovery furnace, or a metal recovery furnace that burns baghouse bags used to capture metallic dusts emitted by steel manufacturing, must comply with the requirements of paragraph (d)(3) of this section, and owners or operators of lead recovery furnaces that are subject to regulation under the Secondary Lead Smelting NESHAP must comply with the requirements of paragraph (h) of this section.

* * * * *

(3) To be exempt from §§ 266.102 through 266.111, an owner or operator of a lead or nickel-chromium or mercury recovery furnace, except for owners or operators of lead recovery furnaces subject to regulation under the Secondary Lead Smelting NESHAP,

* * * * *

(h) Starting June 23, 1997, owners or operators of lead recovery furnaces that process hazardous waste for recovery of lead and that are subject to regulation under the Secondary Lead Smelting NESHAP, are conditionally exempt from regulation under this subpart, except for § 266.101. To be exempt, an owner or operator must provide a one-time notice to the Director identifying each hazardous waste burned and specifying that the owner or operator claims an exemption under this paragraph. The notice also must state that the waste burned has a total concentration of non-metal compounds listed in part 261, appendix VIII, of this chapter of less than 500 ppm by weight, as fired and as provided in paragraph (d)(2)(i) of this section, or is listed in appendix XI to this part 266.

3. Section 266.101 is amended by revising paragraph (c)(1) to read as follows:

§ 266.101 Management prior to burning.

* * * * *

(c) *Storage and treatment facilities.* (1) Owners and operators of facilities that store or treat hazardous waste that is burned in a boiler or industrial furnace are subject to the applicable provisions of parts 264, 265, and 270 of this chapter, except as provided by paragraph (c)(2) of this section. These standards apply to storage and treatment by the burner as well as to storage and treatment facilities operated by intermediaries (processors, blenders, distributors, etc.) between the generator and the burner.

* * * * *

4. Section 266.105 is amended by redesignating paragraph (c) as paragraph (d) and adding paragraph (c), to read as follows:

§ 266.105 Standards to control particulate matter.

* * * * *

(c) Oxygen correction. (1) Measured pollutant levels must be corrected for the amount of oxygen in the stack gas according to the formula:

$$Pc = Pm \times 14/(E - Y)$$

Where:

Pc is the corrected concentration of the pollutant in the stack gas, Pm is the measured concentration of the pollutant in the stack gas, E is the oxygen concentration on a dry basis in the combustion air fed to the device, and Y is the measured oxygen concentration on a dry basis in the stack.

(2) For devices that feed normal combustion air, E will equal 21 percent. For devices that feed oxygen-enriched air for combustion (that is, air with an oxygen concentration exceeding 21 percent), the value of E will be the concentration of oxygen in the enriched air.

(3) Compliance with all emission standards provided by this subpart must be based on correcting to 7 percent oxygen using this procedure.

* * * * *

5. Section 266.112, paragraph (b)(1) introductory text is amended by adding a sentence at the end and paragraph (b)(2)(i) is revised to read as follows:

§ 266.112 Regulation of residues.

* * * * *

(b) * * *

(1) * * * For polychlorinated dibenzo-p-dioxins and polychlorinated dibenzo-furans, analyses must be performed to determine specific congeners and homologues, and the results converted to 2,3,7,8–TCDD equivalent values using the procedure specified in section 4.0 of appendix IX of this part.

