ENVIRONMENTAL PROTECTION AGENCY

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

[FRL–5447–2]

RIN 2050–AF01

Revised Standards for Hazardous Waste Combustors

AGENCY: Environmental Protection Agency.

ACTION: Proposed rule.

SUMMARY: The Agency is proposing revised standards for hazardous waste incinerators, hazardous waste-burning cement kilns, and hazardous waste-burning lightweight aggregate kilns. These standards are being proposed 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. The MACT standards also should result in increased protection to human health and the environment over existing RCRA standards. The nature of this proposal requires that the following actions also be proposed: proposing the addition of hazardous waste-burning lightweight aggregate kilns to the list of source categories in accordance with 112(c)(5) of the Act; exempting from RCRA emission controls secondary lead facilities subject to MACT; considering an exclusion for certain ‘‘comparable fuels’’; and revising the small quantity burner exemption under the BIF rule.

DATES: EPA will accept public comments on this proposed rule until June 18, 1996.

ADDRESSES: Commenters must send an original and two copies of their comments referencing docket number F–96–RCSP–FFFFF to: RCRA Docket Information Center, Office of Solid Waste (5305W), U.S. Environmental Protection Agency Headquarters (EPA, HQ), 401 M Street, SW., Washington, DC 20460. Deliveries of comments should be made to the Arlington, VA, address listed below. Comments may also be submitted electronically through the Internet to: RCRA-Docket@epamail.epa.gov. Comments in electronic format should also be identified by the docket number F–96–RCSP–FFFFF. All electronic comments must be submitted as an ASCII file avoiding the use of special characters and any form of encryption.

Commenters should not submit electronically any Confidential Business Information (CBI). An original and two copies of CBI must be submitted under separate cover to: RCRA CBI Document Control Officer, Office of Solid Waste (5305W), U.S. EPA, 401 M Street, SW, Washington, DC 20460.

Public comments and supporting materials are available for viewing in the RCRA Information Center (RIC), located at Crystal Gateway One, 1235 Jefferson Davis Highway, First Floor, Arlington, VA. The RIC is open from 9 a.m. to 4 p.m., Monday through Friday, excluding federal holidays. To review docket materials, the public must make an appointment by calling (703) 603–9230. The public may copy a maximum of 100 pages from any regulatory docket at no charge. Additional copies cost $.15/page. The index and some supporting materials are available electronically. See the ‘‘Supplementary Information’’ section for information on accessing them.

A public hearing will be held, if requested, to discuss the proposed standards for hazardous waste combustors, in accordance with section 307(d)(5) of the Act. Persons wishing to make an oral presentation at a public hearing should contact the EPA at the address given in the **ADDRESSES** section of this preamble. Oral presentations will be limited to 5 minutes each, unless additional time is feasible. Any member of the public may file a written statement before, during, or within 30 days after the hearing. Written statements should be addressed to the RCRA Docket Section address given in the **ADDRESSES** section of this preamble and should refer to Docket No. F–96–RCSP–FFFFF. A verbatim transcript of the hearing and written statements will be available for public inspection and copying during normal working hours at the EPA’s RCRA Docket Section in Washington, D.C. (see ADDRESSES section of this preamble).

FOR FURTHER INFORMATION CONTACT: For general information, 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 more detailed information on specific aspects of this rulemaking, contact Larry Denyer, Office of Solid Waste (5302W), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460, (703) 308–8770, electronic mail: Denyer.Larry@epamail.epa.gov. For more detailed information on implementation of this rulemaking, contact Val de la Fuente, Office of Solid Waste (5303W), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460, (703) 308–7245, electronic mail: DeLaFuente.Val@epamail.epa.gov. For more detailed information on regulatory impact assessment of this rulemaking, contact Gary Ballard, Office of Solid Waste (5305), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460, (202) 260–2429, electronic mail: Ballard.Gary@epamail.epa.gov. For more detailed information on risk analyses of this rulemaking, contact David Layland, Office of Solid Waste (5304), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460, (202) 260–4796, electronic mail: Layland.David@epamail.epa.gov.

SUPPLEMENTARY INFORMATION: The index and the following supporting materials are available on the Internet: (List documents) Follow these instructions to access the information electronically:

Gopher: gopher.epa.gov
WWW: http://www.epa.gov
Dial-up: (919) 558–0335.

This report can be accessed off the main EPA Gopher menu, in the directory: EPA Offices and Regions/Office of Solid Waste and Emergency Response (OSWER)/Office of Solid Waste (RCRA)/(consult with Communication Strategist for precise subject heading)

FTP: ftp.epa.gov
Login: anonymous
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Files are located in /pub/gopher/OSWRCRA

The official record for this action will be kept in paper form. Accordingly, EPA will transfer all comments received electronically into paper form and place them in the official record, which will also include all comments submitted directly in writing. The official record is the paper record maintained at the address in **ADDRESSES** at the beginning of this document.

EPA responses to comments, whether the comments are written or electronic, will be in a notice in the Federal Register or in a response to comments document placed in the official record for this rulemaking. EPA will not immediately reply to commenters electronically other than to seek clarification of electronic comments that may be garbled in transmission or during conversion to paper form, as discussed above.

Glossary of Acronyms

APCD—Air Pollution Control Device

BDAT—Best Demonstrated Available Technology
BIFs—Boilers and Industrial Furnaces
BTF—Beyond-the-Floor
CAA—Clean Air Act
Cl$_2$—Chlorine
CO—Carbon Monoxide
D/F—Dioxins/Furans
D/O/M—Design/Operation/Maintenance
ESP—Electrostatic Precipitator
EU—European Union
FF—Fabric Filter
HAP—Hazardous Air Pollutant
HC—Hydrocarbons
HCl—Hydrochloric acid
Hg—Mercury
HHE—Human Health and the Environment
HON—Hazardous Organic NESHAPs
HSWA—Hazardous and Solid Waste Amendments
HWC—Hazardous Waste Combustion/Combustor
ICR—Information Collection Request
LDR—Land Disposal Restrictions
LVM—Low-volatile Metals
LWAK—Lightweight Aggregate Kiln
MACT—Maximum Achievable Control Technology
MTEC—Maximum Theoretical Emission Concentration
NESHAPs—National Emission Standards for Hazardous Air Pollutants
PM—Particulate Matter
PICs—Products of Incomplete Combustion
RCRA—Resource Conservation and Recovery Act
RIA—Regulatory Impact Assessment
SVM—Semivolatile Metals
TCLP—Toxicity Characteristic Leaching Procedure
UTS—Universal Treatment Standards

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PART ONE: BACKGROUND

I. Overview

The U.S. Environmental Protection Agency (EPA) is proposing to revise standards for hazardous waste incinerators and hazardous waste-burning cement kilns and lightweight aggregate kilns (LWAKs) under joint authority of the Clean Air Act, as amended, (CAA) and the Resource Conservation and Recovery Act, as amended (RCRA). The emission standards in today's proposal have been developed under the CAA provisions concerning the maximum level of achievable control over hazardous air pollutants (HAPs), taking into consideration the cost of achieving the emission reduction, any non-air quality health and environmental impacts, and energy requirements. These maximum achievable control technology (MACT) standards, also referred to as National Emission Standards for Hazardous Air Pollutants (NESHAPs), are proposed in today's rule for the following HAPs: dioxins/furans, mercury, two semivolatile metals (lead and cadmium), four low volatility metals (antimony, arsenic, beryllium, and chromium), particulate matter, and hydrochloric acid/chlorine gas. Other toxic organic emissions are addressed by standards for carbon monoxide (CO) and hydrocarbons (HC).

This action is being taken for several reasons. First, this proposal is consistent with the terms of the 1993 settlement agreement between the Agency and a number of groups who challenged EPA's final RCRA rule entitled ''Burning of Hazardous Waste in Boilers and Industrial Furnaces'' (56 FR 7134, Feb. 21, 1991). These groups include the Natural Resources Defense Council, Sierra Club, Inc., Hazardous Waste Treatment Council (now the Environmental Technology Council), National Solid Waste Management Association, and a number of local citizens' groups. Under this settlement agreement, the Agency is to propose this rulemaking by September-November, 1995, and finalize it by December 1996.

Second, EPA has scheduled rulemakings to develop maximum achievable control technology (MACT) standards for hazardous waste incinerators and cement kilns. To minimize the burden on the Agency and the regulated community, the Agency has combined its efforts under the CAA and RCRA into one rulemaking to establish MACT standards, which also would satisfy the RCRA settlement agreement obligations.

Third, the Agency's Hazardous Waste Minimization and Combustion Strategy, first announced in May 1993, in addition to stressing waste minimization, also made a commitment to upgrade the emission standards for hazardous waste-burning facilities. The three categories of facilities covered in this proposal burn over 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 are to be addressed in the next rulemaking for which a proposal is to be issued by December 1998 or sooner.]

Finally, as relates to the development of revised standards under concurrent Clean Air Act and RCRA authority, most of these hazardous waste combustion facilities are major sources of HAP emissions. They therefore must be regulated under section 112(d) of the Clean Air Act. In addition, EPA noted, when promulgating the RCRA rules for boilers and industrial furnaces in 1991 and in a proposal to revise the incinerator rules, that existing standards did not fully consider the possibility of exposure via indirect (non-inhalation) exposure pathways. 56 FR at 7150, 7167, 7169–70 (Feb. 21, 1991); 54 FR at 43720–21, 43723, 43757 (Oct. 26, 1989). The Agency reiterated these concerns in the Combustion Strategy announced in 1993 as one of the major factors leading to its decision to undertake revisions to the standards for hazardous waste combustors. As also noted in the Combustion Strategy and elsewhere, site-specific RCRA omnibus authority, whereby permit writers can impose additional conditions as are necessary to protect human health and the environment, can be used to buttress the existing regulations. See, e.g., 56 FR 7145, at n.8. Nevertheless, this process is expensive, time-consuming, and not always sufficiently certain in result. The Agency thus indicated, in the Combustion Strategy, that technology-based standards could provide a superior means of control by providing certainty of operating performance.

Because of the joint authorities under which this rule is being proposed, the proposal also contains an implementation scheme that is intended to harmonize the RCRA and CAA programs to the maximum extent permissible by law. In pursuing a common-sense approach towards this objective, the proposal seeks to establish a framework that: (1) Provides for combined (or at least coordinated) CAA and RCRA permitting of these facilities; (2) allows maximum flexibility for regional, state, and local agencies to determine which of their resources will be used for permitting, compliance, and enforcement efforts; and (3) integrates the monitoring, compliance testing, and recordkeeping requirements of the CAA and RCRA so that facilities will be able to avoid two potentially different regulatory compliance schemes.

In addition, this proposal addresses the variety of issues, to the extent appropriate at this time, raised in several petitions filed with the Agency. These petitions are from the Cement Kiln Recycling Coalition (Jan. 18, 1994), the Hazardous Waste Treatment Council (May 18, 1994), and the Chemical Manufacturers Association (Oct. 14, 1994).

II. Relationship of Today's Proposal to EPA's Waste Minimization National Plan

EPA believes that today's proposed rule will create significant incentives for source reduction and recycling by waste generators that would, in turn, help facilities achieve compliance with the MACT standards. RCRA, as well as the Pollution Prevention Act of 1990 (PPA), encourage pollution prevention at the source, and the Clean Air Act mentions pollution prevention as a specific means of achieving MACT. In § 112(d)(2) of the CAA, Congress expressly defined MACT as the ''application of measures, processes, methods, systems, or techniques including, but not limited to, measures which reduce the volume of, or eliminate emissions of, such pollutants through process changes, substitution of materials and other modifications.''

In addition, in the Hazardous and Solid Waste Amendments of 1984 (HSWA) to RCRA, Congress established a national policy for waste minimization. Section 1003 of RCRA states that, whenever feasible, the generation of hazardous waste is to be reduced or eliminated as expeditiously as possible. Section 8002(r) requires EPA to explore the desirability and feasibility of establishing regulations or other incentives or disincentives for reducing or eliminating the generation of hazardous waste. In 1990, the PPA reinforced these policies by declaring it ''to be the national policy of the United States that pollution should be prevented at the source whenever feasible'' and, when not feasible, waste should be recycled, treated, or disposed of—in that order of preference.

Although the Agency has devoted significant effort to evaluation and promotion of waste minimization in the past[1], the Hazardous Waste Minimization and Combustion Strategy, first announced in May 1993, recently provided a new impetus to this effort. The Strategy had several components, among which was reducing the amount and toxicity of hazardous waste generated in the United States. Other components of the Strategy included strengthening controls on emissions from hazardous waste combustion units; enhancing public participation in facility permitting; establishing risk assessment policies with respect to facility permitting; and continued emphasis on strong compliance and enforcement.

EPA held a National Roundtable and four Regional Roundtables throughout the nation in 1993–94 to facilitate a broad dialogue on the spectrum of waste minimization and combustion issues. The major messages from these Roundtables became the building blocks for EPA's further efforts to promote source reduction and recycling and specifically for EPA's Waste Minimization National Plan, released in November 1994.

The Waste Minimization National Plan focuses on the goal of reducing persistent, bioaccumulative, and toxic constituents in hazardous waste nationally by 25 percent by the year 2000 and 50 percent by the year 2005. The central themes of the National Plan are: (1) Developing a framework for setting national priorities for the minimization of hazardous waste; (2) promoting multimedia environmental benefits and preventing cross-media transfers; (3) demonstrating a strong preference for source reduction by shifting attention to hazardous waste generators to reduce generation at its source; (4) defining and tracking progress in minimizing the generation of wastes; and (5) involving citizens in waste minimization implementation decisions. The Agency intends to continue its pursuit of hazardous waste minimization under the National Plan and other Agency initiatives in concert with the actions proposed in today's rule.

Of the 3.0 million tons of hazardous waste combusted in 1991, approximately two-thirds of that amount were combusted at on-site facilities (i.e., the same facilities at which the waste was generated). Combustion at an on-site facility therefore presents a situation in which the same facility owners and operators may have some measure of control over generation of wastes at its source and its ultimate disposition. Although close to 400 industries generated wastes destined for combustion in 1991, much of the quantity was concentrated in a few sectors. As a companion to this proposed rule, EPA is focusing its waste minimization efforts on reducing the generation and subsequent release to the environment of the most persistent, bioaccumulative, and toxic constituents in hazardous wastes (i.e., metals, halogenated organics).

Analysis of waste minimization potential suggests that generators currently burning wastes may have a number of options for eliminating or reducing these wastes. We believe that roughly 15 percent of all combusted wastes may be amenable to waste minimization. Three waste generating processes appear to have the most potential in terms of tonnage reduction: (1) Solvent and product recovery/distillation procedures, primarily in the organic chemicals industry, (2) product processing wastes, and (3) process waste removal and cleaning. In addition, preliminary analyses of Toxics Release Inventory and hazardous waste stream data indicate that over 3 million pounds of hazardous metals are contained in waste streams being combusted. The top 5 ranking metals (with respect to health risk considering persistence, bioaccumulation, and toxicity) are mercury, cadmium, lead, copper, and selenium. Additional analyses are underway to identify the industry sectors and production processes that are chief sources of these and other high priority hazardous constituents.[2]

In today's rule, EPA is soliciting comment on two options to promote the use of pollution prevention/waste minimization measures as methods for helping meet MACT standards. These options (regarding feed stream analysis and permitting requirements) are described in Part Five, Section VI, Subsection D of this preamble. EPA is also seeking comment on a proposal to consider, on a case-by-case basis, extending the compliance deadlines for this rule by one year if a facility can show that extra time is needed to implement pollution prevention/waste minimization measures in order for the facility to meet the MACT standards and that implementation cannot be practically achieved within the allotted three-year period after promulgation of this rule (see Part V, Section 1, Subsection C).

PART TWO: DEVICES THAT WOULD BE SUBJECT TO THE PROPOSED EMISSION STANDARDS

I. Hazardous Waste Incinerators

A. Overview

A hazardous waste incinerator is an enclosed, controlled flame combustion

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[1] For example, EPA prepared a report to Congress, ''Minimization of Hazardous Wastes'' (October 1986), that summarized existing waste minimization activities and evaluated options for promoting waste minimization.

[2] USEPA, Office of Solid Waste, ''Setting Priorities for Hazardous Waste Minimization'', July 1994.

device, as defined in 40 CFR 260.10, and is used to treat primarily organic and/or aqueous wastes. These devices may be in situ (fixed), or consist of mobile units (such as those used for site remediation and superfund clean-ups) or may consist of units burning spent or unusable ammunition and/or chemical agents that meet the incinerator definition.

B. Summary of Major Incinerator Designs

The following is a brief description of the typical incinerator designs used in the United States.[3]

1. Rotary Kilns

Rotary kiln systems typically contain two incineration chambers: the rotary kiln and an afterburner. The kiln itself is a cylindrical refractory-lined steel shell 10–20 feet in diameter, with a length-to-diameter ratio of 2 to 10. The shell is supported by steel trundles that ride on rollers, allowing the kiln to rotate around its horizontal axis at a rate of 1–2 revolutions per minute. Wastes are fed directly at one end of the kiln and heated by primary fuels. Waste continues to heat and burn as it travels down the inclined kiln. Combustion air is provided through ports on the face of the kiln. The kiln typically operates at 50–200 percent excess air and temperatures of 1600–1800°F. Flue gas from the kiln is routed to an afterburner operating at 2000–2500°F and 100–200 percent excess air where unburnt components of the kiln flue gas are more completely combusted. Auxiliary fuel and/or pumpable liquid wastes are typically used to maintain the afterburner temperature.

Some rotary kiln incinerators, known as slagging kilns, operate at high enough temperatures such that residual materials leave the kiln in a molten slag form. The molten residue is then water-quenched. Another kiln, an ashing kiln, operates at a lower temperature, producing a residual ash, which leaves as a dry material.

2. Liquid Injection Incinerators

A liquid injection incinerator system consists of an incineration chamber, waste burner and auxiliary fuel system. The combustion chamber is a cylindrical steel shell lined with refractory material and mounted horizontally or vertically. Liquid wastes are atomized as they are fed into the combustion chamber through waste burner nozzles. Typical combustion chamber temperatures are 1300–3000°F and residence times are from 0.5 to 3 seconds.

3. Fluidized Bed Incinerators

A fluidized bed system is essentially a vertical cylinder containing a bed of granular material at the bottom. Combustion air is introduced at the bottom of the cylinder and flows up through the bed material, suspending the granular particles. Waste and auxiliary fuels are injected into the bed, where they mix with combustion air and burn at temperatures from 840–1500°F. Further reaction occurs in the volume above the bed at temperatures up to 1800°F.

4. Fixed Hearth Incinerators

Fixed hearth incinerators typically contain two furnace chambers: a primary and a secondary chamber. Some designs have two or three step hearths on which ash and waste are pushed with rams through the system. A controlled flow ‘underfire’ combustion air is introduced up through the hearths. The primary chamber operates in ‘‘starved air’’ mode and the temperatures are around 1000°F. The unburnt hydrocarbons reach the secondary chamber where 140–200 percent excess air is supplied and temperatures of 1400–2000°F are achieved for more complete combustion.

C. Number of Incinerator Facilities

Currently, 162 permitted or interim status incinerator facilities, having 190 units, are in operation in the U.S. Another 26 facilities are proposed[4] (i.e., new facilities under construction or permitting). Of the above 162 facilities, 21 facilities are commercial facilities that burn about 700,000 tons of hazardous waste annually. The remaining 141 are on-site or captive facilities and burn about 800,000 tons of waste annually.

D. Typical Emission Control Devices for Incinerators

Incinerators are equipped with a wide variety of air pollution control devices (APCDs), which range from no control (for devices burning low ash and low chlorine wastes) to sophisticated state-of-the-art units providing control for several pollutants. Hot flue gases from the incinerators are cooled and cleaned of the air pollutants before they exit the stack. Cooling is mostly done by water quenching, wherein atomized water is sprayed directly into the hot gases. The cooled gases are passed through various pollution control devices to control PM, metals and organic emissions to desired or required levels. Most incinerators use wet APCDs to scrub acid emissions (3 facilities use dry scrubbers). Typical APCDs used include packed towers, spray dryers, or dry scrubbers for acid gas (e.g., HCl, Cl_2) control, and venturi-scrubbers, wet or dry electrostatic precipitators (ESPs) or fabric filters for particulate control.

Activated carbon injection for controlling dioxin and mercury is being used at only one incinerator. Newer APC technologies (such as catalytic oxidizers and dioxin/furan inhibitors) have recently emerged, but have not been used on any full scale facilities in the U.S. For detailed description of APCDs, see Appendix A of ‘‘Combustion Emissions Technical Resource Document (CETRED),’’ US EPA Document #EPA530–R–94–014, May 1994.

II. Hazardous Waste-Burning Cement Kilns

A. Overview of Cement Manufacturing

Cement refers to the commodities that are produced by heating mixtures of limestone and other minerals or additives at high temperature in a rotary kiln, followed by cooling, grinding, and finish mixing. This is the manner in which the vast majority of commercially-important cementitious materials are produced in the United States. Cements are used to chemically bind different materials together. The most commonly produced cement type is ‘‘Portland’’ cement, though other standard cement types are also produced on a limited basis (e.g., sulfate-resisting, high-early-strength, masonry, waterproofed). Portland cement is a hydraulic cement, meaning that it sets and hardens by chemical interaction with water. When combined with sand, gravel, water, and other materials, Portland cement forms concrete, one of the most widely used building and construction materials in the world. Cement produced and sold in the U.S. must meet specifications established by the American Society for Testing and Materials (ASTM). Each type requires specific additives or changes in the proportions of the raw material mix to make products for specific applications.

B. Summary of Major Design and Operating Features of Cement Kilns

Cement kilns are horizontally inclined rotating cylinders, refractory-brick lined, and internally-fired, that calcine a blend of raw materials

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[3] For a more detailed description of incineration technology, see ‘‘Combustion Emissions Technical Resource Document (CETRED)’’, USEPA EPA530–R–94–014, May 1994.

[4] USEPA ‘‘List of hazardous waste incinerators,’’ November 1994.

containing calcium (typically limestone), silica and alumina (typically clay, shale, slate, and/or sand), and iron (typically steel mill scale or iron ore) to produce Portland cement. Generally, there is a wet process and a dry process for producing cement. In the wet process, the limestone and shale are ground up, wetted and fed into the kiln as a slurry. In the dry process, raw materials are ground dry and fed into the kiln dry. Wet process kilns are typically longer than dry process kilns in order to facilitate water evaporation from the slurried raw material. Wet kilns can be more than 450 feet in length. Dry kilns are more thermally efficient and frequently use preheaters or precalciners to begin the calcining process (i.e., the essential function of driving CO_2 from raw materials) before the raw materials are fed into the kiln.