* * * * *

(2) * * *

(i) *Nonmetal constituents.* The concentration of each nonmetal toxic constituent of concern (specified in paragraph (b)(1) of this section) in the waste-derived residue must not exceed the health-based level specified in appendix VII of this part, or the level of detection (using analytical procedures prescribed in SW–846), whichever is higher. If a health-based limit for a constituent of concern is not listed in appendix VII of this part, then a limit of 0.002 micrograms per kilogram or the level of detection (using analytical procedures contained in SW–846, or other appropriate methods), whichever is higher, must be used. The levels specified in appendix VII of this part (and the default level of 0.002 micrograms per kilogram or the level of detection for constituents as identified in Note 1 of appendix VII of this paragraph) are administratively stayed under the condition, for those constituents specified in paragraph (b)(1) of this section, that the owner or operator complies with alternative levels defined as the land disposal restriction limits specified in § 268.43 of this chapter for F039 nonwastewaters. In complying with those alternative levels, if an owner or operator is unable to detect a constituent despite documenting use of best good-faith efforts as defined by applicable Agency guidance or standards, the owner or operator is deemed to be in compliance for that constituent. Until new guidance or standards are developed, the owner or operator may demonstrate such good faith efforts by achieving a detection limit for the constituent that does not exceed an order of magnitude above the level provided by § 268.43 of this chapter for F039 nonwastewaters. In complying with the § 268.43 of this chapter F039 nonwastewater levels for polychlorinated dibenzo-p-dioxins and polychlorinated dibenzo-furans, analyses must be performed for total hexachlorodibenzo-p-dioxins, total hexachlorodibenzofurans, total pentachlorodibenzo-p-dioxins, total pentachlorodibenzofurans, total tetrachlorodibenzo-p-dioxins, and total tetrachlorodibenzofurans.

Note to this paragraph: The administrative stay, under the condition that the owner or operator complies with alternative levels defined as the land disposal restriction limits specified in § 268.43 of this chapter for F039 nonwastewaters, remains in effect until further administrative action is taken and notice is published in the **Federal Register** and the Code of Federal Regulations.

* * * * *

6. Appendix VIII to part 266 is revised to read as follows:

Appendix VIII to Part 266.—Organic Compounds for Which Residues Must Be Analyzed

Volatiles	Semivolatiles
Benzene	Bis(2-ethylhexyl)phthalate
Toluene	Naphthalene
Carbon tetrachloride	Phenol
Chloroform	Diethyl phthalate
Methylene chloride	Butyl benzyl phthalate
Trichloroethylene	2,4–Dimethylphenol
Tetra chloroethylene	o-Dichlorobenzene
1,1,1–Trichloroethane	m-Dichlorobenzene
Chlorobenzene	p-Dichlorobenzene
cis-1,4–Dichloro-2-butene.	Hexachlorobenzene
Bromochloromethane	2,4,6–Trichlorophenol
Bromodichloromethane.	Fluoranthene
Bromoform	o-Nitrophenol
Bromomethane	1,2,4–Trichlorobenzene
Methylene bromide	o-Chlorophenol
Methyl ethyl ketone	Pentachlorophenol
	Pyrene
	Dimethyl phthalate
	Mononitrobenzene
	2,6–Toluene diisocyanate
	Polychlorinated dibenzo-p-dioxins [1]
	Plychlorinated dibenzo-furans [1]

[1] Analyses for polychlorinated dibenzo-p-dioxins and polychlorinated dibenzo-furans are required only for residues collected from areas downstream of the combustion chamber (*e.g.,* ductwork, boiler tubes, heat exchange surfaces, air pollution control devices, *etc.*).

PART 270—EPA ADMINISTERED PERMIT PROGRAMS: THE HAZARDOUS WASTE PERMIT PROGRAM

1. The authority citation for part 270 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912, 6924, 6925, 6927, 6939, and 6974.

2. Section 270.19 is amended by revising the introductory text and adding paragraph (e) to read as follows:

§ 270.19 Specific part B information requirements for incinerators.

* * * * *

Except as § 264.340 of this Chapter and § 270.19(e) provide otherwise, owners and operators of facilities that incinerate hazardous waste must fulfill the requirements of paragraphs (a), (b), or (c) of this section.

* * * * *

(e) When an owner or operator demonstrates compliance with the air emission standards and limitations in 40 CFR part 63, subpart EEE, of this chapter (i.e., by conducting a comprehensive performance test and submitting a Notification of Compliance), the requirements of this section do not apply. Nevertheless, the Director may apply the provisions of this section, on a case-by-case basis, for purposes of information collection in accordance with §§ 270.10(k) and 270.32(b)(2).

3. Section 270.22 is amended by adding introductory text to read as follows:

§ 270.22 Specific part B information requirements for boilers and industrial furnaces burning hazardous waste.

When an owner or operator of a cement or lightweight aggregate kiln demonstrates compliance with the air emission standards and limitations in 40 CFR part 63, subpart EEE (i.e., by conducting a comprehensive performance test and submitting a Notification of Compliance), the requirements of this section do not apply. Nevertheless, the Director may apply the provisions of this section, on a case-by-case basis, for purposes of information collection in accordance with §§ 270.10(k) and 270.32(b)(2).

* * * * *

4. Appendix I to § 270.42 is amended by adding an entry 8 in numerical order in section A and revising entry 9 in section L to read as follows:

TABLE 1.—REGULATIONS IMPLEMENTING THE HAZARDOUS AND SOLID WASTE AMENDMENTS OF 1984

Promulgation date	Title of regulation	Federal Register reference	Effective date
* *	* *	* *	*
September 30, 1999	Standards for Hazardous Air Pollutants for Hazardous Waste Combustors.	[Insert FR page numbers].	September 30, 1999.

APPENDIX I TO § 270.42—CLASSIFICATION OF PERMIT MODIFICATION

Modification	Class
A. General Permit Provisions:	
* * * *	*
8. Changes to remove permit conditions that are no longer applicable (*i.e.,* because the standards upon which they are based are no longer applicable to the facility).	[1]1
* * * *	*
L. Incinerators, Boilers, and Industrial Furnaces:	
* * * *	*
9. Technology Changes Needed to meet Standards under 40 CFR part 63 (Subpart EEE—National Emission Standards for Hazardous Air Pollutants From Hazardous Waste Combustors), provided the procedures of § 270.42(j) are followed.	[1]1
* * * *	*

[1] Class 1 modifications requiring prior Agency approval.

5. Section 270.62 is amended by adding introductory text to read as follows:

§ 270.62 Hazardous waste incinerator permits.

When an owner or operator demonstrates compliance with the air emission standards and limitations in 40 CFR part 63, subpart EEE (*i.e.*, by conducting a comprehensive performance test and submitting a Notification of Compliance), the requirements of this section do not apply. Nevertheless, the Director may apply the provisions of this section, on a case-by-case basis, for purposes of information collection in accordance with §§ 270.10(k) and 270.32(b)(2).

* * * * *

6. Section 270.66 is amended by adding introductory text to read as follows:

§ 270.66 Permits for boilers and industrial furnaces burning hazardous waste.

When an owner or operator of a cement or lightweight aggregate kiln demonstrates compliance with the air emission standards and limitations in 40 CFR part 63, subpart EEE (*i.e.*, by conducting a comprehensive performance test and submitting a Notification of Compliance), the requirements of this section do not apply. Nevertheless, the Director may apply the provisions of this section, on a case-by-case basis, for purposes of information collection in accordance with §§ 270.10(k) and 270.32(b)(2).

* * * * *

PART 271—REQUIREMENTS FOR AUTHORIZATION OF STATE HAZARDOUS WASTE PROGRAMS

1. The authority citation for part 271 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), and 6926.

2. Section 271.1(j) is amended by adding the following entries to Table 1 in chronological order by date of publication in the **Federal Register**, to read as follows:

§ 271.1 Purpose and scope.

* * * * *

(j) * * *

TABLE 1.—REGULATIONS IMPLEMENTING THE HAZARDOUS AND SOLID WASTE AMENDMENTS OF 1984

Promulgation date	Title of regulation	Federal Register reference	Effective date
* *	* *	* *	*
September 30, 1999	Standards for Hazardous Air Pollutants for Hazardous Waste Combustors.		Sept. 30, 1999.

[FR Doc. 99–20430 Filed 9–29–99; 8:45 am]

BILLING CODE 6560–50–U