Combustion gases and raw materials move in a counterflow direction, with respect to each other, inside a cement kiln. The kiln is inclined, and raw materials are fed into the upper end (i.e., the ‘‘cold’’ end) while fuels are normally fired into the lower end (i.e., the ‘‘hot’’ end). Combustion gases move up the kiln counter to the flow of raw materials. The raw materials get progressively hotter as they travel down the length of the kiln. The raw materials eventually begin to soften and fuse at temperatures between 2,250 and 2,700 °F to form the clinker product. Clinker is then cooled, ground, and mixed with other materials, such as gypsum, to form cement.

Combustion gases leaving the kiln typically contain from 6 to 30 percent of the free solids as dust, which are often recycled to the kiln feed system, though the extent of recycling varies greatly among cement kilns.

Dry kilns with a preheater (PH) or precalciner (PC) often use a by-pass duct to remove from 5 to 30 percent of the kiln off-gases from the main duct. The by-pass gas is passed through a separate air pollution control system to remove particulate matter. Collected by-pass dust is not reintroduced into the kiln system to avoid a build-up of metal salts that can affect product quality.

Some cement kilns burn hazardous waste-derived fuels to replace from 25 to 100 percent of normal fossil fuels (e.g., coal). Most kilns burn liquid waste fuels but several also burn bulk solids and small (e.g., six gallon) containers of 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. EPA has also found that hazardous waste-fired precalciners can still be considered part of the cement kiln and, thus, would be part of an industrial furnace (per the definition in 40 CFR 260.10). See 56 FR at 7184–85 (February 21, 1991). This finding is codified at § 266.103(a)(5)(I)(c). This is the only time (and the only rulemaking) in which the Agency found that a device not enumerated in the list of industrial furnaces in § 260.10 can be considered part of the industrial furnace when it burns hazardous wastes separate from those burned in the main combustion device.

C. Number of Facilities

The Agency has emissions data from 26 facilities representing 49 cement kilns in the U.S. It should be noted that some facilities no longer burn or process hazardous waste since they were required to certify compliance with the BIF regulations in August 1992.

Of the hazardous waste-burning kilns for which we have emissions data, 14 facilities use a wet process, 5 facilities use a dry process, and the remaining 7 facilities employ either preheaters or preheater/precalciners in the cement manufacturing process.

D. Emissions Control Devices

All hazardous waste-burning cement kilns either use fabric filters (baghouses) or electrostatic precipitators (ESPs) as air pollution control devices. ESPs have traditionally been employed in the cement industry and are currently used at 17 of the facilities. Nine facilities use fabric filters. A detailed description of these and other air pollution control devices is contained in the technical support document.[5]

III. Hazardous Waste-Burning Lightweight Aggregate Kilns

A. Overview of Lightweight Aggregate Kilns (LWAKs)

The term lightweight aggregate refers to a wide variety of raw materials (such as clay, shale, or slate) which 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.

B. Major Design and Operating Features

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 at an angle of about 5 degrees to the horizontal. The length of the kiln depends in part upon the composition of the raw material to be processed but is usually 30 to 60 meters. The prepared raw material is fed into the kiln at the higher end, while firing takes place at the lower end. The dry raw material fed into the kiln is initially preheated by hot combustion gases. Once the material is preheated, it passes into a second furnace zone where it melts to a semiplastic state and begins to generate gases which serve as the bloating or expanding agent. In this zone, specific compounds begin to decompose and form gases such as SO_2, CO_2, SO_3, and O_2 that eventually trigger the desired bloating action within the material. As temperatures reach their maximum (approximately 2100°F), 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. Maximum temperature in the rotary kiln varies from 2050 °F to 2300 °F, depending on the type of raw material being processed and its moisture content. Exit temperatures may range from 300 °F to 1200 °F, again depending on the raw material and on the kiln’s internal design. Approximately 80 to 100 percent excess air is forced into the kiln to aid in expanding the raw material.

C. Number of Facilities

EPA has identified 36 lightweight aggregate kiln locations in the United States. Of these, EPA has identified seven facilities that are currently burning hazardous waste in a total of 15 kilns.

D. Air Pollution Control Devices

Lightweight aggregate kilns use one or a combination of air pollution control devices, including fabric filters, venturi scrubbers, spray dryers, cyclones and wet scrubbers. All of the facilities utilize fabric filters as the main type of emissions control, although one facility uses a spray dryer, venturi scrubber and

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[5] USEPA, ‘‘Draft Technical Support Document for HWC MACT Standards, Volume I: Description of Source Categories’’, February 1996.

wet scrubber in addition to a fabric filter. For detailed descriptions of these and other air pollution control devices, please see Appendix A of the draft EPA document Combustion Emissions Technical Resource Document (CETRED).[6]

PART THREE: DECISION PROCESS FOR SETTING NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAPs)

I. Source of Authority for NESHAP Development

The 1990 Amendments to the Clean Air Act significantly revised the requirements for controlling emissions of hazardous air pollutants. EPA is now required to develop a list[7] of categories of major and area sources[8] of the hazardous air pollutants (HAPs) enumerated in section 112 and to develop technology-based performance standards for such sources over specified time periods. See Clean Air Act (the Act or CAA) §§ 112(c) and 112(d). Section 112 of the Act replaces the previous system of pollutant-by-pollutant health-based regulation that proved ineffective at controlling the high volumes, concentrations, and threats to human health and the environment posed by HAPs in air emissions. See generally S. Rep. No. 228, 101st Cong. 1st Sess. 128–32 (1990).

Section 112(f) also requires the Agency to report to Congress by the end of 1996 on estimated risk remaining after imposition of technology-based standards and to make recommendations as to legislation to address such risk. CAA § 112(f)(1). If Congress does not act on the recommendation, then EPA must address any significant remaining residual risks posed by sources subject to the section 112(d) technology-based standards within 8 years after promulgation of these standards. See § 112(f)(2). The Agency is required to impose additional controls if such controls are needed to protect public health with an ample margin of safety, or to prevent adverse environmental effects. *Id.* 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 the Agency must promulgate additional standards. See § 112(f)(2)(A).

II. Procedures and Criteria for Development of NESHAPs

NESHAPs are developed in order to control HAP emissions from both new and existing sources according to the statutory directives set out in § 112. The statute requires a NESHAP to reflect the maximum degree of reduction of HAP emissions that is achievable taking into consideration the cost of achieving the emission reduction, any non-air quality health and environmental impacts, and energy requirements. § 112(d)(2). In regulatory parlance, these are often referred to as maximum achievable control technology (or MACT) standards.

The Clean Air Act establishes minimum levels, usually referred to as MACT floors, for the emission standards. Section 112(d)(3) requires that MACT floors be determined as follows: for existing sources in a category or sub-category 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 sub-category with less than 30 sources, then 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 * * *’’. See § 112(d)(3)(A) and (B).

EPA must, of course, consider in all cases whether to develop standards that are more stringent than the floor (‘‘beyond the floor’’ standards). To do so, however, EPA must consider the enumerated statutory criteria such as cost, energy, and non-air environmental implications.

Emission reductions may be accomplished through 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 § 112(d)(2).

Application of techniques (1) and (2) of the previous paragraph are consistent with the definitions of pollution prevention under the Pollution Prevention Act and the definition of waste minimization under RCRA/HSWA. These terms have particular applicability in the discussion of pollution prevention/waste minimization options presented in the permitting and compliance sections of today’s proposal.

To develop a NESHAP, the EPA compiles available information and in some cases collects additional information about the industry, including information on emission source quantities, types and characteristics of HAPs, pollution control technologies, data from HAP 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. EPA uses this information in analyzing and developing possible regulatory approaches. EPA, of course, does not always have or collect the same amount of information per industry, but rather bases the standard on information practically available.

Although NESHAPs are normally structured in terms of numerical emission limits—the preferred means of establishing standards—alternative approaches are sometimes necessary and appropriate. In some cases, for example, physically measuring emissions from a source may be impossible, or at least impractical, because of technological and economic limitations. Section 112(h) authorizes the Administrator to promulgate a design, equipment, work practice, or operational standard, or a combination thereof, in those cases where it is not feasible to prescribe or enforce an emissions standard.

EPA is required to develop emission standards based on performance of maximum achievable control technology for categories or sub-categories of major sources of hazardous air pollutants. § 112(d)(1). As explained more fully in the following section, a major source emits, or has the potential to emit considering controls, either 10 tons per year of any hazardous air pollutant or 25 tons or more of any combination of those pollutants. § 112(a)(1). EPA also can establish lower thresholds where appropriate. *Id.* EPA

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[6] USEPA, ‘‘Draft Combustion Emission Technical Resource Document (CETRED)’’, EPA 530–R–94–014, May 1994.

[7] The Agency published an initial list of categories of major and area sources of HAPs on July 16, 1992. See 57 FR 31576.

[8] See Part Three, Section III of today’s proposal for a discussion of major and area sources. Generally, a major source is a stationary source that emits, or has the potential to emit considering controls, 10 tons per year of a HAP or 25 tons per year of a combination of HAPs. CAA § 112(a)(1). An area source is generally a stationary source that is not a major source. *Id.* § 112(a)(2).

may in addition require sources emitting particularly dangerous hazardous air pollutants (such as particular chlorinated dioxins and furans) to be regulated under the MACT standards for major sources. § 112(c)(6).

Area sources are any source which is not a major source. Such sources must be regulated by technology-based standards if they are listed, pursuant to § 112(c)(3), based on the Agency's finding 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, the Agency has a further choice as to require technology-based standards based on MACT or on generally achievable control technology (GACT). § 112(d)(5).

In this rulemaking, EPA is proceeding pursuant to § 112(c)(6) (i.e., imposing MACT controls on area sources), because these hazardous waste combustion units emit a number of the HAPs singled out in that provision, including the enumerated dioxins and furans, mercury, and polycyclic organic matter. (See discussion below.)

III. List of Categories of Major and Area Sources

A. Clean Air Act Requirements

As just discussed, Section 112 of the CAA requires that the EPA promulgate regulations requiring the control of hazardous air pollutants emissions associated with categories or subcategories of major and area sources. These source categories and subcategories are to be listed pursuant to § 112(c)(1). EPA published an initial list of 174 categories of such major and area sources in the Federal Register on July 16, 1992 (57 FR 31576).

B. Hazardous Waste Incinerators

''Hazardous waste incinerators'' is one of the 174 categories of sources listed. The category consists of commercial and on-site (including captive) incinerating facilities. The listing was based on the Administrator's determination that at least one hazardous waste incinerator may reasonably be anticipated to emit several of the 189 listed HAPs in quantities sufficient to designate them as major sources. EPA used two emission rate values to evaluate the available hazardous waste incinerator emissions data: the maximum emission rate measured during the compliance test, and the average emission rate. The data indicate that approximately 30 percent of the facilities meet the major source criteria when using the maximum emissions rate value. When using the average emissions rate value approximately 15 percent of facilities meet the major source criteria.[9] Those facilities meeting the major source criteria do so for HCl and Cl_2 emissions, and one facility is also a major source for antimony emissions.

It should be noted that a major source and boundary for considering whether a source is a major includes all potential emission points of HAPs at that contiguous facility, including storage tanks, equipment leaks, and other hazardous waste handling facilities. The above calculations for incinerators on whether a source is a major source under § 112 do not reflect these potential emission points.

Notwithstanding the fact that most HW incinerators are not likely to meet the HAP emission thresholds for major sources, the Agency is proposing to subject all HWCs to regulation under MACT as major sources, under the authority of § 112(c)(6). See Section IV below.

C. Cement Kilns

Another of the 174 categories of major and area sources of HAPs is Portland Cement Manufacturing (cement kilns). In evaluating the emissions data for the hazardous waste-burning cement kilns, 85 percent of the cement kilns were determined to meet the major source criteria when using the maximum emission rate value. Using the average emission rate value, just over 80 percent of the hazardous waste-burning cement kilns meet the major source criteria.[10] Those facilities meeting the major source criteria do so for HCl and Cl_2 emissions, and one facility is also a major source for organic emissions. It should be noted that the calculation on whether a cement kiln is a major source did not include potential emission points of HAPs at that contiguous facility.

Notwithstanding the fact that some hazardous waste-burning cement kilns may not meet the definition of major source, the Agency is proposing to subject all HWCs to regulation under MACT, as major sources, under the authority of § 112(c)(6). See Section IV below.

D. Lightweight Aggregate Kilns

Section 112(c)(5) authorizes EPA to amend the source category list at any time to add categories or subcategories that meet the listing criteria. EPA is proposing to exercise that authority by adding HW-burning lightweight aggregate kilns to the list of source categories.

In analyzing the emissions data, EPA found that all hazardous waste-burning LWAKs met the major source criteria for two HAPs, HCl and Cl_2, using either the average or maximum emission rate value.[11] It should be noted that the calculation on whether a LWAK is a major source did not include potential emission points of HAPs at that contiguous facility. EPA is therefore proposing today the addition of hazardous waste-burning LWAKs as a source category in accordance with section 112(c)(5) of the Act. In addition, as discussed below, even if a LWAK would otherwise be an area source, EPA is proposing to subject it to the same NESHAPS as major LWAK sources.

IV. Proposal To Subject Area Sources to the NESHAPs Under Authority of Section 112(c)(6)

EPA is today proposing to subject all hazardous waste incinerators, hazardous waste-burning cement kilns, and hazardous waste-burning lightweight aggregate kilns (i.e., both area and major sources) to regulation as major sources pursuant to CAA § 112(c)(6). That provision states that, by November 15, 2000, EPA must list and promulgate § 112 (d)(2) or (d)(4) standards (i.e., standards reflecting MACT) for categories (and subcategories) of sources emitting specific pollutants, including the following HAPs emitted by HWCs: polycyclic organic matter, mercury, 2,3,7,8-tetrachlorodibenzofuran, and 2,3,7,8-tetrachlorodibenzo-p-dioxin. (Although the Agency has not prepared the list, it is the Agency's intention to include hazardous waste combustors.) EPA must assure that sources accounting for not less than 90 percent of the aggregate emissions of each enumerated pollutant are subject to MACT standards.

The chief practical effect of invoking § 112(c)(6) for this rulemaking is to subject area sources that emit 112(c)(6) pollutants to the same MACT standards as major sources, rather than to the potentially less stringent 112(d)(5) or ''GACT'' (''generally achievable control technology'') standards.[12] Today's proposal constitutes one of many EPA actions to assure that sources accounting for at least 90 percent of

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[9] For further details see USEPA, ''Draft Technical Support Document for HWC MACT Standards, Volume I: Description of Source Categories'', February 1996.

[10] Ibid.

[11] Ibid.

[12] EPA also solicits comment on an alternative reading of § 112(c)(6), whereby the provision would require MACT control for the enumerated pollutants but not necessarily for other HAPs emitted by the source, which HAPs are not enumerated in § 112(c)(6).

emissions of § 112(c)(6) pollutants are subject to MACT standards.

Although § 112(c)(6) requires the Agency to regulate source categories that emit not less than 90 percent of the aggregate emissions of the high priority HAPs, the Agency will use its discretion to avoid regulating area source categories with trivial aggregate emissions of specific § 112(c)(6) HAPs. However, as an example of the emissions that are possible from the HWC source categories, it is estimated that HWCs presently emit in aggregate 11.1 tons of mercury per year. Of this quantity, 4.6 tons per year can be attributed to hazardous waste incinerators and 6.5 tons per year to hazardous waste-burning cement and lightweight aggregate kilns. Also, it is estimated that HWCs presently emit in aggregate 122 pounds of dioxins/furans (or 2.15 pounds TEQ) per year. Of this quantity, 9 pounds (or 0.2 pounds TEQ) per year can be attributed to hazardous waste incinerators and 113 pounds (or 1.95 pounds TEQ) per year to hazardous waste-burning cement and lightweight aggregate kilns. To show an example of how today's proposal constitutes an action to assure that sources accounting for at least 90 percent of emissions of § 112(c)(6) pollutants are subject to MACT standards, the document Estimating Exposure to Dioxin-Like Compounds, Vol. II: Properties, Sources, Occurrence and Background Exposures (EPA, 1994) estimates (on p. 29) that national emissions of dioxins and furans (D/F) total 4.18 pounds TEQ per year. Based on this estimation, HWCs account for 51 percent of the annual national emissions of D/F. (Consequently, EPA expects these source categories to be included in the list of sources to be controlled to achieve the requisite 90 percent reduction in aggregate emissions of section 112(c)(6) pollutants.)

Congress singled out the HAPs enumerated in § 112(c)(6) as being of ‘‘specific concern’’ not just because of their toxicity but because of their propensity to cause substantial harm to human health and the environment via indirect exposure pathways (i.e., from the air through other media, such as water, soil, food uptake, etc.). S. Rep. No. 228, 101st Cong. 1st Sess., pp. 155, 166. These pollutants have exhibited special potential to bioaccumulate, causing pervasive environmental harm in biota (and, ultimately, human health risks). *Id.* Indeed, as discussed later, the data appear to show that much of the human health risk from emissions of these HAPs from HWCs comes from these indirect exposure pathways. *Id.* at p. 166. Congress' express intention was to assure that sources emitting significant quantities of § 112(c)(6) pollutants received a stricter level of control. *Id.*

V. Selection of MACT Floor for Existing Sources

The starting point in developing MACT standards is determining floor levels, i.e. the minimum (least stringent) level at which the standard can be set.

All of the hazardous waste combustion units subject to this proposed rule are already subject to RCRA regulation under 40 CFR Parts 264, 265, or 266. As a result, the Agency has a substantial amount of data reflecting performance of these devices. These data consist largely of trial burn data for hazardous waste incinerators and data from certifications of compliance for hazardous waste-burning cement kilns and LWAKs obtained pursuant to 266.103(c). These data consist of at least three runs for any given test condition.

In using these ‘‘short term’’ test data to establish a MACT floor, the Agency has developed an approach that ensures the standards are achievable, i.e. reflect the performance over time of properly designed and operated air pollution control devices (or operating practices) taking into account intrinsic operating variability.

In addition, the Agency notes that the floor calculations were performed on individual HAPs or, in the case of metals, in two groups of HAPs that behave similarly (i.e., separate floor levels for each hazardous air pollutant or group of metal pollutants). However, for HAPs that are controlled by the same type of air pollution control device (APCD), EPA has ensured that all HAP floors are simultaneously achievable by identifying the APCD and APCD treatment train that can be used to meet all floor levels. The ultimate floor levels thus derived can be achieved using the identified technology. This approach is consistent with methods used by EPA in other rules to calculate MACT requirements where the HAP species present must be treated by a treatment train. See, e.g., MACT Rules for Secondary Lead Smelters. 60 FR 32589 (June 23, 1995).

The Agency is not, however, treating hazardous waste-burning incinerators, cement kilns, and LWAKs as a single source category for purposes of developing the MACT floor (or for any other purpose). The Agency's initial view is that there are technical differences in performance for particular HAPs among the three source categories, and therefore that the technology-based floors must reflect these operating differences.

A. Proposed Approach: Combined Technology-Statistical Approach

This analysis first identified the best performing control technology(ies) for each source category (i.e., incinerators, cement kilns, and lightweight aggregate kilns) and each HAP of concern by arraying from lowest to highest all the particular HAP emissions data from existing units within the source category by test condition averages. These technologies comprise MACT floor. In cases where a source had emissions data for a HAP from several different test conditions of a compliance test, the Agency arrayed each test condition separately. The Agency then identified the emission control technology or technologies (and normalized feedrate of metals and chlorine in hazardous waste) used by sources with emissions levels at or below the level emitted by the median of the best performing 12 percent of sources. The sources are termed ‘‘the best performing 6 percent’’ of the sources, or ‘‘MACT pool’’, and the controls they use comprise MACT floor.

The next step was to identify an emissions level that MACT floor control could achieve. Thus, emissions data from *all* sources (in the source category) that use MACT floor control were arrayed in ascending order by average emissions. [This is referred to as the ‘‘expanded MACT pool’’ or ‘‘expanded universe’’.] The Agency evaluated the control technologies used by the additional sources within the ‘‘expanded universe’’ as available data allowed to ensure that they were in fact equivalent in design to MACT floor. The Agency then selected the test condition in the expanded MACT pool with the highest mean emissions to identify the emission level that MACT floor could achieve.

Because the emissions database was comprised of ‘‘short-term’’ test data, the Agency used a statistical approach to identify an emission level that MACT floor could achieve *routinely.* The Agency then identified the test condition in the expanded MACT pool with the highest mean emissions to statistically calculate a ‘‘design level’’ and a floor standard. The design level was calculated as the log mean of the emissions for the test condition. The standard was calculated as a level that a source (that is designed and operated to routinely meet the design level) could meet 99 percent of the time if it has the average within-test-condition emissions variability of the expanded MACT pool. Although the Agency evaluated 90th and 95th percentile limits, the 99th percentile limit was chosen to: (1) More accurately reflect the variability that could be present in emissions data, and (2) appropriately characterize this variability in light of the consequence of failing to achieve the emissions standards. Additional information on how MACT floor levels were identified is provided in the ''Draft Technical Support Document for HWC MACT Standards, Volume III: Selection of Proposed MACT Standards and Technologies''.

In accounting for operating variability, the Agency solicits comment on whether it may have overcompensated so that the identified floor levels are unduly lenient. The test data on which the proposal is based to some extent reflect worst-case performance conditions because RCRA sources try to obtain maximum operating flexibility by conducting test burns at extreme operating conditions. For example, many sources spike wastes with excess metals and chlorine during compliance testing. In addition, sources operate their emissions control devices under low efficiency conditions (while still meeting emission standards) to ensure lenient operating limits. It thus may be that the Agency's emissions database is so inflated that separate consideration of emissions variability may not be warranted. A floor level could be the highest mean of the test conditions in the expanded MACT pool.

The Agency emphasizes that it would be preferable, for purposes of setting these MACT standards, to have operational and emissions data that better reflect long-term, more routine day-to-day facility operations from all of the source categories. We believe that this type of data would enable the MACT process to articulate a set of HAP standards that would not create some of the issues raised in subsequent sections of this preamble (such as the most appropriate resolution of a variability factor, the optimum approach for considering the contribution of cement and lightweight aggregate kiln raw material feed to HAP emissions, and better identification among sources that are now in an expanded MACT pool but which, with better data, would be determined not to be employing the identified floor controls). As noted in these subsequent sections, the Agency urges commenters to submit these types of data.

B. Another Approach Considered but not Used

Although the Agency believes the proposed approach reflects a reasonable interpretation of the statute, there are other possible interpretations. One of these interpretations, termed the ''12 percent approach'', was raised and, in fact, evaluated during the process already outlined. This approach is presented here, along with the results of the process in Part Four, Section VIII, for public inspection.

This ''12 percent approach'' was evaluated in a like manner to the Agency's preferred approach just described. Again, the best performing control technology(ies) for each source category and each HAP were identified by arraying the data by test condition averages. However, the Agency identified the technology or technologies used by the best performing 12 percent of the sources. After arraying emissions data from *all* facilities in the source category that use the identified MACT floor technology(ies) (i.e., the expanded MACT pool), the Agency selected an emissions floor level based on the statistical average of the 12 percent MACT pool, to which was added the average within-test condition variability within the expanded MACT pool. The emissions floor was then calculated at a level that a source with average emissions variability would be expected to achieve 99 percent of the time. The approach was not proposed because it could not be demonstrated that sources within the expanded MACT pool using MACT floor controls could achieve the floor levels. Again, the details of the statistical methods employed are presented in the ''Draft Technical Support Document for HWC MACT Standards, Volume III: Selection of Proposed MACT Standards and Technologies''.

C. Identifying Floors as Proposed in CETRED

The discussion in the Draft Combustion Emissions Technical Resource Document (CETRED) (U.S. EPA, EPA530–R–94–014, May 1994) presented one methodology for establishing particulate matter (PM) and dioxin/furan (D/F) technology-based emission levels for hazardous waste combustors (HWCs). The document presented a procedure for establishing numerical levels which took into account the natural variability that was present in the Agency's PM and D/F emissions data. EPA received numerous comments on the document.

The approaches outlined in CETRED were an initial and preliminary attempt to apply the process by which the NESHAPs are to be established for the existing types of hazardous waste combustors. The approaches in CETRED focused solely on the performance of MACT and how to establish the ''floor'' emission level under the MACT process.

In CETRED, determination of the MACT floor involved: (1) screening unrepresentative data; (2) ranking all HWC sources based on the data average, considering variability; (3) identifying the top 12 percent of sources as the MACT pool; and (4) statistically evaluating the MACT pool to set the MACT floor. These elements and considerations are described in further detail in CETRED and the ''Draft Technical Support Document for HWC MACT Standards, Volume III: Selection of Proposed MACT Standards and Technologies''. The Agency specifically indicated the preliminary nature of the CETRED approaches and, in light of further deliberations and comments received, has considered and adopted other approaches for this proposal. The comments received are found in the docket.

In considering the use of a purely statistical approach to setting MACT floors, the Agency recognized that whether sources could actually achieve a statistically-derived MACT floor level on a regular basis was significant in determining whether a purely statistical approach could be appropriate or not. The Agency encountered difficulties in identifying an appropriate purely statistical model for the combined source category (HW incinerators, HW-burning cement kilns, and HW-burning lightweight aggregate kilns) emissions database. Consequently, the Agency abandoned a purely statistical approach and examined an approach—referred to here as the ''technology approach''—that used demonstrated technological capabilities as a key factor in selecting MACT floor levels.

D. Establishing Floors One HAP or HAP Group at a Time

EPA believes it is permissible to establish MACT floors separately for individual HAPs or group of HAPs that behave the same from a technical standpoint (i.e., based on separate MACT pools and floor controls), provided the various MACT floors are simultaneously achievable. As set out below, Congress has not spoken to this precise issue. An interpretation that allows this approach is consistent with statutory goals and policies, as well as established EPA practice in developing MACT standards.

As described earlier, Congress specified in section 112(d)(3) the minimum level of emission reduction that could satisfy the requirement to adopt MACT. For new sources, this floor level is to be ''the emission control that is achieved in practice by the best controlled similar source''. For existing sources, the floor level is to be ''the average emission limitation achieved by the best performing 12 percent of the existing sources'' for categories and subcategories with 30 or more sources, or ''the average emission limitation achieved by the best performing 5 sources'' for categories and subcategories with fewer than 30 sources. An ''emission limitation'' is ''a requirement * * * which limits the quantity, rate, or concentration of emissions of air pollutants'' (section 302 (k)) (although the extent, if any, the section 302 definitions need to apply to the terms used in section 112 is not clear).

This language does not expressly address whether floor levels can be established HAP-by-HAP. The existing source MACT floor achieved by the average of the best performing 12 percent can reasonably be read as referring to the source as a whole or performance as to a particular HAP. The statutory definition of ''emission limitation'' (assuming it applies) likewise is ambiguous, since ''requirements limiting quantity, rate, or concentration of pollutants'' could apply to particular HAPs or all HAPs. The reference in the new source MACT floor to ''emission control achieved by the best controlled similar source'' can mean emission control as to a particular HAP or achieved by a source as a whole.

Here, Congress has not spoken to the precise question at issue, and the Agency's interpretation effectuates statutory goals and policies in a reasonable manner. See *Chevron* v. *NRDC*, 467 U.S. 837 (1984) (indicating that such interpretations must be upheld). The central purpose of the amended air toxics provisions was to apply strict technology-based emission controls on HAPs. See, e.g., H. Rep. No. 952, 101st Cong. 2d sess. 338. The floor's specific purpose was to assure that consideration of economic and other impacts not be used to ''gut the standards''. While costs are by no means irrelevant, they should by no means be the determining factors. There needs to be a minimum degree of control in relation to the control technologies that have already been attained by the best existing sources. Legislative History of the Clean Air Act *Vol. II* at 2897 (statement of Rep. Collins).

Furthermore, an alternative interpretation would tend to result in least common denominator floors where multiple HAPs are emitted, whereby floors would no longer be reflecting performance of the best performing sources. For example, if the best performing 12 percent of facilities for HAP metals did not control organics as well as a different 12 percent of facilities, the floor for organics and metals would end up *not* reflecting best performance. Indeed, under this reading, the floor would be no control, because no plant is controlling both types of HAPs.

EPA is convinced that this result is not compelled by the statutory text, and does not effectuate the evident statutory purpose of having floor levels reflect performance of an average of a group of best-performing sources. Conversely, using a HAP-by-HAP approach (or an approach that groups HAPs based on technical factors) to identify separate floors for metals and organics in this example promotes the stated purpose of the floor to provide a minimum level of control reflecting what best performing existing sources have already demonstrated an ability to do.

EPA notes, however, that if optimized performance for different HAPs is not technologically possible due to mutually inconsistent control technologies (for example, metals performance decreases if organics reduction is optimized), then this would have to be taken into account in establishing a floor (or floors). (Optimized controls for both types of HAPS would not be MACT in any case, since the standards would not be mutually achievable.) The Senate Report indicates that in such a circumstance, EPA is to optimize the part of the standard providing the most environmental protection. S. Rep. No. 228, 101st Cong. 1st sess. 168. It should be emphasized, however, that ''the fact that no plant has been shown to be able to meet all of the limitations does not demonstrate that all the limitations are not achievable''. *Chemical Manufacturers Association* v. *EPA*, 885 F. 2d at 264 (upholding technology-based standards based on best performance for each pollutant by different plants, where at least one plant met each of the limitations but no single plant met all of them).

All available data for HWCs indicate that there is no technical problem achieving the floor levels for each HAP or HAP metal group simultaneously, using the MACT floor technology. In the case of metals and PM, the characteristics of the MACT floor technology associated with the hardest-to-meet floor (e.g., the fabric filter with lowest air-to-cloth ratio) would define the MACT floor technology for purposes of determining achievability of floors and for purposes of costing out the impact of the standards. Existing data show that approximately 9 percent of existing hazardous waste incinerators, approximately 8 percent of hazardous waste-burning cement kilns, and approximately 25 percent of hazardous waste-burning LWAKs are already achieving the proposed floor standards for all HAPs.

Finally, EPA notes that the HAP-by-HAP or HAP group approach to establishing MACT floor levels is not unique to this rule. For example, the Agency has adopted it for the NESHAP for the secondary lead source category (60 FR 32589 (June 23, 1995)) and proposed the same approach for municipal waste combustors (59 FR 48198 (September 20, 1994)).

As discussed above, EPA has the authority to establish MACT floors on a HAP group by HAP group basis and has done so in this case. In doing so, EPA will ensure that such floors, taken as a whole, are reasonably achievable for facilities subject to the MACT standards.

VI. Selection of Beyond-the-Floor Levels for Existing Sources

As discussed in Section V above, the MACT floor defines the minimum level of emission control for existing sources, regardless of cost or other considerations. The process of considering emissions levels more stringent than the MACT floor for existing sources is called a ''beyond-the-floor'' (BTF) analysis and involves consideration of certain additional factors, including cost, any non-air quality health and environmental impacts and energy requirements, technologies currently in use within these industry sectors, and also other more efficient and appropriate technologies that have been demonstrated and are available on the market (e.g., carbon bed for dioxin/furan control).

Because there are virtually unlimited BTF emissions levels that the Agency could consider, the Agency used several criteria in this proposal to identify when to examine a particular beyond-the-floor emissions level in detail, and also whether to propose a MACT standard based on the beyond-the-floor emissions levels for existing sources.

The primary factor is the cost-effectiveness of setting MACT standards based upon a more efficient technology than the MACT floor technology(ies). If the Agency's economic analysis suggested that BTF levels could be cost-effectively achieved (particularly if significant health benefits would result from a lower emission level), then an applicable BTF emission level control technology was identified to achieve that level. The associated costs were then weighed along with the other criteria. Dioxin/furans is an example where the Agency considered a BTF level because a beyond-the-floor emission level can be achieved in a cost-effective manner, achieving, in addition, significant non-air quality environmental benefits.

VII. Selection of MACT for New Sources

For new sources, the standards for a source category (or sub-category) cannot be less stringent than the emission control that is achieved in practice by the best-controlled similar source. See § 112(d)(3). The following discussion summarizes the methodology used by the Agency in developing today's proposed emissions standards for new HWC sources.

The approach used to identify MACT for new sources parallels in most ways the approach used to determine the MACT floor for existing sources. For each HAP, the Agency identified the technology associated with the single best performing source (for each source category). The Agency used this best performing technology then looked at all facilities operating the control technology, and determined the achievable emission levels that represent ‘‘the emission control that is achieved in practice by the best controlled similar source’’ by using the maximum value achieved by properly-operated technology (adjusted upwards by a statistically derived variability factor). For further details, see the technical background documents[13] supporting today's proposal.

Since MACT for new sources is to reflect optimized achievable performance and is not necessarily limited to performance levels currently achieved, the Agency also considered several other factors in selecting the MACT new emissions limit. These factors included: (1) Comparisons to other emissions standards which may indicate that a technology is demonstrated and its level of performance (e.g., proposed municipal waste combustors and medical waste incinerators regulations and the European Union waste incineration standards); and (2) test condition emissions variability.

As mentioned earlier, the Agency believes that it is appropriate to compare the proposed emissions standards for new sources to other existing or recently proposed standards applicable to hazardous waste combustors or similar devices as a type of ‘‘reality check’’ that we are developing the most rigorous emissions limits for new sources based upon the best technologies available today.

The extracted data and data plots are presented in the background document[14] located in the docket.

VIII. RCRA Decision Process

It is EPA's intention to eliminate duplicative or potentially duplicative regulation wherever possible. In this section, we discuss: (1) The RCRA mandate to ensure protection of human health and the environment and how that mandate relates to the CAA technology-based MACT standards; (2) how, for RCRA purposes, we evaluated the protectiveness of the proposed MACT standards; (3) how, for RCRA purposes, the Agency intends to continue its policies with respect to site-specific risk assessments and permitting so that, in appropriate situations, additional RCRA permit conditions can be developed as necessary to protect human health and the environment; and (4) how waste minimization opportunities may be considered at individual facilities during the permitting process.

A. RCRA and CAA Mandates To Protect Human Health and the Environment

The Agency is proposing emission standards for HWCs under joint authority of the Clean Air Act Amendments of 1990 and the Resource Conservation and Recovery Act (RCRA). As noted earlier, section 3004(a) of RCRA requires the Agency to promulgate standards for hazardous waste treatment, storage, and disposal facilities as necessary to protect human health and the environment. The standards for incinerators generally rest on this authority. In addition, § 3004(q) requires the Agency to promulgate standards as necessary to protect human health and the environment specifically for facilities that burn hazardous waste fuels (e.g., cement and light-weight aggregate kilns). Using RCRA authority, the Agency has historically established emission (and other) standards for HWCs that are either entirely risk-based (e.g., site-specific standards for metals under the BIF rule), or are technology-based but determined by a generic risk assessment to be protective (e.g., the DRE standard for incinerators and BIFs).

The MACT standards proposed today implement the technology-based regime of CAA § 112. There is, however, a residual risk component to air toxics standards. Section 112(f) of the Clean Air Act requires the Agency to impose, within eight years after promulgation of the technology-based standards promulgated under § 112(d) (i.e., the authority for today's proposed standards), additional controls if needed to protect public health with an ample margin of safety or to prevent adverse environmental effect. (Cost, energy, and other relevant factors must be considered in determining whether regulation is appropriate in the case of environmental effects.)

As noted earlier, EPA's express intent is to avoid regulatory duplication. RCRA § 1006 directs that EPA ‘‘integrate all provisions of [RCRA] for purposes of administration and enforcement and * * * avoid duplication, to the maximum extent possible, with the appropriate provisions of the Clean Air Act * * *.’’ The overall thrust of the proposed rule is to have the CAA standards supplant independent RCRA standards wherever possible (i.e., to have the CAA standards, wherever possible, also serve to satisfy the RCRA mandate so that additional RCRA regulation is unnecessary).

Under RCRA, EPA must promulgate standards ‘‘as may be necessary to protect human health and the environment.’’ RCRA § 3004(a) and (q). Technology-based standards developed under CAA § 112 do not automatically satisfy this requirement, but may do so in fact. See 59 FR at 29776 (June 6, 1994) and 60 FR at 32593 (June 23, 1995) (RCRA regulation of secondary lead smelter emissions unnecessary at this time given stringency of technology-based standard and pendency of § 112(f) determination). If the MACT standards, as a factual matter, are sufficiently protective to also satisfy the RCRA mandate, then no independent RCRA standards are required. Conversely, if MACT standards are inadequate, the RCRA authorities would have to be used to fill the gap.

It should be noted that this RCRA risk evaluation can inform the MACT decision process as well. For example, the RCRA risk evaluations indicate the potential for significant risk via indirect pathways from dioxins and furans originating in today's baseline air emissions for HWCs. EPA is explicitly authorized to consider non-air environmental impacts (such as exposure to HAPS which, after emission, enter into the food chain and are eventually consumed by humans and other biota) in determining whether to adopt standards more stringent than the MACT floor. Thus, EPA can consider benefits from curbing these

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[13] USEPA, ‘‘Draft Technical Support Document for HWC MACT Standards, Volume III: Selection of Proposed MACT Standards and Technologies’’, February 1996.

[14] USEPA, ‘‘Draft Technical Support Document for HWC MACT Standards, Volume III: Selection of Proposed MACT Standards and Technologies’’, February 1996.

indirect exposures as part of its beyond-the-floor determinations.

As discussed below, the Agency has conducted an evaluation, for the purposes of satisfying the RCRA statutory mandates, of the degree of protection afforded by the MACT standards being proposed today. However, the Agency's current RCRA evaluation is not intended to have any bearing on what we may or may not determine is necessary in several years to satisfy the § 112(f) provisions.

B. Evaluation of Protectiveness

To determine whether the MACT standards are consistent with the Agency's mandate under RCRA to establish standards for hazardous waste management facilities and to issue permits that are protective of human health and the environment, the Agency conducted two types of analyses to assess the extent to which potential risks from current hazardous waste combustion emissions would be reduced through implementation of MACT standards.

The first of these analyses was designed to assess the potential risks to individuals living near hazardous waste combustion facilities and to nearby aquatic ecosystems. The procedures used in this analysis are discussed in detail in the background document contained in the docket for today's proposal.[15] The results are summarized in Part Four of today's notice, ''Rationale for Selecting Proposed Standards''.

The second analysis of potential risk reduction was a more qualitative evaluation of risks at the national level for those two constituents (dioxins and mercury) which the Agency believes pose significant health risks at the national level and which are found at significant concentrations in hazardous waste combustor emissions. The results of this analysis are presented in Section Seven, ''Regulatory and Administrative Requirements'', as part of the discussion of potential costs and benefits required under Executive Order 12866.

1. Individual Risk Analysis

The Agency assessed potential risks to individuals from both direct inhalation of emissions (after dispersion in the ambient air) and indirect exposure to emissions through deposition onto soils and vegetation and subsequent uptake through the food chain. The analysis focussed primarily on dioxins and related compounds since these have been of major concern to the Agency from a risk perspective and because there is enough information about the properties of these constituents to allow for a quantitative analysis. The individual risk analysis did also include risks from inhalation of metals, hydrogen chloride, and chlorine (Cl_2).

The Agency conducted an evaluation of risks from metals through indirect exposure routes. With the exception of mercury, most of the metals are not expected to accumulate significantly in the food chain, and the risks from other indirect exposure routes (such as deposition on soil and incidental ingestion of the soil) are not projected to be significant, even with conservative assumptions.

With respect to mercury, the Agency suspects that there may be significant individual risks near hazardous waste combustion facilities, primarily through deposition, erosion to surface waters, and accumulation in fish which are then consumed. However, the current state of knowledge concerning the behavior of mercury in the environment does not allow for a meaningful quantitative risk assessment of emission sources which is precise enough to support regulatory decisions at the national level. Specifically, there is insufficient information with respect to speciation of the mercury into various forms in emissions and with respect to the deposition and cycling of mercury species in the environment to conduct a defensible national quantitative assessment of mercury deposition, erosion to surface waters, and bioaccumulation in fish. The Agency solicits comment and information on the issue of the risks posed by mercury emissions from hazardous waste combustion facilities.

The Agency also considered potential risks from emissions of non-dioxin semi-volatile organics that are products of incomplete combustion (PICs). However, the Agency was not able to conduct an appropriate analysis for several reasons. First, the limited emissions data now available to the Agency on non-dioxin PICs are not sufficiently reliable to conduct an adequate assessment of risk. Second, there is not a universally accepted set of parameter values for some non-dioxin PICs with which to assess potential exposures (e.g., the use of octanol-water partition coefficients (Kow) to predict bioaccumulation versus the use of empirical data and the extent to which bioaccumulation of compounds such as phthalates and polycyclic aromatic hydrocarbons (PAHs) occurs in domestic animals). The Agency solicits comment on these issues and, in particular, requests data on bioaccumulation of PAHs, phthalates, and other non-dioxin PICs in farm animals used for food production and in other mammals and birds. The Agency also intends to obtain a better set of data relating to the non-dioxin PIC emissions from hazardous waste combustion facilities.

2. Individual Risks From Dioxins

In order to evaluate potential risks from dioxins to individuals living near hazardous waste combustion facilities, the Agency selected eleven example facility locations, consisting of areas in which five actual cement kilns, four incinerators, and two lightweight aggregate kilns are located. The example facility locations represent a variety of environmental settings and facility characteristics. The purpose of using example facilities was to incorporate as much realism as possible into the Agency's risk assessment and to reduce the reliance on hypothetical, conservative assumptions about either location or source type characteristics. Site-specific characteristics considered in the analysis include meteorological conditions, topography, and land use as well as stack height and gas flow rates. However, the stack gas concentrations used in the modeling of the example facilities were derived from national emissions data. Therefore, while the example facility analyses are useful for providing information to evaluate national standards on a generic basis, they are not site-specific assessments of any individual facility and cannot be regarded as such.

The Agency has identified a number of indirect exposure pathways which are most likely to present significant risks. These include: consumption of locally-produced meat, eggs, and dairy products and consumption of fish from local waterways. Contamination of food occurs from deposition of toxic emissions onto plants and soil with subsequent ingestion by farm animals or, in the case of fish contamination, from deposition directly into water bodies or onto soil and runoff into surface waters with subsequent uptake in fish.

In assessing risks to the more highly exposed individuals, the Agency assumed that certain segments of the population subsisted in part on home-produced foods or fish obtained from nearby lakes or streams. In addition, the Agency assumed that these individuals were exposed in the farming and fishing areas most affected by the example facilities' emissions. In its analysis of the eleven example facilities, the

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[15] ''Risk Assessment Support to the Development of Technical Standards for Emissions from Combustion Units Burning Hazardous Wastes: Background Information Document,'' February 20, 1996.

Agency attempted to identify the actual location of farms and water bodies where subsistence activities might be expected to occur. For dioxins, the highest exposures are expected to occur for individuals whose diets include significant amounts of home-produced meat and eggs or locally caught fish. Individuals likely to have high exposures include subsistence farmers that raise beef cattle, dairy cows, or chickens along with their families as well as subsistence fishers and recreational anglers and their families.

In evaluating individual risks, the Agency projected both ''high end'' and ''central tendency'' estimates of risks to the individuals of concern in the analysis. The central tendency estimates were derived by setting all emission rates, fate and transport parameters, and exposure assumptions at central tendency values, as described in the risk assessment background document. To derive high end risk estimates, the Agency set the emission levels at the 90th percentile of the distribution of available dioxin concentrations and, for most exposure scenarios, set one exposure parameter to a high end value while keeping all other parameters at central tendency values. For purposes of evaluating the protectiveness of the standards, the Agency used a target risk level of 10–5 for the high end individual risk, which is consistent with the approach taken in the 1991 BIF rule.

3. Uncertainties in the Individual Dioxin Risk Estimates

Much of the information used to derive the individual risk estimates for dioxins was taken from the Agency's draft Dioxin Reassessment documents[16] [17] [18]. Those documents discuss in considerable detail a number of the uncertainties associated with both the cancer slope factor (the dose-response descriptor) and the many parameters used in the exposure assessment. Some of these uncertainties are also discussed in the risk assessment background document for today's proposal.

In addition, there have been a large number of public comments on the Dioxin Reassessment, which the Agency is now considering. If the Agency decides to revise its assessment of either the toxicity or exposure associated with dioxins prior to the final promulgation of this rule, those revisions will be considered in the development of the final rule.

The Agency is also conducting an external peer review of its risk analysis supporting today's proposal. The results of this peer review, which are expected during the comment period, will be available in the public record for this rule and will be considered in developing the final rule.

4. Qualitative Assessments of National Risks

While the individual risk assessment discussed above provides a quantitative measure of the protectiveness of the proposed MACT standard, there are other ways of evaluating potential impacts of reducing emissions of hazardous constituents. One approach taken by the Agency is to describe to the extent practicable what is known about the national extent of risks from constituents such as dioxins and mercury. To put that information in context with respect to this rule, the relative contribution of hazardous waste combustion to other known air releases of these constituents to the environment is then presented. The Agency recognizes that it is not appropriate to quantitatively correlate emissions with risk on a national scale; nevertheless, this type of information is useful for qualitatively evaluating the potential impact of the proposed MACT rule.

C. Use of Site-Specific Risk Assessments Under RCRA

As part of the Agency's Hazardous Waste Minimization and Combustion Strategy, EPA currently has a national RCRA policy of strongly recommending to all federal and state RCRA permit writers that, under the omnibus permit provisions of RCRA § 3005(c)(3), site-specific risk assessments be performed as part of the RCRA permitting process if necessary to protect human health and the environment. Regions and authorized states have been implementing this national policy since mid-1993 under the aegis of the omnibus and other applicable authorities.

The Combustion Strategy announced this policy encouraging site-specific risk assessments as part of the overall effort to ensure that, under appropriate legal authorities, all RCRA combustion permits being issued are sufficiently protective. Specifically, these site-specific risk assessments were intended to address potential concerns about a suite of hazardous air pollutants, among them dioxins, furans, metals, and non-dioxin PICs, during the time it took for the Agency to upgrade the technical standards for hazardous waste incinerators, boilers, and industrial furnaces. This proposal is the first rulemaking that the Agency has issued in the upgrading effort.

The question has arisen as to the status of the Agency's current policy with respect to site-specific risk assessments, particularly with respect to the HAPs for which standards are being proposed today as well as for other non-dioxin PICs. As noted above, the Agency has conducted a risk evaluation under RCRA of the degree of protection afforded by the proposed MACT standards for the HAPs addressed in today's rule. However, with respect to mercury and non-dioxin PICs, the Agency does not at this time have sufficient reliable data to be able to assess, on a national basis, the magnitude of the risks that can routinely be expected from burning hazardous waste in HWCs. Although the Agency has plans to obtain extensive and detailed PIC emissions data from hazardous waste combustors in the coming months, it may be some time before the Agency is in a proper position to make any type of regulatory and policy judgment about the need, if any, for additional national standards for these toxic organics. Indeed, at several sites, the levels of some non-dioxin PICs have not previously been shown to be of concern, at least to the extent that site-specific testing revealed their presence and to the extent evaluated in site-specific risk assessments.

The Agency is continuing its policy of recommending that, if necessary to protect human health and the environment, site-specific risk assessments be conducted as part of RCRA permitting for all hazardous waste combustors (incinerators, boilers, and industrial furnaces alike) until national standards for HAPs of concern are in place. We expect that, in most situations prior to actual implementation of facility measures to appropriately control the HAPs addressed in this rule, the EPA regional and authorized state permitting officials will find there is a necessity to conduct site-specific risk assessments prior to final permit determinations. We also note that the remaining uncertainties about the risks from non-dioxin PICs and mercury would likely bear upon implementation of the national policy. However, small on-site facilities are not likely to present the same level of potential risk as other facilities. This industry segment may not warrant site specific risk assessments with the same frequency as the large on-site or

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[16] ''Health Assessment Document for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds Volume I and II'', Office of Research and Development, June 1994.

[17] ''Health Assessment Document for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds Volume III'', Office of Research and Development, August 1994.

[18] ''Estimating Exposure to Dioxin-Like Compounds Volume I, II, and III'', Office of Research and Development, June 1994.

commercial facilities. Among the factors that the regions and states should consider in their evaluation of the necessity for a site-specific risk assessment are: (1) The current level of HAPs being emitted by a facility, particularly in comparison to the MACT standards being proposed and in comparison to the emissions assumptions and exposure scenarios used in the RCRA risk evaluation of the proposed MACT standards (detailed in the Background Document); (2) whether the facility is exceeding the proposed HAP standards, particularly for dioxins/furans and mercury, what immediate measures could be instituted to reduce those emissions; (3) the scope of waste minimization efforts at the facility with respect to the HAPs of concern and the status of implementation of any facility waste minimization plan; (4) particular site-specific considerations such as proximity to receptors, unique dispersion patterns, etc.; (5) the PICs most likely to be found and those most likely to pose significant risk; (6) the presence or absence of other sources of HAPs in sufficient proximity as to exert a significant influence on interpretation of a facility-specific risk assessment; (7) the presence or absence of significant ecological considerations, including for example high background levels of a particular contaminant or proximity of a particularly sensitive ecological area; and (8) the volume and types of wastes being burned. This list is by no means exhaustive, but is meant only to suggest significant factors that have thus far been identified. Others may be equally or more important.

Continuation of the site-specific risk assessment policy rests primarily on the RCRA requirement to ensure that all permits are protective of human health and the environment. Until the Agency is in a position to determine, on a national basis, whether additional standards are needed to address toxic emissions, we anticipate this policy will remain in effect. EPA's intention is to make that determination, if sufficient data is in hand, by the time of the final rule, now scheduled for issuance in December 1996. In that respect, we emphasize the importance of the submission of detailed data on non-dioxin PICs from commenters.

In the meantime, the omnibus provision in § 3005(c)(3) provides the regions and authorized states with the proper site-by-site authority to ensure that these risk assessments are completed as part of the permitting process. Other RCRA statutory and regulatory provisions may apply as well. Furthermore, we encourage individual facilities to work with their local communities in designing these risk assessments and in carrying out the testing and analysis, so that the confidence of local communities is maximized.

In addition, EPA strongly urges companies to explore waste minimization opportunities as a means to reduce risks from combustion emissions, particularly with respect to the HAPs of concern. Nearly every state provides free pollution prevention/waste minimization technical assistance. Further information on how to obtain this assistance can be furnished by state permitting agencies or by contacting the National Pollution Prevention Roundtable at (202) 466–7272. Other sources of information include Enviro$ense, an electronic library on pollution prevention, technical assistance, and environmental compliance. Access is via a system operator (703) 908–2007, via modem at (703) 908–2092, or via Internet at http://wastenot.inel.gov/enviro-sense.

PART FOUR: RATIONALE FOR SELECTING THE PROPOSED STANDARDS

This part describes the Agency's rationale for today's proposed standards and other options under consideration.

I. Selection of Source Categories and Pollutants

A. Selection of Sources and Source Categories

The Agency is proposing emissions standards for three source categories: hazardous waste incinerators, hazardous waste-burning cement kilns, and hazardous waste-burning lightweight aggregate kilns. The Agency is not proposing to regulate emissions from CKs (in this notice) or LWAKs that do not burn hazardous waste.

In this section, we discuss the Agency's analysis of subdividing incinerators by size (i.e., small and large sources) and subdividing cement kilns by process type (i.e., wet and dry). We also discuss the scope of the MACT standards for cement kilns, and the existing RCRA standards that control emissions of HAPs from equipment leaks and tanks which are used to manage hazardous waste.

1. Consideration of Subdividing Incinerators by Size

Section 112(d) allows the Administrator to distinguish among classes, types, and sizes of sources within a source category in establishing MACT floor levels. Given that the size of incinerators, as measured by gas flow rate in actual cubic feet per minute (acfm), varies substantially (i.e., from 1,000 acfm to 180,000 acfm), the Agency considered subdividing incinerators by size.

The basis for distinguishing between small and large incinerators as well as the preliminary estimates of the resultant floor levels for each category are presented in the docket and summarized below. The Agency is not proposing separate standards (at the floor)[19] for incinerators because: (1) the types and concentrations of uncontrolled HAP emissions are similar for large and small incinerators; (2) the same types of emission control devices are applicable to both small and large incinerators; and (3) the floor levels would be generally unchanged[20] (several floor levels would decrease somewhat), with the exception that the LVM standard for large incinerators would increase by more than a factor of four. We believe that the higher LVM floor level for large incinerators would not be appropriate given that approximately 80 percent of incinerators already are meeting the LVM floor without subdividing.

The Agency invites comment on its determination that subdividing incinerators by size would not be warranted. We also invite comment on whether subdividing incinerators by other classifications (e.g., commercial versus on-site units) would be appropriate for establishing MACT floor levels. Commenters should provide data and information on, in particular: (1) how the types and concentrations of uncontrolled HAP emissions are different for the suggested categorization of sources; (2) whether and why MACT emission control technology would not be applicable to a category of sources; and (3) other appropriate factors.

To investigate the effect on MACT floor levels of subdividing incinerators by size, the Agency identified a gas flow rate of 23,127 acfm as a reasonable and appropriate demarcation between small and large incinerators. This value was determined using a slope analysis approach whereby gas flow rates for each source (for which the Agency had data) were plotted in ascending order. The Agency chose the point at which the slope markedly changed as the point of demarcation between small and large incinerators. Approximately 57 percent of incinerators for which we have gas flow rate data would be classified as small using this approach.

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[19] Note that we discuss in Part Four, Section III in the text whether beyond-the-floor standards for D/F, Hg, and PM (as currently proposed for all incinerators) are appropriate for small incinerators.

[20] And therefore, a level of complexity would be added to the rule without substantial benefit.

Projected MACT floor levels for small and large incinerators are compared to floor levels for combined incinerators (i.e., without subdividing) in the table below:

	Small incinerators	Large incinerators	Floor levels for all incinerators combined
	Floor level	Floor level	
D/F (ng/dscm)	0.2 TEQ or <400 °F	0.2 TEQ or <400 °F	0.2 TEQ or <400 °F.
PM (mg/dscm)	180	180	180
Hg (µg/dscm)	110	130	130
SVM (µg/dscm)	230	270	270
LVM (µg/dscm)	160	880	210
$HCl + Cl_2$ (ppmv)	280	260	280
CO (ppmv)	100	100	100
HC (ppmv)	12	12	12

2. Consideration of Subdividing Cement Kilns by Manufacturing Process

The Agency also considered whether to subdivide the cement kiln source category into wet and dry process kilns given that these types of kilns are designed and operated differently. (See discussion in Part Two, Section II.) MACT floor levels for wet and dry kilns are compared to floor levels for combined cement kilns (i.e., without subdividing) in the table below:

Pollutant	Wet process kilns	Dry process kilns	Floor levels for all kilns combined
	Floor level	Floor level	
D/F (ng/dscm)	0.2 TEQ or 418 °F	0.2 TEQ or 547 °F	0.2 TEQ or 418 °F.
PM (mg/dscm)	69	69	69
Hg (µg/dscm)	83	150	130
SVM (µg/dscm)	870	57	57
LVM (µg/dscm)	220	49	130
$HCl + Cl_2$ (ppmv)	460	340	640

Subdividing cement kilns by process type would result in a mix of impacts with varying degrees of significance. For wet kilns, the main impact would be an increase in the SVM floor from 57 to 870 µg/dscm. The mercury floor, on the other hand, would drop from 130 to 83 µg/dscm. The remainder of the floors would remain roughly the same. For dry cement kilns, the main impact would be that the LVM floor drops from 130 to 49 µg/dscm. The dioxin/furan floor would change by allowing a higher APCD temperature—547 °F rather than 418 °F.

The Agency is not proposing separate standards for wet and dry process kilns because: (1) The types and concentrations of uncontrolled HAP emissions are similar for both types of kilns; (2) the same types of emission control devices are applicable to both types of kilns; (3) for dry process kilns, the LVM floor level would drop to an extremely low level that may be difficult for many kilns to achieve because of the presence of these metals in raw materials; and (4) for wet kilns, the SVM floor would increase to 870 µg/dscm, a level much higher than the industry can achieve.[21] There may also be other factors that should be considered, and the Agency invites comment on those in addition to the factors noted above.

We note that the cement industry has asserted that it is not feasible to use a FF on wet kilns in cold climates because the ‘‘high moisture content of the gas will clog the fabric with cement-like dust and ice.’’[22] This is not consistent with the Agency’s understanding. Although wet kilns located in cold climates that operate at low flue gas temperatures (e.g., 350–400 °F) in order to minimize formation of D/F and improve performance of activated carbon injection systems may be required to improve insulation or take other measures to minimize cold spots in the baghouse to limit corrosion, we believe that appropriate measures can be readily taken. The Agency is aware of two wet kilns that currently operate fabric filters in cold climates (Thomaston, Maine, and Dundee, Michigan) at flue gas temperatures below 400 °F.[23] In addition, a wet kiln burning hazardous waste in Paulding, Ohio, is currently upgrading its PM control system to replace an ESP with a FF.

The Agency invites comment on the appropriate criteria to be used and upon its determination that subdividing cement kilns by process type is not warranted. Commenters should provide data and information on, in particular: (1) Whether the types and concentrations of uncontrolled HAP emissions are different for wet and dry kilns; (2) whether and why MACT emission control technology(ies) would not be applicable to a wet or dry kiln; and (3) other appropriate factors.

3. Scope of the MACT Standards for Cement Kilns

The proposed NESHAP for cement kilns addresses only exhaust combustion gas emissions from main stack(s), bypass stack(s), and fugitive combustion emissions (e.g., leaks from kiln seals). The cement kiln standards would not apply to process or fugitive emissions that are not affected

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[21] See letter from Craig Campbell, CKRC, to James Berlow, USEPA, undated but received February 20, 1996. We note that, although the Agency is proposing a SVM standard of 57 µg/dscm, we invite comment on an alternative (and potentially preferable) approach to identify MACT floor technology which would result in a floor-based standard of 160 µg/dscm. See Part Four, Section IV in the text. Because we identified the alternative approach late in the rule development process, we are inviting comment on the higher standard rather than proposing it.

[22] See letter from Micheal O’Bannon, EOP Group, to Elliot Laws, USEPA, dated February 14, 1996, p. 3 of Attachment.

[23] See USEPA, ‘‘Draft Technical Support Document For HWC MACT Standards, Volume III: Selection of Proposed MACT Standards and Technologies’’, February, 1996, for further information.

by burning hazardous waste (such as emissions from raw material processing or clinker cooler emissions).[24]

4. Current RCRA Controls on Equipment Leaks and Tanks

We note that the Agency has promulgated air emission standards regulating fugitive emissions from equipment leaks (e.g., pumps, compressors, valves) and tanks which are used to manage hazardous waste. Accordingly, these devices are not addressed by today's proposal. (Tanks and equipment leaks from HW management activities at HWCs are regulated under RCRA standards. See, e.g., 40 CFR Parts 264 and 265, Subparts AA, BB, and CC. These controls are expected to be consistent with MACT and are not being reevaluated here.)

B. Selection of Pollutants

As noted earlier, section 112(b) of the Clean Air Act contains a list of 189 hazardous air pollutants for which the Administrator must promulgate regulations establishing emissions standards for designated major and area sources. The list of 189 HAPs is comprised of metallic, organic, and inorganic compounds.

Hazardous waste incinerators and hazardous waste-burning cement kilns and LWAKs emit many of the listed HAPs. Data available to the Agency indicate that metal HAP emissions include antimony, arsenic, beryllium, cadmium, chromium, lead, mercury, nickel, and selenium compounds. Organic HAPs emitted include chlorinated dioxin and furan, benzene, carbon disulfide, chloroform, chloromethane, hexachlorobenzene, methylene chloride, naphthalene, phenol, toluene, and xylene. Hydrochloric acid and chlorine gas are prevalent inorganic compounds found in stack emissions because of high chlorine content of many hazardous wastes.

Today, the Agency is proposing eight emissions standards for individual HAPs, group of HAPs, or HAP surrogates. These emission standards cover dioxin/furan, mercury, particulate matter, semivolatile HAP metals (lead and cadmium), low-volatile HAP metals (antimony, arsenic, beryllium, and chromium), carbon monoxide, hydrocarbons, and total chlorides. The following discussion presents the Agency's rationale for proposing NESHAPs for these individual HAPs, group of HAPs, or HAP surrogates.

1. Toxic Metals

In developing today's proposed rule, the Agency considered 14 toxic metals that may pose a hazard to human health and the environment when they are components of emissions from hazardous waste combustion sources. Section 112(b) of the Act contains a list of 11 metal HAPs: antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, and selenium. The list of hazardous constituents under RCRA[25] specifies three additional metals: barium, silver, and thallium. Five of these metals (or their compounds) are known or suspected carcinogens: arsenic, beryllium, cadmium, hexavalent chromium, and nickel.

To develop an implementable approach for controlling the metal HAP emission levels, the Agency grouped metal HAPs by their relative volatility and is proposing an emissions limit for the each volatility group (i.e., the sum of emissions from the metals in the group cannot exceed the limit). We selected the following three groups: (1) A high-volatile group comprised of only mercury, (2) a semivolatile group comprised of lead and cadmium, and (3) a low-volatile group consisting of antimony, arsenic, beryllium, and chromium. The Agency's proposal not to include the remaining seven toxic metals in these volatility groupings is discussed later in this section.

Our data indicate that mercury is generally in the vapor form in and downstream of the combustion chamber, including at the air pollution control device (APCD). Thus, the level of emissions is a function of the feedrate of mercury and the use of APCDs that can control Hg in the vapor form (e.g., carbon injection, wet scrubbers for some control of soluble HgCl). The semivolatile group metals typically vaporize at combustion temperatures, then condense onto fine particulate before entering the APCD. Thus, emissions of semivolatile metals are a function not only of the feedrate of the metal, but also of the efficiency of the particulate matter (PM) control device. Low-volatile metals are less apt to vaporize at combustion temperatures and therefore partition primarily to the bottom ash, residue, or clinker (in the case of cement kilns) or adsorb onto large, easy-to-control particles in the combustion gas. Thus, low-volatile metal emissions are more strongly related to the operation of the PM APCD than to the feedrate.[26]

We note that the dynamics associated with the fate of metals in a combustion device are much more complex than presented here. Numerous factors impact metals' behavior such as the presence of chlorine (higher metal volatility associated with metal chlorides than metal oxides), combustion conditions within the device (e.g., temperature profile), inter-metal relationships, physical and chemical form the metal exhibits when introduced to the device (e.g., valence state and solid versus liquid), type and efficiency of the particulate control device, and differences in the design and operation of sources (e.g., cement kiln dust recycling rate). See the technical background document supporting today's proposal for more details.[27]

Setting an emission level for a number of grouped metals has several advantages and disadvantages. One advantage is that fewer individual standards are involved, which helps implementability. Moreover, grouping allows a facility more flexibility in complying with an emissions standard based on facility-specific characteristics (e.g., special characteristic waste streams) and operation requirements (e.g., reduced spiking of numerous metals). On the other hand, a disadvantage of a group emission limit is that it potentially allows higher emissions of the more toxic metals within a group (than if an individual metal limit were established).[28]

The Agency is proposing not to regulate directly emissions of the remaining four metal HAPs (i.e., cobalt, manganese, nickel, and selenium).[29] The

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[24] Today's proposal applies only to those kilns that burn or process hazardous waste irrespective of the purpose of burning or processing. The term ''burn'' means burning for energy recovery or destruction, or processing as an ingredient. The Agency is developing a NESHAP for cement kilns that do not process hazardous waste in a separate rulemaking. That NESHAP will also regulate those hazardous waste-burning cement kiln process and fugitive emissions that would not be subject to today's rule (i.e., emission sources other than the main or by-pass stack).

[25] The list of hazardous constituents is contained in appendix VIII of Part 261. Cobalt and manganese are not hazardous constituents.

[26] Although, at a given PM emission rate at a source, emissions of LMV will be affected by LVM feedrate.

[27] USEPA, ''Draft Technical Support Document for HWC MACT Standards, Volume VII: Miscellaneous Technical Issues'', February 1996.

[28] We note that, for the risk assessment used to determine if RCRA concerns would be adequately addressed by the proposed MACT standards, we assumed that each metal in a volatility was emitted in turn at the emission limit for that volatility group.

[29] The Agency acknowledges that three metals (barium, silver and thallium), currently regulated by the BIF rule, would not be regulated under this MACT proposal. EPA notes that these three metals are not HAPs. The Agency believes that the combination of the proposed particulate and metals standards would adequately control emissions of these three metals.

Agency's rationale is based upon a combination of factors: (1) Inadequate emissions data for Co, Mg, Ni, and Se; and (2) relatively low toxicity of Co and Mn. The Agency specifically requests comment on whether these four metals would be adequately controlled under the MACT standards that would be provided by today's proposal.

The Agency is aware of two other approaches to group toxic metals. First, the European Union has established three groupings to control metal emissions from hazardous waste incineration units. One ''group'' includes only mercury, a second group consists of cadmium and thallium, and the third group includes antimony, arsenic, chromium, cobalt, copper, lead, manganese, nickel, tin, and vanadium. Section VII of this Part summarizes the European Union emission standards.

A rulemaking petition [30] submitted to the Agency by the Cement Kiln Recycling Coalition (CKRC) contained a report [31] (appendix D of the petition) prepared by a technical advisory board to the CKRC. Their analysis of stack emissions and cement kiln dust data suggests three volatility groupings based on metal volatility demonstrated in cement kilns. The groupings are: (1) Volatile metals including mercury and thallium; (2) semivolatile metals consisting of antimony, cadmium, lead, and selenium; and (3) low-volatile metals comprising barium, beryllium, chromium, arsenic, nickel, manganese, and silver. See the technical background document for further discussion on grouping metals by volatility.[32] The Agency requests comments on the appropriateness of grouping metals by volatility and requests supporting information and data on the appropriate composition of metal volatility groups (i.e., for the metals discussed above).

2. Toxic Organic Compounds

Burning hazardous waste that contains toxic organic compounds under poor combustion conditions can result in substantial emissions of HAPs originally present in the waste as well as other compounds, due to the partial but incomplete combustion of the constituents in the waste (known as products of incomplete combustion, or PICs). PICs can be unburned organic compounds that were present in the waste, thermal decomposition products resulting from organic constituents in the waste, or compounds synthesized during or immediately after combustion. The quantity of toxic organic compounds emitted depends on such factors as the combustion conditions under which the waste is burned (including time, temperature, and turbulence), the concentrations of the toxic compounds in the waste, and the waste firing rate.

Since the majority of the 189 enumerated HAPs are organics, the Agency has concluded (for today's proposal) that establishing individual emission limits for each of the organic HAP compounds emitted from these combustion sources would be impractical and not implementable. Measuring each compound would be very costly and would pose unreasonable compliance and monitoring burden on the regulated community while achieving little, if any, emission reduction from the approach presented in today's proposal. In addition, EPA and state compliance oversight and enforcement efforts would also be unreasonably costly without concurrent benefits. Also, the Agency does not have adequate emissions data to support development of individual organic emission limits [33] at this time. Therefore, the Agency is proposing a multi-faceted approach to control the toxic organic HAPs to be addressed under § 112: (1) Emissions limits for dioxin and furan on a toxicity equivalents (TEQ) basis; (2) limits on flue gas concentrations of hydrocarbons (HC) as a HAP surrogate; (3) limits on flue gas concentrations of carbon monoxide (CO) also as a HAP surrogate; and (4) emission limits for particulate matter (PM) to control adsorbed semivolatile organic HAPs (see separate discussion on PM below).

First, given the high toxicity of some dioxin and furan congeners and the fact that standards ensuring good operating conditions alone (i.e., temperature at the inlet of the APCD) will not always control emissions of dioxin/furans (D/F), the Agency has determined that proposing an emission standard specifically for D/F is a necessary component to the multi-faceted approach for toxic organics emissions control. The D/F standard proposed today is based on TEQ (Toxicity Equivalents).[34] TEQ is a method for assessing the risks associated with exposures to complex mixtures of chlorinated dibenzo-p-dioxin and dibenzofurans (CDDs and CDFs). The method relates the toxicity of the 209 structurally related chemical pollutants to the toxicity of 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD).

Second, the Agency is proposing to use carbon monoxide (CO) and hydrocarbons (HC) as surrogates to control emissions of non-D/F organic HAPs. We note that limiting CO and HC emissions to levels ensuring good combustion conditions would also help minimize D/F precursors. CO and HC emissions are both recognized indicators of combustion intensity and completeness. Low CO flue gas levels are indicative of a combustion device operating at high combustion efficiency (56 FR at 7149–54). Operating at high combustion efficiency helps ensure minimum emissions of unburned (or incompletely burned) organics. However, limiting CO may not by itself absolutely minimize PIC emissions. This is because PICs can result from small pockets within the combustion zone where adequate time, temperature, turbulence, and oxygen have not been provided to completely oxidize these organics.[35] As combustion becomes less efficient or less complete, at some point, the emissions of total organics (measured as HC) will increase. A

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[30] CKRC's rulemaking petition proposes to establish new technology-based combustion emissions standards and was submitted to EPA on January 18, 1994. CKRC's petition consists of four basic components. First, the stringency of current BIF Rule toxic metal limits should be increased by factors of 5 to 10 and applied to all combustion devices (i.e., both BIFs and incinerators). Second, new regulatory efforts for dioxin/furan standards should focus on a toxic equivalency approach (TEQ) rather than on a total congener approach. Third, the implementation of the new metals and dioxin/furan standards should be applied uniformly to all types of hazardous waste combustors (HWCs) and imposed at the same time. Finally, EPA should conduct a rulemaking on indirect exposure risk assessments before requiring their use. CKRC's petition has been placed in the docket supporting today's proposal.

[31] ''Scientific Advisory Board on Cement Kiln Recycling (Process Technology Workgroup), Evaluation of the Origin, Emissions and Control of Organic and Metal Compounds From Cement Kilns Co-Fired With Hazardous Wastes,'' June 8, 1993.

[32] USEPA, ''Draft Technical Support Document for HWC MACT Standards, Volume VII: Miscellaneous Technical Issues,'' February 1996.

[33] The number of organic HAPs measured at each facility varies widely with some facilities reporting measurements for a large number of HAPs while other facilities measuring only a few HAPs.

[34] The TEQ approach used for today's proposal is the I–TEQ/89 approach defined in 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. For a discussion of establishing D/F limits based on TEQ versus total congeners, see USEPA, ''Combustion Emissions Technical Resource Document (CETRED),'' May 1994, pp. 4–21.

[35] We note that there are emissions data indicating that even though CO levels are below 100 ppmv, HC emissions can exceed 5 ppmv (measured as propane with a heated sampling system), the upper HC level that is generally representative of operating under good combustion conditions. See 56 FR 7154, note 26 (February 21, 1991), and Energy and Environmental Research Corporation, ''Surrogate Evaluation of Thermal Treatment Systems,'' Draft Report dated October 17, 1994, Figure 2–1.

portion of the HC emission is comprised of organic HAPs. Thus, CO levels provide an indication of the potential for organic HAP emissions and CO limits are therefore proposed as a measure to help prevent these emissions. HC limits are proposed to document actual emissions of organic HAPs.[36]

Notwithstanding today's proposal to establish MACT standards for both CO and HC emissions for HWIs and LWAKs (CKs would be required to comply with either a CO or HC standard for technical reasons discussed in Section IV below), the Agency invites comment on whether standards for both CO and HC (coupled with the D/F and PM standards to also control organic HAPs) are unnecessarily redundant. Commenters should provide data and information on how either CO or HC alone (but in conjunction with D/F and PM standards) would ensure proper control of organic HAPs. In particular, commenters should address the fact that the Agency's database indicates that HC levels can exceed good combustion condition levels when CO levels are below 100 ppmv (thus suggesting that controls on both CO and HC are needed). In addition, commenters should address how the MACT standards proposed today for HC would or could ensure that sources operate under good combustion conditions and thus minimize emissions of organic HAPs.

If based on review of comments and further analysis the Agency determines that standards for both CO and HC are not warranted, we would consider, among other potential options, the following alternative regulatory approaches: (1) Give each source the option of complying with either the CO or HC standard (as proposed today for technical reasons for by-pass duct gas for cement kilns); or (2) establish a national standard for either CO or HC, but not both (the Agency would determine which parameter is more appropriate and establish a standard for that parameter). The Agency invites comment on these alternative regulatory approaches or others that would ensure proper control of organic HAP emissions.

3. Hydrochloric Acid (HCl) and Chlorine (Cl_2)

Both hydrochloric acid and chlorine are designated HAPs that are present in HWC emissions. However, the test method used to determine HCl and Cl_2 emissions (BIF methods 0050, 0051, and 9057, commonly referred to as ''Method 26A'')[37] may not be able to distinguish between HCl and Cl_2 in all situations.[38] Therefore, EPA proposes combining the two HAPs into a single HCl and Cl_2 standard. We believe this is appropriate because emissions of both of these HAPs can be controlled by limiting feedrate of chlorine in hazardous waste and wet scrubbing.[39]

4. Particulate Matter (PM)

EPA is proposing to use particulate matter (PM) as a surrogate for non-D/F organic HAPs (that are adsorbed onto the PM) and for the metal HAPs which are not specified in the metals standards (i.e., Co, Mn, Ni, and Se).[40] More than 40 semivolatile organic HAPs can be adsorbed onto PM and can, thus, be controlled by a MACT standard for PM.[41] The metal HAPs that are not directly controlled by the MACT standards for metals can also be controlled (at least partially) by a PM standard. The low volatility metals are likely to be entrained in larger particulates and the semivolatile metals are likely to be condensed onto small particulates.

The Agency notes that we are proposing to use PM also as a compliance parameter to ensure compliance with the SVM, LVM, and D/F standards. As discussed in Part V, Section II, of the preamble, a site-specific PM operating limit would be established as a surrogate for the PM control device collection efficiency. Given that we are also proposing a PM MACT emission standard, the site-specific operating limit for PM could not exceed the PM standard.

C. Applicability of the Standards Under Special Circumstances

In this section, we discuss the applicability of the proposed MACT standards under the following circumstances: (1) When a regulated metal or chlorine is not present in the hazardous waste at detectable levels; (2) when the source temporarily ceases hazardous waste burning; and (3) when the source terminates hazardous waste burning.

1. Nondetect Levels of Metals or Chlorine in All Feedstreams

If no feedstreams to a HWC (e.g., on-site incinerator) contain detectable levels of Hg, SVM, LVM, or chlorine, the source would not be subject to the emission standard associated with the metal or chlorine (e.g., if no feedstreams contain detectable levels of chlorine, the HCl/Cl_2 standard would be waived). In addition, performance testing, monitoring, notification, and recordkeeping requirements ancillary to the waived standard would also be waived. We believe that this waiver is appropriate because the source would be incompliance with the emission standard by default if it was not feeding the metal or chlorine.

To be eligible for the waiver, the source must develop and implement a feedstream sampling and analysis plan to document that no feedstream contains detectable levels of the metal or chlorine (for which a waiver is claimed).

The Agency invites comment on whether it is necessary to specify minimum detection levels (or to take other measures) to ensure that appropriate analytical procedures are used to document levels of metal or chlorine in feedstreams.

2. Nondetect Levels of Metals or Chlorine in the Hazardous Waste Feed

The proposed MACT standards for mercury, SVM, LVM, or chlorine would apply even if these constituents are not present at detectable levels in the

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[36] We note that virtually all HWCs are already equipped with a CO monitor because of RCRA requirements. In addition, several incinerators, cement kilns and lightweight aggregate kilns are also equipped with a HC monitor because of RCRA or state requirements or voluntary initiative.

[37] We note that owners and operators of cement kilns have argued that this method provides measurements that are biased high because metallic salts penetrate the filter and the chloride is incorrectly reported as HCl. EPA has considered this concern and continues to believe that metallic salts do not significantly bias the results. Nonetheless, we invite comment on this issue. If, in fact, metallic salts can bias the results, we invite comment particularly on how or whether the proposed MACT standards could be adjusted given the inflated emissions database, and how compliance with an adjusted standard could be demonstrated.

[38] In the presence of other halogens (e.g., fluorine and bromine) that are often constituents of hazardous waste, fossil fuels or kiln raw materials, EPA is concerned that reactions can occur in the impinger solutions used by the stack sampling method that cause a portion of the Cl_2 to be reported as HCl. Thus, the HCl levels could be biased high, and the Cl_2 levels could be biased low. Nonetheless, the method does continue to give an accurate determination of combined HCl and Cl_2 levels in the presence of other halogens.

[39] We also note that, for purposes of determining whether the proposed MACT standard would satisfy RCRA concerns, we evaluated the level of protection that would be provided assuming (conservatively) that 10 percent of the HCl/Cl_2 standard would be emitted as the more toxic Cl_2.

[40] We note that PM 10 is a criteria pollutant under the Clean Air Act. PM can also have adverse effects on human health even if toxics are not adsorbed on the PM. Although EPA cannot control PM in and by itself under § 112(d) (it must be a surrogate for HAP control), EPA may consider reductions in criteria pollutants in assessing cost-effectiveness of MACT controls. See S. Rep. No. 228, 101st Congress, 1st Session, p. 172.

[41] See memo from Larry Gonzalez, EPA, to the docket for this rule (F–96–RCSP–FFFFF), entitled ''Semi-volatile Organic HAPs that Can Be Adsorbed onto PM'', dated February 22, 1996.

hazardous waste. This issue is relevant for cement kilns and light-weight kilns because, if these sources were not burning hazardous waste, the proposed MACT standards would not apply. Cement kilns (CKs) that do not burn hazardous waste would be subject to separate MACT standards that the Agency is developing for those sources, and light-weight aggregate kilns (LWAKs) that do not burn hazardous waste would not be subject to any MACT standards.

It could be argued that a CK or LWAK that burns hazardous waste with nondetect levels of Hg, SVM, LVM, or chlorine is not burning hazardous waste with respect to that metal or the HCl/Cl_2 standard. Accordingly, regulation should revert to any applicable MACT standard for the source when not burning hazardous waste. The Agency rejects this argument, however. A source cannot be subject to regulation under two MACT source categories. Further, such an approach would be extremely difficult to implement and enforce for CKs given that compliance procedures would be different for the two source categories.

3. Sources That Temporarily Cease Burning Hazardous Waste

Sources that temporarily cease burning hazardous waste would remain subject to today's proposed standards. Similar to the discussion above, such sources could argue that in the interim when hazardous waste is not burned, MACT regulation should revert to the MACT standards applicable to CKs or LWAKs that do not burn hazardous waste.

The Agency rejects this argument as well and for the same reasons discussed above: a source cannot be intermittently subject to MACT regulation under two source categories, and implementation and enforcement would be extremely complicated. See the discussion below regarding how to define temporary interruptions in waste burning versus termination of waste burning.

4. Sources That Terminate Hazardous Waste Burning

A source that terminates hazardous waste burning would no longer be subject to today's proposed rules. A source has terminated hazardous waste burning when it: (1) ceases burning hazardous waste (i.e., hazardous waste is not fed and hazardous waste does not remain in the combustion chamber); and (2) stops complying with the proposed standards and begins complying with other applicable MACT standards (i.e., cement kilns must comply with the MACT standards, when promulgated, for kilns that do not burn hazardous waste). In addition, today's rule would require sources that terminate hazardous waste burning to notify the Administrator in writing within 5 days of the termination.

Such sources could begin burning hazardous waste again under the following conditions: (1) The source must comply with the MACT standards applicable to new sources; (2) the source must submit a notification of compliance with the standards (based on a comprehensive performance test); and (3) prior to submitting the notification of compliance, the source cannot burn hazardous waste for more than a total of 720 hours, and hazardous waste may be burned only for purposes of emissions pretesting (i.e., in preparation for the comprehensive performance test) or comprehensive performance testing.

We are taking this position regarding termination of waste burning to avoid the implementation and enforcement complications that could result if a source could claim that it was not subject to the proposed regulations during those periods of time that it was not burning hazardous waste. Without these requirements, a source could vacillate at will between being regulated and unregulated (or for CKs, between being subject to regulation as a hazardous waste-burning kiln versus a non-hazardous waste-burning kiln). We invite comment on whether these requirements are reasonable and appropriate to address the Agency's implementation and enforcement concerns.

II. Selection of Format for the Proposed Standards

A. Format of the Standard

When EPA regulates a source, it must determine on a case-by-case basis what format the standards are. This section explains the reasons why EPA chose the format it did for this specific source category. Due to differing situations in other cases, other formats may be chosen for other source categories.

1. Units

EPA investigated four formats for use in expressing today's proposed standards: mass-based emissions; calculated mass-based emissions; percent reduction; and concentration-based. The Agency ultimately selected concentration-based standards for the reasons discussed below.

The mass-based approach would set a limit of mass emissions per unit time, i.e., kg/hr, lb/hr, etc. This approach was rejected because it is inherently incompatible with technology based standards for several reasons. First, a mass-based standard does not assure good control at small facilities. Small facilities have lower flow rates, would be allowed higher concentration of emissions, and thus could meet a standard with no or minimal technological control. Also, it produces an undue burden on larger facilities in that they would have to install controls and small facilities would not. One potential consequence is that it would cause an incentive for more small facilities, causing an increase in emissions nationally. For these reasons, this option was not chosen.

An alternate to the mass-based approach is the calculated mass-based approach. This would involve EPA determining some appropriately low level of metals and chlorine feed, multiplying that by a system removal efficiency factor, and issuing the result as a mass-based limit. One concern with this approach is EPA does not know what feedrate would be appropriate. Any feedrate could be construed as arbitrary. Also, the approach would result in a mass-based limit which does not address concerns described in the preceding paragraph. It also does not address how to set the other standards: CO, HC, PM, and dioxin/furans. For these reasons, this option was not chosen.

A third approach is to set the standards based on a specified percent reduction. This comports well with a technology-based approach because it deals directly with determining what technology performs most efficiently. However, there are problems with this approach. First, it is difficult to determine where the percent reduction should be applied: feed to stack, across the APCD train, or across a specific control device. Use of feed to stack percent reductions present a difficulty due to the measurement variability of feed samples and stack emissions. APCD train or device specific percent reductions would be difficult to implement. Facilities are not configured to sample inlet emissions to the APCD train or to a specific APCD. Thus, facilities would have to be reconfigured to allow inlet sampling. Stack sampling would be required at both the outlet and, possibly, multiple inlet points. This would significantly increase the testing burden. In addition, implementation of any approach based on percent reduction would involve substantial and expensive monitoring of operating parameters to ensure that the specified percent reduction occurs during operation. For these reasons, this approach was not chosen.

The approach that was chosen for these source categories is to set concentration-based standards. This approach is consistent with how EPA has historically based air emission standards. It favorably addresses the problems of the other options. However, it does allow larger facilities to emit higher mass emissions of HAPs. But mass-based levels would result in higher emissions nationally by encouraging more smaller facilities (see previous paragraph). This tradeoff, having higher mass emissions at larger facilities but lower emissions nationally, was considered acceptable for this proposal. Concentration based approaches are also easier to implement and do not necessarily rely on the setting of operating limits. For this reason, concentration-based standards are regarded as preferable to the other options, and was chosen on that basis.

It is possible that other units could be chosen for other source categories. As explained in the introductory paragraph this is consistent because other units might be more appropriate for other source categories.

2. Correction to 7 Percent Oxygen and 20° C

All standards are corrected to 7 percent oxygen and 20° C. This is because the data EPA used to derive the standards were corrected in this manner. This is also consistent with the correction used for BIFs, hazardous waste incinerators, MWCs, and MWIs.

3. Significant Figures and Rounding

All standards proposed here are expressed to two significant figures.

For the purposes of rounding, we propose to require the use of ASTM procedure E–29–90 or its successor. This procedure is the American standard for rounding. Rounding shall be avoided prior to rounding for the reported result.

B. Averaging Periods

Averaging periods are the time periods over which emissions or feedstream and operating parameters are set. These periods require consideration because of the inherent variability associated with the operation of complying (i.e., properly designed and operated) MACT devices. As noted above, facilities normally operate within certain limits but do have emissions above and below these normal levels due to the natural variability associated with the operation of a facility. EPA must account for this variability when promulgating technology-based standards. See, *e.g., FMC Corp.* v. *Train,* 538 F.2d 973, 986 (4th Cir. 1976). If EPA were to establish a ''not-to-be-exceeded'' limit, that limit would invariably be higher than if the limit were expressed as an average emission level. That would tend to encourage higher emitting, but low variability devices since they could meet the not-to-exceed standard.

For instance, say EPA is considering establishing a standard on: an instantaneous basis; a one hour average; and a 12-hour average. Also, assume that the complying MACT facility has average emissions of 5 and short-term perturbations as high as 300. In this case equally stringent emissions levels could be: 300 on an instantaneous basis; on the order of 10 for an hourly average; or closer to 5 for the 12-hour average. If the limit were established at 300 on an instantaneous basis, this could significantly favor a facility that has high perturbations less than 300, but average emissions of 250 (assuming the facility with average emissions of 250 could meet the instantaneous limit, 300, with fewer controls.) This facility would emit 50 times more of that HAP than a facility operating at an emission average of 5, but would still comply with the standard. To address the problem of setting limits on an instantaneous basis, emissions and feedstream and operating limits are established on the average with specified averaging periods.

1. Manual Methods

The MACT standards for HWCs (except those for HC and CO) were based on the average of data from three test runs during which emissions were measured by manual methods. EPA thus proposes that compliance be based on the average of three manual methods test runs to be consistent with data used to establish the standards. *Chemical Waste Management* v. *EPA,* 976 F.2d 2, 34 (D.C. Cir. 1992) (Noting that this is an inherently reasonable approach and is consistent with the standard approach for compliance under the Part 63 MACT standards.)

The standard could be set in such a way as to require all three runs to be less than the standard. Such a standard would be derived by choosing the highest data point from three manual test runs and would result in an emission level higher than those proposed. The ''not-to-be-exceeded'' approach was considered problematic for reasons just described, so averaging was chosen.

Manual methods sample facility exhaust emissions for a period of time. The minimum length of time required to sample is specified indirectly by the manual method in the form of collection or gas flow specifications. The results of the manual method test are reported as an average over the sampling period. Therefore for manual method test runs, the averaging period is the sampling period over which the sample was collected.

EPA proposes no specific averaging period here for manual method test runs, with one caveat discussed below. Instead EPA proposes to rely on the minimum sampling volumes or collected sample (whichever the method requires) specified by the manual methods. EPA invites comment on whether minimum sampling periods for manual methods should be specified directly.

EPA is proposing a three hour minimum sampling time for method 0023A. Three hours is also the minimum sampling period stated in method 23 to Part 60, appendix A. EPA is proposing a minimum sampling time in order to ensure that each D/F run samples long enough to obtain adequate samples of the various congeners to determine compliance with the TEQ standard. This issue is important here because there is an inconsistency between air rules and RCRA rules regarding how to treat nondetected congeners when calculating the TEQ.

The document which defines the TEQ calculation, ''Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of Chlorinated Dibenzo-p-Dioxins (CDDs and CDFs) and 1989 Update'' (EPA/625/3–89/016, March 1989), uses in its examples the assumption that all non-detects are zero. Also, Method 23 of Part 60 Appendix A, the method used by air programs for determining total D/F congeners, similarly states in Section 9, titled Calculations:

> Any PCDD's or PCDF's that are reported as nondetected (below the MDL) shall be counted as zero for the purpose of calculating the total concentration of PCDD's and PCDF's in the sample.

Therefore, many assume that nondetects are zero for the purposes of calculating site specific TEQs.

Unfortunately, RCRA programs in most instances use the nondetect value, not zero, in the calculation of the TEQ. (See BIF method 23 found in Part 266, Appendix IX, section 3.4.) Since this rule would be promulgated under both RCRA and CAA authority, this issue needs to be resolved.

The Agency believes a facility will have to measure for 20 minutes per run using SW–846 method 0023a to obtain enough sample to be useful for the TEQ calculation. This leads EPA to believe that enough sample will be collected during a three hour run to assure that nondetected congeners are indeed not present. If a source complies with the minimum sampling period and still has non-detects, then EPA proposes allowing non-detects to be assumed to be zero.

This would also apply to other methods which have passed the Method 301 validation procedures and EPA has agreed are acceptable. In the case of other methods, the facility would assume that non-detects are zero if the method accumulates the same amount or more sample than Method 0023A would in a three hour run. If a source chooses not to comply with the three hour minimum, EPA would mandate that non-detected congeners be assumed to be present at the detection level for the purposes of the TEQ calculation.

EPA specifically invites comments on the selection of the proposed minimum sampling time for the D/F method and the assumed concentration of nondetected congeners in the calculation of the TEQ.

2. Continuous Emissions Monitoring Systems (CEMS)

EPA is proposing to require the use of five CEMS—CO, HC, O_2, Hg, and PM—and to allow the use of CEMS for SVM, LVM, HCl, and Cl_2. Presently, for cement kilns and LWAKs, continuous emission monitoring of O_2 and CO (or HC) is required under the BIF rule (40 CFR 266.103(c)(1)(v)). Emission limits and their associated averaging period must be established for all of these pollutants (except for O_2) in keeping with the nature of compliance with a CEMS. (The O_2 CEMS is used to continuously correct the CEMS readings for the other pollutants to 7 percent O_2. There is no emission limit specific to O_2.) Hourly rolling average emissions data are available to establish emission limits for CO and HC on an hourly-rolling average.

Only manual method stack emissions data, however, are available to establish appropriate emission limits and averaging periods for the other standards: Hg, PM,[42] SVM, LVM, and HCl and Cl_2. This presents a unique issue for the Agency to resolve since, in most cases, EPA promulgates CEMS standards by collecting CEMS emissions data from facilities run under ''normal'' conditions. The Agency would use this CEMS data to calculate a statistically based CEMS emission standard, assuming some confidence interval and number of annual exceedances. Since no ''normal'' CEMS data exists, but worst-case manual test data from trial burns and compliance tests does, an alternate approach must be developed to derive a CEMS emission standard an its associated averaging period.

a. Approach to Establishing Averaging Periods for Hg, PM,[43] SVM, LVM, HCl and Cl_2 CEMS. One important issue concerning the data is that it was obtained from trials burn and compliance test results (similar to the comprehensive performance test, described in section III of Part Five). These are generally worst-case tests facilities used to establish operating limits under the BIF and Incinerator rules. Facilities must be in compliance with all standards at all times they are burning hazardous waste. Therefore, the emissions represented by this data are the highest emissions the facility could experience and be in compliance with the current BIF and incinerator rules. In other words, the emissions data represents a not-to-be-exceeded emission level for the given facility.

Now, let us examine how a facility would comply with today's proposed emission standards if they were *not* to use a CEMS, but by performing a comprehensive performance test and complying with the standards using operating parameter limits. As a result of today's proposed rule and as was the case in the BIF and incinerator rules, EPA believes facilities will conduct a comprehensive performance test in the same way current trial burns and compliance tests are conducted. That is they will attempt to get the widest operating envelope possible by intentionally running the facility under conditions which will maximize emissions (by practices such as maximizing feed-rates, running control devices less effectively, etc.) and yet not exceed any applicable emission standards. Facilities will use the operating data from the comprehensive test to establish and continuously monitor operating limits for feedrate and device parameters. This defines the facility's operating envelope. During normal operation, owner/operators will operate in such a way that the facility is performing better than the operating limits established during the comprehensive performance test. Since exceedances of operating limits established during the comprehensive performance test are a *de facto* violation of the corresponding standard, this means that the emissions during normal operation will at all times be lower than those during the comprehensive test.

When complying with today's proposed standards using a CEMS, it is important that facilities using a CEMS not be at a disadvantage relative to facilities using operating parameter limits. There are two ways a disadvantage could occur: when the emission standard is numerically less and/or the averaging period is shorter. In the case of manual stack tests, the averaging period is the stack sampling time. Therefore, the CEMS emission limit would be equal in stringency to the manual stack test limit if they both had the same numerical value and the CEMS averaging period were equal to the sampling period for the manual method.

Also, EPA believes facilities have a number of advantages using CEMS. First, the assumptions to assure compliance are fewer and less conservative (direct measure of the standard is the top of the monitoring hierarchy; see section II.A. of Part Five.) CEMS are less intrusive on the facility than operating parameter limits. Most importantly, CEMS mean facilities need to monitor only one emissions parameter to assure compliance rather than multiple operating limits, often relevant to more than one standard.[44]

In summary, regardless of whether CEMS or operating limits are used, both continually assure that the facility is meeting the standard(s) at all times. CEMS are an alternate, more direct, method of confirming a state of performance than are continuously monitored operating parameter limits established through a comprehensive test. A facility which complies with the standards in today's proposed rule would experience its highest emissions during a comprehensive performance test, when the facility establishes its operating envelope to ensure it is in compliance with the standards at all times. Therefore, a CEMS limit is equally stringent to a standard for a comprehensive performance test if it is numerically equal and has the same averaging period. For comprehensive performance tests, the averaging period is the sampling time for the manual method. Therefore, it is proposed that the CEMS standards be the same numerical limits established for manual method comprehensive performance tests with the averaging period equal to

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[42] Note that the PM CEM is also used as an operating parameter for PM APCD efficiency and that additional averaging periods apply during normal operation. See Part Five, Section II.C.7. titled ''Particulate Matter'' for more information.

[43] Note that the PM CEM is also used as an operating parameter for PM APCD efficiency and that additional averaging periods apply during normal operation. See Part Five, Section II.C.7. titled ''Particulate Matter'' for more information.

[44] For example, an exceedance of an operating parameter limit used to ensure compliance with the dioxin, mercury, SVM, LVM, and HCl and Cl_2 standards would be a violation of all those standards. If a CEM were used for one or more of these standards, a violation would only occur if the CEM limit were exceeded.

the sampling period for three manual method test runs.

b. Averaging Periods for CO and HC CEMS. As stated previously, the data used to derive today's proposed CO and HC standards proposed are not manual methods data, but continuous emissions data based on a one-hour rolling average. To be consistent with the data used to derive the standards, it is proposed that the averaging periods for CO and HC CEMS standards remain one-hour.

c. Averaging Periods for Other CEMS. Based on the discussion of subsection I above, EPA proposes the following CEMS averaging periods for CEMS. The numerical standard is the same as those proposed in sections III through V of this part.

Three main assumptions were used in determining how long a facility would have to sample to achieve the minimum levels specified in the manual methods. They are assumptions for: sample flow rate; flue gas oxygen content; and the detection limit or specified sample collection specified in the method. For sample flow rate, EPA assumed a flow rate of 0.5 scfm because this is either what is directly stated as the flow rate in the methods or it is used by convention.

The Agency also assumed that the oxygen concentration in the flue gas was 7 percent, the basis of today's standards. Oxygen concentrations in the flue gas can change greatly, but EPA believes that the derived sampling time is elastic relative to the assumed oxygen concentration. In other words, the sampling times would change roughly five to ten per cent over the range of oxygen concentrations experienced by HWCs. This is not significant relative to other assumptions made here, so a 7 percent oxygen concentration was assumed.

Finally, each method specifies a minimum analytical detection limit or sample collection. We assumed that a test operator would collect three times what is prescribed in the method to account for facility variability, unknowns at a given site, etc. This is a conventional approach used by testing contractors. This will be referred to below as the ''collected sample.''

There are other issues which need to be addressed as well. One CEMS can be used to comply with more than one standard and standards can vary from subcategory to subcategory. Therefore, EPA proposes that the sampling time used to derive the averaging period be the longest sampling time which relates to the CEM averaging period. For an example, see the discussion on the Hg and multi-metals CEM standards, below.

Manual methods tests do not run on-the-hour, so an averaging periods with some fraction of an hour would result if rounding were not used. EPA believes it is reasonable and simpler to have integer value hourly averages. Since the direct measure of a standard at the stack is at the top of the monitoring hierarchy, a less conservative approach is warranted in this case, so EPA proposes that averaging periods for CEMS be rounded up to the nearest hour. (See section II.A. of Part Five for more information on the monitoring hierarchy.)

Also, a resulting averaging period may be inappropriately short, i.e., less than one hour. In this case EPA would establish an averaging period of one-hour. This is reasonable since the averages for operating parameters to control average emissions are one-hour. (See section II.B.1. of Part Five for a discussion of averages for operating parameters.) Monitoring of a standard continuously at the stack is at the top of the monitoring hierarchy, while establishing operating parameter limits is at the bottom. It would be inconsistent if an averaging period for CEMS were less than those for operating parameter limits, so a one-hour average will be proposed in this case.

For mercury (Hg) and multi-metal CEMS, it is proposed that the averaging period be ten hours. SW–846 method 0060 would be the manual method used to comply with these standards if a CEM were not used. Emission standards for these HAP categories vary greatly from HAP-to-HAP and within a HAP, from subcategory-to-subcategory. But the proposed SVM standard for LWAKs results in the longest sample collection time. EPA believes that an LWAK will have to sample for approximately 200 minutes per run to collect 15 µg of sample to be in compliance with the LWAK SVM standard. Three runs of 200 minute duration is 600 minutes, or ten hours.

For the HCl and Cl_2 standard, it is proposed that the CEMS averaging period be one hour. In this case, EPA has determined that a facility would have to sample less than ten minutes per run to collect the minimum amount, 300 µg, of sample specified by the method. If three times this sampling time were used to establish the averaging time, it would result in one of roughly 30 minutes. This is unreasonable for a CEMS averaging period, so EPA is proposing that the averaging period be one hour.

Finally, it is proposed that the PM CEMS averaging period be two hours. This is because a facility would have to sample for roughly 30 minutes per run to collect the minimum amount, 30 mg, of particulate specified by the method. Three times this sampling time is 1.5 hours, so after rounding an averaging period of two hours is proposed.

Table IV.2.1 summarizes the CEMS averaging period for the various CEMS emission standards.

TABLE IV.2.1.—AVERAGING PERIODS FOR CEMS STANDARDS

HAP or standard	CEMS averaging period
PM	2 hours.
Mercury (Hg)	10 hours.
SVM	10 hours.
LVM	10 hours.
HCl and Cl_2	1 hour.
CO	1 hour.
HC	1 hour.

d. All Averages are Rolling Averages. All CEMS averaging periods are on a rolling-basis. In other words, each time a sample is recorded, a new rolling average is calculated using the new sample and all previous samples obtained during the specified averaging period. If sample results are recorded every minute and the averaging period is one hour, then the most recent sample is averaged together with the results of the previous 59 samples to obtain the hourly rolling average. When there are not enough data to obtain a rolling average, one of two approaches would be used. We propose that for short-term interruptions of the rolling average that the rolling average ''pick-up'' where it left off, i.e., consider the one-minute average immediately prior to the interruption to be the one minute average that occurred prior to the current one-minute average. For longer term interruptions, all available one minute averages would be averaged together until the time period since the start of the rolling average equals the averaging period for that parameter. Then there is enough data to perform the rolling average as usual, and the rolling average would continue as normal. For more information on the use of CEMS and the rolling average, see Part Five, Section II.C. ''Compliance Monitoring Requirements'' and the proposed regulations, Appendix J to Part 60.

3. Feedstream and Operating Limits

Today, EPA is proposing specific monitoring requirements to ensure facilities are in compliance with the standards during normal operation. Some of these monitoring requirements require setting limits on feedstream or operating parameters. These limits will be set on an average. Other limits would be instantaneous limits, such as those for fugitive process emissions.

It is proposed that four averaging periods be used for feedstream and operating limits: twelve hour, one hour, ten minutes, and instantaneous. All averages would be calculated on a rolling-average basis with measurements taken every 15 seconds to obtain a one minute average. The one minute averages are used to obtain the twelve hour, one hour or ten minute rolling average. The use of one-minute averages, i.e., the average of the previous 15 second averages within that minute, is the current practice for HWCs. ‘‘Instantaneous’’ limits are just that, values not to be exceeded at any time. Averaging does not occur for ‘‘instantaneous’’ values. These definitions supersede requirements in the Part 63 general provisions, which are less stringent. Consult chapter 5, volume IV of the Technical Background Document for more information regarding EPA’s choice of the time duration for averaging periods.

For discussion on what operating limits EPA is proposing and what the averaging period will be for particular operating limits, see section II of Part Five of this preamble.

III. Incinerators: Basis and Level for the Proposed NESHAP Standards for New and Existing Sources

Today’s proposal would establish maximum achievable control technology (MACT) emission standards for dioxins/furans, mercury, semivolatile metals (cadmium and lead), low volatile metals (arsenic, beryllium, chromium and antimony), hydrochloric acid and chlorine (combined), particulate matter, carbon monoxide, and hydrocarbons from existing and new hazardous waste incinerators (HWIs). See proposed § 63.1203. The following discussion addresses how MACT floor and beyond-the-floor (BTF) levels were established for each HAP, and EPA’s rationale for the proposed standards. The Agency’s overall procedural approach for MACT determinations has been discussed in Part Three, Sections V and VI for existing sources and in Section VII for new sources.

To conduct the MACT floor analyses presented today, the Agency compiled available data from hazardous waste-burning incinerators: both commercial as well as on-site facilities. As discussed earlier, the vast majority of these data were generated during trial burns to demonstrate compliance with existing RCRA standards at 40 CFR Part 264, Subpart O. Therefore, the data were obtained under proper QA/QC procedures. These emissions data, however, represent worse-case emissions that cannot be exceeded (because limits on operating parameters are based on operations during the trial burn). As noted earlier, the Agency invites commenters to submit data that reflect more normal, day-to-day operations and emissions. This will enable the Agency, among other things, to be better able to distinguish among facilities that are now included in the expanded MACT floor pool but which, upon closer inspection and with better data, may not be actually employing the identified floor controls.

A. Summary of MACT Standards for Existing Incinerators

This section summarizes EPA’s proposed emission levels for existing incinerators for each HAP, HAP group, or HAP surrogate. The proposed emission standards for HWIs are presented in the table below:

TABLE IV.3.A.1.—PROPOSED MACT STANDARDS FOR EXISTING INCINERATORS

HAP or HAP surrogate	Proposed standards[1]
Dioxin/furans	0.20 ng/dscm TEQ.
Particulate Matter	0.030 gr/dscf. (69 mg/dscm).
Mercury	50 µg/dscm.
SVM [Cd, Pb]	270 µg/dscm.
LVM [As, Be, Cr, Sb]	210 µg/dscm.
HCl + Cl_2	280 ppmv.
CO	100 ppmv.
HC	12 ppmv.

[1] All emission levels are corrected to 7 percent O_2.

1. Dioxins and Furans (D/Fs)

a. MACT Floor. The Agency’s analysis of dioxin/furan (D/F) emissions from HWCs and other combustion devices (e.g., municipal waste combustors and medical waste incinerators) indicates that temperature of combustion gas at the inlet to the particulate matter (PM) control device can have a major effect on D/F emissions.[45] D/F emissions generally decrease as the gas temperature of the PM control device decreases, and emissions are lowest when the gas temperature of the PM control device is below the optimum temperature window for D/F formation—450 to 650 °F.[46] Given that incinerators are equipped with both wet and dry PM control devices that operate under a range of temperatures, the Agency is identifying a MACT floor for D/F based on temperature control at the inlet to the PM control device.

Incinerators emitting D/F at or below levels emitted by the median of the best performing 12 percent of incinerators have combustion gas temperatures below 400° F. These best performing sources were equipped with venturi scrubbers to control PM. The gas temperature of the wet air pollution control system for one source was 163° F; gas temperature data for the other best performing sources were not available. Although gas temperatures at a wet PM control device would normally be less than 200° F, temperatures could be higher in the presence of acid gases such as HCl and SO_2. Consequently, the Agency believes that it would be reasonable and appropriate to generalize that gas temperatures of wet PM control devices are less than 400° F.

The Agency evaluated D/F emissions from all incinerators that are equipped with wet PM control systems. Average D/F emissions for test conditions ranged from 0.01 ng/dscm (TEQ) to 39 ng/dscm (TEQ). D/F emissions were as high as 3.5 ng/dscm (TEQ) for incinerators that were not burning substantial levels of known D/F precursors or were not equipped with a waste heat boiler (WHB). (It is hypothesized that WHB-equipped incinerators may have high (uncontrolled) D/F emissions because D/F may be formed on particulate attached to boiler tubes as combustion gases pass through the optimum temperature window (450–650° F) for D/F formation.) WHB-equipped incinerators using wet PM control devices had D/F emissions ranging from 0.4 to 8 ng/dscm (TEQ), and an incinerator equipped with a wet PM control device burning waste comprised of approximately 30 percent PCBs had D/F emissions of 39 ng/dscm (TEQ).

The Agency is consequently identifying temperature control to below 400° F at the PM control device as the MACT floor. Given that approximately 45 percent of test conditions in our database have average D/F emissions below 0.20 ng/dscm (TEQ), we believe that it is appropriate to express the floor as ‘‘0.20 ng/dscm (TEQ), or temperature at the PM control device not to exceed 400° F’’. This would allow sources that operate at temperatures above 400° F but that achieve the same D/F emissions as 45 percent of sources that operate below 400° F to meet the standard without incurring the expense of

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[45] USEPA, ‘‘Draft Technical Support Document For HWC MACT Standards, Volume III: Selection of Proposed MACT Standards and Technologies’’, February 1996.

[46] For example, during compliance testing of a cement kiln, D/F emissions exceeded 1.7 ng/dscm (TEQ) at a ESP temperature of 435° F.

lowering the PM control device gas temperature.

EPA estimates that 75 percent of incinerators are currently meeting the floor level. The annualized cost for the remaining incinerators to reduce D/F emissions to 0.20 ng/dscm (TEQ) or control gas temperature at the PM control device to below 400° F would be $3.0 million. Achievement of the floor levels would reduce D/F TEQ emissions nationally by 35 g/yr.

b. Beyond-the-Floor (BTF) Considerations. The Agency has identified activated carbon injection (CI) operated at gas temperatures less than 400° F as BTF control for D/F for incinerators.[47] CI is currently used by a commercial hazardous waste incinerators to achieve emission levels routinely (based on quarterly stack testing) of less than 0.20 ng/dscm (TEQ). CI is also used to reduce D/F emissions from several municipal and medical waste incinerators (MWIs) in a similar manner.

CI has been demonstrated to be routinely effective at removing greater than 95 percent of D/F and some tests have demonstrated a removal efficiency exceeding 99 percent at gas temperatures of 400° F or below.[48] To determine a BTF emission level, the Agency considered the emission levels that could result from gas temperature control to less than 400° F combined with CI.

To estimate D/F emissions with temperature control combined with CI, the Agency considered the range of emissions from sources in the MACT floor database, as discussed above. Incinerators that are not equipped with a WHB and not burning high levels of D/F precursors (the vast majority of incinerators) could be expected to achieve D/F emissions of less than 3.5 ng/dscm (TEQ) with temperature control only. These sources could be expected to achieve D/F emissions of below 0.18 ng/dscm (TEQ) when using CI assuming a fairly conservative removal efficiency of 95 percent.

There are three sources in our database equipped with WHBs. One currently uses CI to achieve D/F emissions below 0.20 ng/dscm (TEQ) when controlling PM with an ESP operating below 400° F. Another source had D/F emissions of 0.56 ng/dscm (TEQ) when controlling PM with a wet system. This source could be expected to achieve D/F emissions below 0.03 ng/dscm (TEQ) using CI at a removal efficiency of 95 percent. The third WHB-equipped incinerator in our database had D/F emissions of 8.0 ng/dscm (TEQ) when controlling PM with a wet system. This source could be expected to achieve D/F emissions below 0.40 ng/dscm using CI at a removal efficiency of 95 percent. We note, however, that the feed to this source during testing comprised approximately 10 percent hexachlorophenol, a D/F precursor.

Finally, one incinerator in the database that controlled PM with a wet system had D/F emissions of 39 ng/dscm (TEQ). This source could be expected to achieve D/F emissions below 2 ng/dscm (TEQ) when using CI at 95 percent efficiency. We note, however, that the feed to this source during testing comprised approximately 30 percent PCBs, known D/F precursors.

The Agency has considered this information and determined that it would be reasonable and appropriate to establish 0.20 ng/dscm (TEQ) as an emission level that is achievable with BTF control. Although two sources in our database that fed (during testing) high levels of D/F precursors may not have been able to achieve that level if they had been equipped with CI, we believe that those sources could achieve a level of 0.20 ng by reducing the feedrate of D/F precursors.

We note that, because we have assumed a fairly conservative CI removal efficiency of 95 percent to identify the 0.20 ng/dscm BTF level, we believe that this adequately accounts for emissions variability that would be experienced at a given source attempting to operate under constant conditions (e.g., as during a performance test). That is, because CI removal efficiency is likely to be up to or greater than 99 percent, we believe that it is not necessary to add a statistically-derived variability factor to the 0.20 ng/dscm BTF level to account for emissions variability. Accordingly, the 0.20 ng/dscm (TEQ) BTF level is proposed as the emission standard.

We invite comment on this issue, and note that if a statistically-derived variability factor were deemed appropriate, the BTF level of 0.20 ng/dscm would be expressed as a standard of 0.31 ng/dscm (TEQ). We note, however, that under this approach, it may be appropriate to use a less conservative CI removal efficiency (i.e., because emissions variability would be accounted for using statistics rather than in the engineering decision to use a conservative CI removal efficiency), thus lowering the 0.20 ng/dscm level to approximately 0.1 ng/dscm (TEQ). If so, the BTF standard would be approximately 0.21 ng/dscm (TEQ) (i.e., virtually identical to the proposed standard) after considering a statistically-derived variability factor.

EPA estimates that 50 percent of incinerators are currently meeting a BTF level of 0.20 ng/dscm (TEQ). The incremental annualized cost for the remaining incinerators to meet this BTF level rather than comply with the floor controls would be $26.2 million, and would provide an incremental national reduction of 38 g/yr in D/F TEQ emissions over the floor level. This represents an overall reduction of about 95 percent compared to baseline D/F emissions of 77 g/year.

EPA has determined that proposing a BTF MACT standard is warranted and a number of factors support the proposed BTF level of 0.20 ng/dscm (TEQ). D/F are some of the most toxic compounds known due to their bioaccumulation potential and wide range of health effects at exceedingly low doses, including carcinogenesis. Exposure via indirect pathways was in fact a chief reason Congress singled out D/F for priority MACT control in section 112(c)(6). See S. Rep. No. 228, 101st Cong. 1st Sess. at 154–155 (1990). As discussed elsewhere in today's preamble (and as qualified by the discussion below regarding small incinerators), EPA's risk analysis developed for purposes of RCRA in fact shows that D/F emissions from hazardous waste incinerators could pose significant risks by indirect exposure pathways and that these risks would be reduced by BTF controls. EPA is expressly authorized to consider this non-air environmental benefit in determining whether to adopt a BTF level. CAA section 112(d)(2).

As discussed in Part Seven of the preamble, the cost-effectiveness of the BTF level for small on-site incinerators may be high. This is because on-site incinerators are generally smaller than commercial incinerators, have lower gas flow rates, and therefore have lower mass emission rates of D/F. Thus, the cost per gram of D/F TEQ removed for small incinerators is greater than for large (on-site and commercial) incinerators. Accordingly, the Agency invites data and comment on: (1) whether the BTF level is cost-effective for small incinerators; and (2) whether the final rule should establish MACT standards at the floor level (i.e., 0.20 ng/dscm (TEQ), or 400° F) for these small

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[47] We note that incinerators using wet PM control systems would need to reheat the combustion gas before injecting the carbon. This is because CI is not efficient at D/F (or Hg) removal at gas temperatures below the dew point. Gas reheating in these situations was considered in estimating the cost of compliance with the proposed standards.

[48] USEPA, ''Draft Technical Support Document For HWC MACT Standards, Volume III: Selection of Proposed MACT Standards and Technologies'', February 1996.

incinerators.[49] [50] Under this approach, the Agency would use the same definition of small incinerator used to identify incinerators subject to less frequent performance testing—incinerators with gas flow rates less than 23,127 acfm.[51]

EPA notes further that the control technology on which the proposed BTF standard is based, carbon injection, also controls mercury. The ability and efficiencies of controlling two such high toxicity HAPs with the same highly-efficient control technology is an important factor in the Agency's decision to propose a BTF standard. The Agency notes further that the absolute cost of achieving the proposed standard is relatively low, particularly considering the toxicity of D/F (as well as mercury, which, as just noted, would also be controlled). For example, the proposed BTF levels would result in annualized costs of $27 million to all HWIs or $15 per ton of hazardous waste burned.

Finally, EPA's initial view is that it may be necessary to adopt further controls under RCRA to control D/F if it did not adopt the BTF level. This would defeat one of the purposes of this proposal—to avoid imposing emission standards under both statutes for these sources wherever possible. These risks would, however, be reduced to acceptable levels if emission levels are reduced to the proposed BTF level of 0.20 ng/dscm (TEQ).

2. Particulate Matter

a. MACT Floor. The Agency has a database for PM emissions from 74 HWIs that indicates a range (by test condition average) from 0.0003 gr/dscf to 1.9 gr/dscf. For MACT determination, the median of the best performing 12 percent of the HWIs in the MACT pool were analyzed and found to be using the following APCDs to control PM: (1) A fabric filter (with an air to cloth ratio of less than 10.0 acfm/ft^2); and (2) an ionizing wet scrubber (IWS) in combination with a venturi-scrubber. Accordingly, these APCDs were tentatively designated as the MACT floor technologies. To identify an emission level that these technologies could be expected to achieve routinely, the Agency examined the emissions from all incinerators (in the database) that were equipped with these PM control devices. A MACT floor level of 240 mg/dscm (0.107 grains/dscf) resulted from the analysis based on considerations discussed in Part Three, Section V, above.

This level, however, is higher than the current federal standard of 180 mg/dscm (0.08 grains/dscf).[52] Thus, the Agency is not proposing to use the statistically-derived approach to identify the MACT floor emission level. The Agency has regulated PM emissions from hazardous waste incinerators under RCRA (40 CFR 264.343(c)) since 1981 and all RCRA-permitted incinerators have been required to meet the federal standard of 0.08 gr/dscf (180 mg/dscm). The Agency, therefore, is identifying the MACT floor at the regulated level of 180 mg/dscm.

The APCDs commonly used at HWIs to control PM to the current RCRA standard are fabric filters, ESPs, IWSs, and venturi-scrubbers. Accordingly, we have designated these technologies as MACT floor for PM control. Approximately 95 percent of all test conditions in our database have lower average levels (average over all runs of the test condition) than the MACT floor level of 180 mg/dscm.[53] This MACT floor level will not impose any incremental burden on HWIs (except compliance and related permitting costs) since it is the currently enforceable level.

b. Beyond-the-Floor Considerations. The Agency considered two levels of more stringent BTF PM standards, 69 and 34 mg/dscm (0.03 and 0.015 gr/dscf), since well designed and well operated ESPs, IWSs, and fabric filters can routinely achieve PM control at the 69 mg/dscm level,[54] while state-of-the-art ESPs, IWSs and FFs can achieve 34 mg/dscm level. The Agency is proposing a BTF standard of 69 mg/dscm (0.03 grains/dscf) based on engineering evaluation of the emissions data from HWIs. (We note that, as discussed in Sections IV and V below, it also is consistent with the proposed standards for cement kilns and LWAKs). Most of the HWIs having PM emissions between 69 to 180 mg/dscm (0.03 to 0.08 gr/dscf) range are likely to be using older APCDs that can be upgraded to provide better PM control. Only 30 percent of all test conditions [55] in our database were found to have PM emissions greater than the proposed BTF level of 69 mg/dscm (0.03 gr/dscf). Analysis of the test data appeared to indicate that some sources operated under poor, non-normal conditions during one test condition resulting in high PM levels, while much lower PM emissions were achieved during other test conditions. As noted elsewhere, the Agency is specifically concerned that the nature of these test data (and the absence of more detailed, routine operations and emissions data) has interfered with our ability to derive MACT standards that appropriately reflect the lower, day-to-day emissions achievements of the best performing facilities. The Agency will continue to refine its analysis in this regard, and we specifically invite data and comments on this issue.

The Agency estimates that 9 percent of existing incinerators can achieve the proposed BTF levels using design, operation and maintenance upgrades of their APCDs, while 11 percent facilities would require installation of new fabric filters or other equivalent APCD (e.g., ESP or IWS). The national annualized cost to HWIs to comply with the proposed BTF level would be $2.7 million and would provide an incremental reduction of PM emissions of 839 tons/year (52 percent) from the baseline emissions level of 1606 tons/year. Accordingly, the Agency believes that a BTF level of 69 mg/dscm (0.03 gr/dscf) is appropriate.

The performance of many APCDs can be improved to achieve a more stringent PM BTF level of 34 mg/dscm by adopting good D/O/M practices; in other cases, the APCD may have to be upgraded or replaced. Upgrades include techniques for ESPs such as humidification or increasing the plate area or power input, and for FFs, increasing cloth to air ratio and pressure drop across bags, or retrofits to modern fabrics like heavy woven fiberglass. The Agency is concerned, however, that the cost of such retrofitting to achieve PM levels of 34 mg/dscm (0.015 gr/dscf)

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[49] See also discussion in Part Four, Section I (Selection of Source Categories and Pollutants), regarding whether the Agency should subdivide incinerators by size and promulgate separate floor standards (and BTF standards, if warranted).

[50] If after review of comments and further analysis the Agency determines that subdividing incinerators is not appropriate but, because of cost-effectiveness considerations, BTF levels are not warranted for all types of incinerators, the Agency invites comment on whether such cost-effectiveness and BTF decisions should be based on incinerator size or whether the incinerator is a commercial or on-site unit.

[51] We also use this definition to request (elsewhere in the text) comment on whether the requirement to use Hg and PM CEMS for compliance monitoring should be relaxed or waived for small incinerators.

[52] This anomalous result is apparently attributable to: (1) inability to consider emissions from only those HWIs truly using MACT floor control (because of inadequate data to properly characterize the design, operation, and maintenance of the control device); and (2) use of a variability factor that is based on emissions variability (during trial burn testing) that may be much higher than many sources actually experience.

[53] We presume that those few test conditions that exceeded the 180 mg/dscm standard occurred during failed trial burn tests.

[54] We note also that, as discussed in the next section, cement kilns with much higher inlet particulate loadings are currently required to meet a 69 mg/dscm standard.

[55] Representing 20 percent of the sources.

could be substantial. We also note that PM is not a HAP, but rather a surrogate for non-dioxin/furan HAPs adsorbed on to PM and for metal HAPs not directly controlled by a MACT standard. These HAPS would be controlled to some extent by other proposed standards (e.g., metal-specific standards; CO and HC limits to control organic HAPs). For these reasons, we believe that controlling PM to the proposed BTF level of 69 mg/dscm (0.03 gr/dscf) is appropriate. In addition, we also note that the Agency has no information that a lower PM standard would be needed to satisfy RCRA requirements.

3. Mercury

a. MACT floor for mercury. Mercury (Hg) emissions from incinerators are currently controlled by controlling the feedrate of Hg and by using wet scrubbers (although such scrubbers are used primarily for acid gas control). Wet scrubbers can remove soluble forms of mercury species (e.g., HgCl).

The Agency's Hg emissions database from 29 HWIs indicates that baseline Hg emissions range from 0.05 μg/dscm to a high of 1,360 μg/dscm. To identify MACT floor control, EPA determined that sources with Hg emissions at or below the level emitted by the median of the best performing 12 percent of sources were controlling Hg using either: (1) Hg feedrate control expressed as a maximum theoretical emission concentration (MTEC)[56] of 19 μg/dscm; or (2) wet scrubbers coupled with an MTEC of 51 μg/dscm. Analysis of emissions from all incinerators in the database using these or better controls (i.e., lower Hg feedrates expressed as lower MTECs) resulted in a MACT floor level of 130 μg/dscm.[57] To meet this floor level 99 percent of the time, EPA estimates that a source with average emissions variability must be designed and operated to routinely meet an emission level of 57 μg/dscm.

EPA estimates that approximately 70 percent of incinerators currently meet the floor level. The annualized cost for the remaining incinerators to meet the floor level is estimated to be $29.5 million, and would reduce Hg emissions nationally by 7,166 lbs per year from the baseline emissions level of 9,193 lbs per year.

b. Beyond-the-Floor Considerations. The Agency has considered two alternative beyond-the-floor (BTF) controls for improved Hg control: flue gas temperature reduction to 400° F or less followed by either activated carbon injection (CI) or carbon bed (CB). (As discussed in the D/F section, we note that incinerators with PM control devices operating below the dew point (e.g., venturi-scrubbers, ionizing wet scrubbers) would have to reheat the combustion gas before using CI, and would need to add a FF or other PM control device to remove the injected carbon.) EPA believes that CI-controlled systems can routinely achieve Hg emission reductions of 90 percent or better and that CB-controlled systems can routinely achieve Hg emissions of 99 percent or better.[58]

For CI-controlled systems, EPA has identified a BTF emission standard of 50 μg/dscm, assuming first that a source has controlled its Hg emissions to only 300 μg/dscm using a wet scrubber and/or feed control, and second, a CI removal efficiency of 90 percent. (The BTF emission standard corresponds to a design level of 30 μg/dscm, i.e., a level that the device is designed and operated to achieve routinely.)[59] For CB systems, the BTF standard would be 5.0 μg/dscm (assuming 99 percent removal efficiency).

We note that another option for identifying BTF levels would be to consider the CI or CB system as an add on to the floor controls identified above. Under this option, emission levels prior to CI would be assumed to be the floor level, 130 μg/dscm. Thus, a CI system at 90 percent removal could be expected to achieve a standard of approximately 13 μg/dscm. A CB system at 99 percent removal could be expected to achieve a standard of approximately 1.3 μg/dscm. We specifically request comment on whether this approach of applying BTF reductions to the floor levels is appropriate.

We also note that an alternative approach to using a statistically-derived variability factor to account for emissions variability would be to assume a conservative control efficiency for the CI or CB BTF technology. We believe that using a conservative removal efficiency could adequately account for emissions variability. Under this approach, we would conservatively assume that CI-controlled systems could achieve a removal efficiency of 80 percent and that CB-controlled systems could achieve an efficiency of 90 percent. When these removal efficiencies are applied to the floor level of 130 μg/dscm (corresponding to a design level of 57 μg/dscm), this would result in emission standards of 11 μg/dscm for CI-controlled systems, and 5.7 μg/dscm for CB-controlled systems.[60] We invite comment on this alternative approach to account for emissions variability among runs within a test condition.

For the reasons discussed below, EPA believes that a BTF level based on use of CI is warranted and is proposing a MACT standard of 50 μg/dscm. The proposed standard would result in nationwide Hg emissions reductions of 757 lbs per year above the floor level and 7,922 lbs per year from baseline levels, and the incremental annualized cost to achieve the BTF level over the floor level would be $7.7 million.

EPA has considered costs in relation to emissions reductions and the special bioaccumulation potential that Hg poses and determined that proposing a BTF limit is warranted. Hg is one of the more toxic metals known due to its bioaccumulation potential and the adverse neurological health effects at low concentrations especially to the most sensitive populations at risk (i.e., unborn children, infants and young children). Congress has singled out mercury in CAA section 112(c)(6) for prioritized control. A more detailed discussion of human health benefits for mercury can be found in Part Seven of today's proposal. The chief means of control, activated carbon injection, also controls D/F so that there are distinct efficiencies in control.[61]

The Agency evaluated a more stringent standard of 8 μg/dscm for Hg emissions based on CB technology. This standard would result in additional national Hg reductions of 960 lbs per year over the proposed standard of 50

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[56] MTEC is the Hg feedrate divided by the gas flow rate, and is an approach to normalize Hg feedrate across sources.

[57] As discussed above in the text, we added a within-test condition emissions variability factor to the log-mean of the runs for the test condition in the expanded MACT pool with the highest average emission.

[58] USEPA, "Draft Technical Support Document For HWC MACT Standards, Volume III: Selection of Proposed MACT Standards and Technologies", February 1996. See also memo from Shiva Garg, EPA, to the Docket (No. F–96–RCSP–FFFFF), dated February 22, 1996, entitled "Performance of Activated Carbon Injection On Dioxin/Furan and Mercury Emissions."

[59] To achieve a standard of 50 μg/dscm 99 percent of the time, a source with average emissions variability must be designed and operated to achieve an emission level of 30 μg/dscm.

[60] The same approach could be applied to the previously discussed approach of applying the BTF control to an assumed emission level of 300 μg/dscm. When assuming the conservative removal efficiencies of 80 percent for CI and 90 percent for CB, this would result in BTF standards of 60 μg/dscm for CI-controlled systems and 30 μg/dscm for CB-controlled systems. A statistically-derived variability factor would not be added because emissions variability is accounted for by assuming conservative (i.e., lower-than-expected) removal efficiencies for CI and CB systems.

[61] As discussed for D/F, we invite comment on whether the final rule should establish floor levels, rather than BTF levels, for Hg for small incinerators. This is because the Agency is concerned about the cost-effectiveness of the BTF levels for small incinerators.

µg/dscm at an incremental annualized national cost of $20 million. The Agency does not believe that a CB-based emission level of 8 µg/dscm would be appropriate.

4. Semivolatile Metals (SVM) (Cadmium and Lead)

a. MACT Floor. Emissions of SVMs from HWIs are currently controlled by PM control devices. In addition, some incinerators have specific emission limits for these metals established under RCRA omnibus permit authority. The Agency has a database for SVM emissions from 42 HWIs, which indicates a range (by test condition average) from a low of 1.46 to a high of 29,800 µg/dscm. For the MACT analysis, the median of the best performing 12 percent of HWIs were found to be using: (1) a venturi-scrubber (VS)[62] with a MTEC level of 170 µg/dscm; (2) a combination of ESP and WS with a MTEC level of 5,800 µg/dscm; and (3) a combination of VS and IWS with a MTEC of 49,000 µg/dscm.[63] Accordingly, we identified these technologies as MACT floor.

To identify an emission level that these technologies could routinely achieve, we evaluated the emission levels from all HWIs equipped with these controls.[64] We identified the test condition in this expanded MACT pool with the highest average emission and used procedures discussed above in Part Three, Section V, (i.e., addition of a within-test condition emissions variability factor to the log mean of the runs for this test condition) to identify a MACT floor level 270 µg/dscm.

We estimate that approximately 65 percent of all incinerators currently meet this MACT floor level. Sources not already meeting the floor level can readily achieve it by making design, operation, or maintenance improvements to their existing PM control system or by retrofitting with a new PM control device.

The national annualized cost to HWIs to comply with the proposed floor level is estimated to be $9.9 million, and would provide a reduction in Cd and Pb emissions of 50 tons/year, a 94 percent reduction in emissions.

b. Beyond-the-Floor Considerations. The Agency is not proposing a more stringent BTF standard for SVM. We note that the floor level alone would provide for a 94 percent reduction in emissions, and emissions at the floor are not likely to trigger the need for additional control for these sources under RCRA.

5. Low Volatile Metals (Arsenic, Beryllium, Chromium and Antimony)

a. MACT floor. The Agency has a database for LVM emissions from 41 HWIs, which indicates a range (by test condition average) from a low of 3.5 to a high of 133,000 µg/dscm. For MACT analysis, the median of the best performing 12 percent of HWIs achieved the LVM emission levels using: (1) a venturi-scrubber (VS) for MTECs up to 1,000 µg/dscm; and (2) an ionizing wet scrubber (IWS) for MTECs up to 6,200 µg/dscm. Accordingly, we identified these technologies as MACT floor.

In addition, we consider any PM control device to provide equivalent LVM control to a VS. We therefore identified an ESP, IWS, or FF with a MTEC up to 1,000 µg/dscm as MACT floor control. Similarly, we consider a FF or ESP as equivalent technology to a IWS. Thus, a FF or ESP coupled with a MTEC up to 6,200 µg/dscm is also considered MACT floor control.

To identify an emission level that these technologies could routinely achieve, we considered the emissions from all HWIs in our database equipped with MACT floor control. We identified the test condition in this expanded MACT pool with the highest average emissions and added a within-test condition emissions variability factor to the log-mean of the test condition runs. See Part Three, Section V, above. Accordingly, we have identified a MACT floor level of 210 µg/dscm.

Approximately 80 percent of all test conditions in our database achieved the MACT floor level even though many HWIs were equipped with different APCDs or had higher MTECs. EPA believes that most HWIs would be able to achieve the proposed MACT floor without installing an add-on control system. The control technologies necessary to achieve the MACT floor level are already being used by many HWIs for PM and acid gas control.

The national annualized cost to HWIs to comply with the floor level would be $7.7 million and would provide an incremental reduction in LVM emissions of 25 tons/year (91 percent) from the baseline emissions level of 27.3 tons/year.

b. Beyond-the-Floor Considerations. The Agency is not proposing a more stringent LVM standard using BTF controls (i.e., better performing PM control equipment). We note that the floor level alone would provide for a 91 percent reduction in emissions, and emissions at the floor are not likely to trigger the need for additional control for these sources under RCRA.

6. Hydrochloric Acid and Chlorine

a. MACT floor for HCl/Cl_2. The Agency's database for HCl/Cl_2 emissions from 59 HWIs indicates a range (by test condition average) from a low of 0.1 to a high of 1068 ppmv (expressed as HCl equivalents). For MACT analysis, the median of the best performing 12 percent of HWIs achieving the lowest HCl/Cl_2 emission levels were found to be using some kind of scrubbing using combinations of absorber, ionizing wet scrubber, VS, packed bed scrubber (PBS), or generic wet scrubber. In addition, the best performing sources had a chlorine feedrate of up to 2.1E7 µg/dscm, expressed as a MTEC. Accordingly, we identified MACT floor control as wet scrubbing coupled with a chlorine MTEC up to 2.1E7 µg/dscm.

To identify an emission level that wet scrubbing with an MTEC up to 2.1E7 µg/dscm could routinely achieve, we considered the emissions from all HWIs in our database equipped with these controls. We identified the test condition in this expanded MACT pool with the highest average emissions and added a within-test condition emissions variability factor to the log-mean of the test condition runs. See Part Three, Section V, above. Accordingly, we have identified a MACT floor level of 280 ppmv.

Over 90 percent of all test conditions in our database achieve this MACT floor level. At current baseline levels, HWIs emit 1712 tons/year of HCl/Cl_2, and at today's proposed MACT standard, these emissions would be reduced by 592 tons/year, a reduction of 35 percent. The estimated annualized national cost to the industry to meet the proposed MACT standard would be $4.5 million.

b. Beyond the-Floor Considerations. The Agency considered whether to propose a BTF level and determined that it would not be warranted. We note that emissions at the floor are not likely to trigger the need for additional control for these sources under RCRA.

7. Carbon Monoxide and Hydrocarbons

As discussed in Section I above, the Agency believes that establishing emission limits and continuous

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[62] Because virtually all other PM control devices (e.g., ESP, FF, IWS) would be expected to have a SVM collection efficiency equivalent to or better than a VS, a source equipped with any PM control device and having a MTEC less than 170 µg/dscm was considered to be using MACT floor control.

[63] We considered a FF to have equivalent (or better) SVM removal efficiency compared to an IWS. Thus, we considered a source equipped with a FF and any wet scrubber (ahead of the FF) and having a MTEC less than 49,000 µg/dscm to be using MACT floor control. A FF alone may not provide equivalent control of SVM because SVM can be volatile in stack emissions.

[64] Sources with better controls (MACT technology and lower feedrate expressed as MTEC) were also included in the expanded MACT pool.

monitoring of two surrogate compounds (hydrocarbons (HC) and carbon monoxide (CO)) will help control emissions of non-dioxin organic HAPs (in combination with PM control to control absorbed organic HAPs).

a. MACT Floor for HC. The Agency's database for HC emissions from 31 HWIs indicates a range (by test condition average) from a low of 0.2 to a high of 35.8 ppmv. Unlike certain cement kilns and LWAKs, incinerators are not required to monitor HC under RCRA regulations. Facilities generally obtained HC emissions data for their own information and often used an unheated FID detector, in which soluble volatiles and semivolatiles are condensed out before entering the detector. Also much of the data were based on run averages (as opposed to the maximum hourly rolling average format proposed today).[65] Notwithstanding these shortcomings, the Agency used these data to identify a MACT floor level.

The Agency identified MACT control for HC as operating under good combustion practices (GCPs). GCPs include techniques such as thorough air, fuel, and waste mixing, provision of adequate excess oxygen, maintenance of high temperatures to destroy organics, design of the facility to provide high enough residence times for destruction of organics, operation of the facility by qualified and certified operators, and periodic equipment maintenance to manufacturer-recommended standards.

To identify the MACT floor level, the Agency conducted a quantitative evaluation of the data combined with engineering judgment to identify test conditions that appear to be conducted under good combustion conditions. Since it is not possible to say with certainty which test conditions were conducted using GCPs absent a detailed examination of all test conditions, we conducted the analysis by arraying the entire HC database from the lowest to the highest emission levels. We then assumed that test conditions beyond a clear break-point were not operated under GCPs. Based on the above analysis and a statistical evaluation of the level that the average source can achieve 99 percent of the time, the Agency identified a MACT floor level of 12 ppmv.

We estimate that the annualized burden on HWIs to meet this floor level would be $8.5 million. An annual reduction of 49 tons of HC emissions (20 percent) is expected from the baseline levels of 239 tons/year.

EPA specifically invites comment on the approach used to identify the MACT floor level and requests HC data on a hourly rolling average basis, using heated FID monitors.

b. MACT floor for CO. RCRA regulations for HWIs were promulgated in 1981 and limit CO emissions to levels achieved during the trial burn. (As noted elsewhere, facilities typically design trial burns to maximize CO in order to provide operational flexibility.) Most of our database for CO (from 59 facilities) is based on run-averages during trial burns (rather than an hourly rolling average-basis; see discussion below). The CO levels in our database that are on a run-average basis range from 0.3 to 10,400 ppmv.

We are proposing today a maximum hourly rolling average (MHRA) format for CO (and HC), which is the same format in which a standard of 100 ppmv (Tier 1) was proposed in 1990 for HWIs (see 55 FR 17862 (April 7, 1990)) and promulgated for CKs and LWAKs in 1991 (see 56 FR 7134 (February 21, 1991)).

Although the Agency did not promulgate a final rule for CO emissions from HWIs (because of Agency resource constraints), the Agency published a guidance document[66] wherein a Tier 1 CO limit of 100 ppmv HRA was recommended for control of PIC emissions if warranted on a site-specific basis. Accordingly, subsequent trial burns for HWIs have been conducted using a HRA format for CO. Our CO database in the HRA format is comprised of 17 test conditions and has a range of 10 to 1,500 ppmv.

For MACT determination, the Agency conducted an analysis similar to that described above for HC and a CO MACT floor level of 120 ppmv resulted (e.g., MACT floor control is GCPs, and a break-point analysis was used to identify sources likely to be truly using GCPs). Nonetheless, since the Agency has previously proposed a CO limit of 100 ppmv and since this level is readily achievable by well-designed and well-operated HWIs, the Agency is proposing 100 ppmv HRA as the MACT floor.

We note that this floor level compares favorably with CO standards for other types of incinerators such as medical waste incinerators for which the proposed standard is 50 ppmv (60 FR 10654, February 27, 1995), and mass burn and fluidized bed municipal waste incinerators for which the promulgated CO standard is 100 ppmv (60 FR 65382, December 19,1995).

The Agency estimates that at a 100 ppmv standard, national CO emission reductions of 13,200 tons/year could be achieved from the baseline level of 14,080 tons/year at an annualized national cost of $17.4 million.

c. Beyond-the-Floor Considerations. The Agency considered more stringent BTF limits for CO and HC. Although state-of-the-art HWIs operating under GCPs should be able to routinely achieve levels below 100 ppmv HRA for CO and 12 ppmv HRA for HC, the Agency is concerned that the incremental compliance cost may not warrant more stringent standards.

EPA invites comments specifically on: (1) the use of CO and HC as surrogates for non-dioxin organic emissions; and (2) data and information and suggestions on an approach to identify a lower floor level for HC that more accurately reflects the levels that are being routinely achieved by HWIs operating under GCPs.

8. MACT Floor and BTF Cost Impacts

The annualized national cost to achieve the proposed standards is estimated at $486,000 for each on-site incinerator unit and $731,000 for each commercial unit. The total (pre-tax) national annualized cost is estimated to be $90 million for on-site and $25 million for commercial incinerators. These costs include a CEMS cost of $130,000 per source annually. The most expensive HAPs would be dioxins and mercury, for which BTF levels have been proposed, and would cost $3.0 million and $30 million respectively nationally at MACT floor levels, and $29.2 million and $37.2 million respectively at BTF levels. These costs include maintenance and operation of the equipment and CEMS. CEMS account for 18 percent of the total compliance cost. Details of these cost estimates have been provided in ''Second Addendum to the Regulatory Impact Assessment for Proposed Hazardous Waste Combustion Standards'' and are based on no market exit by any HWI and assuming that the facilities have only a limited ability to pass through the costs of the rule to generators.

The Agency, however, estimates that perhaps 4 of the 34 commercial facility units and up to 51 of the 184 on-site facility units would elect to cease

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[65] The average of emissions over a run is lower than the maximum hourly rolling average for the run. In addition, unheated FIDs report lower HC levels than a heated FID that would be required under today's proposal. Both of these factors would lead the Agency to underestimate the cost of compliance. On the other hand, the HC levels in the database were measured during worst-case, trial burn conditions. Thus, these emissions are likely to be much higher than during normal operations. This factor has lead the Agency to overestimate compliance costs.

[66] USEPA, ''Guidance on PIC Controls For Hazardous Waste Incinerators'', April 1990, EPA/530–SW–90–040.

burning hazardous wastes as a result of today's proposals. Most of these facilities burn small quantities of hazardous wastes. These facilities would likely find it more economical to transport the hazardous wastes to other facilities, while perhaps continuing to burn other non-hazardous and industrial wastes, in lieu of incurring expenditures to upgrade their units to continue to burn that small quantity of HW under MACT standards. As such, the total quantity of wastes burned would not be affected since those wastes would be burned by other HWCs, for which there appears to be sufficient capacity available.

B. Summary of MACT Standards For New Incinerators

1. Basis for MACT New

According to Section 112 of CAA, the degree of reduction in emissions deemed achievable for new facilities may not be less stringent than the emissions control achieved in practice by the best controlled similar unit. This section summarizes EPA's rationale for establishing MACT standards for new HWIs. The methodology for determining the standards for new incinerators is similar to that for existing sources, except that MACT floor control is based on the single best performing technology, and the MACT pool is expanded to consider emissions from any source using that technology. For more details see ''Draft Technical Support Document for HWC MACT Standards, Volume III: Selection of Proposed MACT Standards and Technologies''.

The Agency is proposing the following standards for new HWIs:

TABLE IV.3.B.1—PROPOSED MACT STANDARDS FOR NEW INCINERATORS

HAP or HAP surrogate	Proposed standard [a]
Dioxins/furans	0.2 ng/dscm TEQ.
Particulate matter	69 mg/dscm (0.030 gr/dscf).
Mercury	50 µg/dscm.
SVM [Cd, Pb]	62 µg/dscm.
LVM [As, Be, Cr, Sb]	60 µg/dscm.
HCl + Cl_2	67 ppmv.
CO	100 ppmv.
HC	12 ppmv.

[a] All emission levels are corrected to 7 percent O_2.

2. MACT New for Dioxin/Furans

a. MACT New Floor. EPA examined its emissions database and identified the single best performing existing source, and found that the test condition with the lowest PCDD/F TEQ emissions had a test-condition average of 0.005 ng/dscm. This facility employs a water quench and wet scrubbing air pollution control systems (APCSs). The D/F emission control by this source is being achieved by inhibiting the formation of D/F in the APCD by rapid quench of the hot gases from the combustion chamber. Therefore, the Agency selected wet scrubbing and low APCD inlet temperature (400° F) as the MACT floor control.

To determine an emission level that this the floor control could be expected to achieve, the Agency considered data from all HWIs using the MACT floor control. Using the same methodology as used for identifying the floor level for existing sources, the Agency identified a MACT floor level of 0.20 ng/dscm TEQ or an APCD inlet temperature of 400° F.

b. Beyond-the-Floor (BTF) Considerations. As discussed above for existing sources, the Agency selected activated carbon injection (ACI) as the BTF technology. ACI is routinely effective in removing greater than 95 percent of D/F from flue gases. The Agency had identified a BTF level of 0.2 ng/dscm TEQ for the same reasons discussed above for the BTF standard for existing sources.

The Agency also consider a carbon bed as a BTF technology to achieve lower emission levels. As discussed for existing sources, however, the Agency is concerned that the cost of carbon beds may not be warranted given the incremental emissions reduction over a ACI-based BTF standard.

3. PM Standard for New HWIs

The single best performing source in our database for PM emissions was a source equipped with a FF having an air to cloth ratio of 3.8 acfm/ft^2. Thus, this technology represents MACT new floor control. When we considered emissions data from all sources equipped with this level of control (or better), we identified a floor level of 0.039 gr/dscf.

The Agency considered more efficient PM control (e.g., lower air-to-cloth ratio, better bags) as BTF control that could achieve alternative BTF levels of 0.03 or 0.015 gr/dscf. These are the same controls investigated for BTF considerations for existing sources.

The Agency is proposing the same BTF standard for new sources as it is proposing for existing sources—(69 mg/dscm or 0.03 gr/dscf). This standard is readily achievable. The Agency is not proposing a 0.015 gr/dscf standard because, as discussed for existing sources, it is not clear that the additional cost is warranted considering the incremental reduction in PM.

4. Mercury Standard for New HWIs

a. MACT New Floor. The single best performing source in our database for Hg emissions was a source equipped with a wet scrubber (WS) and having a MTEC of 51 µg/dscm. The Agency considered any wet scrubbing device an equivalent control technology (when coupled with a MTEC up to 51 µg/dscm) because of the ability to scrub soluble forms of mercury species. Thus, the Agency identified MACT new floor control as any wet scrubber coupled with a MTEC up to 51 µg/dscm. When we considered emissions data from all sources equipped with this level of control, we identified a floor level of 115 µg/dscm.

b. Beyond-the-Floor Considerations. As for existing sources, the Agency considered the use of both activated carbon injection (ACI) and carbon bed (CB) as alternative BTF technologies. We are proposing a BTF standard of 50 µg/dscm for new sources based on use of ACI for the same reasons we are proposing this standard for existing sources.

5. Semivolatile Metals Standard for New HWIs

a. MACT New Floor. The single best performing source in our database for SVM emissions was a source equipped with a VS in combination with a IWS, and having a MTEC of 49,000 µg/dscm. The Agency considered a wet scrubber in combination with a FF (coupled with a MTEC up to 49,000 µg/dscm) to provide equivalent or better control of SVM. Thus, these technologies represent MACT new floor control. When we considered emissions data from all sources equipped with this level of control, we identified a floor level of 240 µg/dscm.

b. Beyond-the-Floor Considerations. The Agency believes that state-of-the-art FFs can achieve much lower emissions of SVM. For example, the Agency has determined that MWCs equipped with a FF can achieve more than a 99 percent reduction in SVM. See 59 FR 48198 (September 20, 1994). Given that we have identified a MACT new floor (design) level for cement kilns of 35 µg/dscm (see discussion in Section IV below), we believe that a design level of 35 µg/dscm for HWIs is achievable, reasonable, and appropriate. To ensure that a source that is designed to meet a SVM level of 35 µg/dscm can meet the standard 99 percent of the time (assuming the source has average within-test condition emissions variability for sources equipped with

ESPs and FFs), the Agency has established a standard of 62 µg/dscm.

We note that SVM emissions at this level are not likely to result in additional regulation of these sources to satisfy RCRA health risk concerns.

6. Low Volatile Metals Standard for New HWIs

a. MACT New Floor. The single best performing source in our database for LVM emissions was a source equipped with a VS with an MTEC of 1,000 µg/dscm. Given the LVM collection efficiency of a VS, the Agency considered any PM control device (e.g., ESP, IWS, FF) to provide equivalent or better collection efficiency. Thus, these technologies represent MACT new floor control. When we considered emissions data from all sources equipped with this level of control, we identified a floor level of 260 µg/dscm. (We note that this floor level for new sources is higher than the floor level proposed for existing sources. Although the statistically-derived emissions variability factor was added to the same test condition for both MACT existing floor and MACT new floor, the variability factor was greater for test conditions in the MACT new expanded pool.)

b. Beyond-the-Floor Considerations. The Agency believes that state-of-the-art PM control devices (e.g., ESPs, IWS, FFs) can achieve LVM emission levels well below the floor level. Given that we have identified a floor (design) level[67] for new CKs and new LWAKs of 35 µg/dscm and 26 µg/dscm, respectively (see discussion in Sections IV and V below), we believe that a BTF design level of 35 µg/dscm is achievable, reasonable, and appropriate for new HWIs. To ensure that a source that is designed to meet a LVM level of 35 µg/dscm can meet the standard 99 percent of the time (assuming the source has average within-test condition emissions variability for sources equipped with ESPs and FFs), the Agency has established a standard of 60 µg/dscm.

We note that LVM emissions at this level are not likely to result in additional regulation of these sources to satisfy RCRA health risk concerns.

As discussed elsewhere in today's proposal, we are encouraging but not requiring sources to document compliance with the metals standard using a multi-metal continuous monitoring system (CEMS). Given that available information indicates that a multi-metal CEMS could not effectively detect LVM emissions below 80 µg/dscm, we are proposing an alternative standard of 80 µg/dscm for sources that elect to document compliance with a CEMS.

7. HCl and Cl_2 Standards for New HWIs

a. MACT New Floor. The single best performing source in our database for HCl and Cl_2 emissions was a source equipped with a wet scrubber with a MTEC of 1.7E7 µg/dscm. The Agency considered any wet scrubber to be equivalent technology. Thus, MACT new floor control is defined as wet scrubbing with a MTEC up to 1.7E7 µg/dscm. When we considered emissions data from all sources equipped with this level of control, we identified a floor level of 280 ppmv.

b. Beyond-the-Floor Considerations. The Agency believes that state-of-the-art wet scrubbers can readily achieve better than 99 percent removal of HCl and Cl_2. Applying this removal efficiency to the test condition in our database with the highest average emission (i.e., 1,100 ppmv; no emission control device) results in an emission of 11 ppmv. We do not believe, however, that it is necessary to establish a BTF (design) level[68] this low for HCl and Cl_2. Accordingly, we believe that it is reasonable and appropriate to establish a design level of 25 ppmv which corresponds to a statistically-derived standard of 67 ppmv.[69]

We note that this level is consistent with the levels we are proposing for new CKs (67 ppmv BTF level) and new LWAKs (62 ppmv floor level). Further, we note that HCl and Cl_2 emissions at this level are not likely to result in additional regulation of these sources to satisfy RCRA health risk concerns.

8. Carbon Monoxide and Hydrocarbon Standards for New HWIs

As with existing sources, CO and HC in conjunction with PM remain the parameters of choice to monitor continuously for controlling non-dioxin organics. Current regulations require continuous monitoring of CO, but not of HC, and so the database of CO from incinerators is quite extensive. However, the format of our CO data is mostly on a run average basis as explained above. The CO levels of the best performing facility in this database are less than 10 ppmv hourly rolling average (HRA). The technology to achieve low level of non-dioxin organics is ''Good Combustion Practices'', which is the same as for existing sources.

As such, we are proposing the same MACT standards for CO and HC as for existing sources, but request comments on whether more stringent standards would be more appropriate for new sources. The promulgated standard for new large MWCs ranges from 50 to 150 ppmv based on type of the device and the Agency would like to consider more stringent levels for CO and HC that are representative of good combustion practices in new HWIs in the final rule.

9. MACT New Cost Impacts

The annualized incremental costs (capital, operation and maintenance) for a small, medium and large HWI based on today's proposed control levels are estimated at $336K, $514K and $772K, respectively. Major increases are due to installing FF, activated carbon injection (for D/F and Hg control) and scrubbing devices (for acid gas control). For this analysis, it was assumed that baseline facilities can comply with existing regulations using a wet scrubber and venturi-scrubber. Since the number of new facilities starting construction every year is uncertain, total annualized incremental cost for all the new HWIs in the U.S. due to today's proposal cannot be estimated. The above costs include increased costs of APCS' needed above baseline levels, and do not include costs of the main incinerator system or the ancillary systems like fans, stack etc. Details of these costs have been provided in the ''Regulatory Impact Assessment for the Proposed Hazardous Waste Combustion MACT Standards''.

C. Evaluation of Protectiveness

In order to satisfy the Agency's mandate under the Resource Conservation and Recovery Act to establish standards for facilities that manage hazardous wastes and issue permits that are protective of human health and the environment, the Agency conducted an analysis to determine if the proposed MACT standards satisfy RCRA requirements, or whether independent RCRA standards would be needed. These analyses were designed to assess both the potential risks to individuals living near hazardous waste combustion facilities who are highly exposed and risks to other less exposed individuals living near such facilities. The Agency evaluated potential risks both from direct inhalation exposures and from indirect exposures through deposition onto soils and vegetation and

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[67] That is, the log mean of runs for the test condition in the expanded MACT pool with the highest average emission. A within-test condition emissions variability factor (based on test conditions in the expanded MACT pool) is added to the log-mean for this test condition to derive the standard.

[68] An emissions variability factor would be added to the log-mean of the runs of this test condition to derive a standard.

[69] The variability factor is based on within-test condition emissions variability for incinerators equipped with wet scrubbers.

subsequent uptake through the food chain. The Agency evaluated a variety of exposure scenarios representing various populations of interest, including subsistence farmers, subsistence fishers, recreational anglers, and home gardeners.[70] In characterizing the risks within these populations of interest, both high-end and central tendency exposures were considered.

The primary exposure parameter considered in the high-end characterization was exposure duration. For the baseline, 90th percentile stack gas concentrations were also included in the high-end characterization to reflect the variability in current emissions. For dioxins at the floor, the high-end characterization also included 90th percentile stack gas concentrations to reflect the large variation in dioxin emissions using the floor technology (i.e., temperature control). For the MACT standards, the Agency used the design value which is the value the Agency expects a source would have to design in order to be assured of meeting the standard on a daily basis and hence is always a lower value than the actual standard for all HAPs controlled by a variable control technology.[71] The procedures used in the Agency's risk analyses are discussed in detail in the background document for today's proposal.[72]

The risk results for hazardous waste incinerators are summarized in Table III.C.1 for cancer effects and Table III.C.2 for non-cancer effects for the populations of greatest interest, namely subsistence farmers, subsistence fishers, recreational anglers, and home gardeners. The results are expressed as a range where the range represents the variation in exposures across the example facilities (and example water bodies for surface water pathways) for the high-end and central tendency exposure characterizations across the exposure scenarios of concern. For example, because dioxins bioaccumulate in both meat and fish, the subsistence farmer and subsistence fisher scenarios are used to determine the range.[73]

TABLE III.C.1.—INDIVIDUAL CANCER RISK ESTIMATES FOR INCINERATORS [1]

	Dioxins	Semi-volatile metals [2]	Low volatile metals [3]
Existing Sources			
Baseline	2E–9 to 9E–5	4E–9 to 7E–7	2E–10 to 4E–6
Floor	3E–9 to 5E–5 [4]	5E–8 to 5E–7	5E–8 to 8E–6
BTF	3E–9 to 2E–6 [5].		
New Sources			
Floor	3E–9 to 5E–5 [4]	5E–8 to 5E–7	5E–8 to 8E–6
BTF	3E–9 to 2E–6 [5].		
CEM Option [6]		2E–8 to 2E–7	4E–8 to 6E–6

[1] Lifetime excess cancer risk.
[2] Carcinogenic metal: cadmium.
[3] Carcinogenic metal: arsenic, beryllium, and chromium (VI).
[4] Based on 20 ng/dscm TEQ, the highest level known to be emitted at the floor.
[5] Based on 0.20 ng/dscm TEQ.
[6] Based on SVM standard of 60 μg/dscm and LVM standard of 80 μg/dscm (applicable only if the source elects to document compliance using a multi-metals CEM).

TABLE III.C.2.—INDIVIDUAL NON-CANCER RISK ESTIMATES FOR INCINERATORS [1]

	Semi-volatile metals [2]	Low volatile metals [3]	Hydrogen chloride	Chlorine
Existing Sources				
Baseline	<0.001 to 0.02	<0.001 to 0.2	0.001 to 0.05	0.008 to 0.7
Floor	<0.001 to 0.01	<0.001 to 0.09	0.02 to 0.05 [4]	0.07 to 0.3 [5]
New Sources				
Floor	<0.001 to 0.01	<0.001 to 0.09	0.02 to 0.05 [4]	0.07 to 0.3 [5]
BTF	<0.001 to 0.003	<0.001 to 0.03	0.004 to 0.01 [4]	0.02 to 0.07 [5]
CEM Option [6]	<0.001 to 0.004	<0.001 to 0.06.		

[1] Hazard quotient.
[2] Cadmium and lead.
[3] Antimony, arsenic, beryllium, and chromium.
[4] $HCl+Cl_2$ assuming 100 percent HCl.
[5] $HCl+Cl_2$ assuming 10 percent Cl_2.
[6] Based on SVM standard of 60 μg/dscm and LVM standard of 80 μg/dscm (applicable only if the source elects to document compliance using a multi-metals CEM).

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[70] In addition, the Agency evaluated a ''most exposed individual'' for the purpose of assessing inhalation risks. A most exposed individual (MEI) is operationally defined as an individual who resides at the location of maximum predicted ambient air concentration.

[71] For the semi-volatile and low volatility metals categories, the Agency assumed the source could emit up to the design value for each metal in the category for the purpose of assessing protectiveness.

[72] ''Risk Assessment Support to the Development of Technical Standards for Emissions from Combustion Units Burning Hazardous Wastes: Background Information Document,'' February 20, 1996.

[73] For the semi-volatile and low volatility metals categories, the inhalation MEI scenarios are also used. For hydrogen chloride and chlorine (Cl_2) only the inhalation MEI scenarios are used.

The risk analysis indicates that for the semi-volatile and low volatility metals category, the MACT standards for incinerators are protective at the floor for both existing and new sources. The analysis indicates that the CEM compliance option for new sources is also protective. For hydrogen chloride and chlorine (Cl_2), the MACT standards for incinerators are also protective at the floor for both existing and new sources. However, the analysis indicates that for dioxins the proposed beyond the floor standards, rather than the floor levels, are protective.

IV. Cement Kilns: Basis and Level for the Proposed NESHAP Standards for New and Existing Sources

Today's proposal would establish new emission standards for dioxins/furans, mercury, semivolatile metals (cadmium and lead), low volatile metals (arsenic, beryllium, chromium and antimony), particulate matter, acid gas emissions (hydrochloric acid and chlorine), particulate matter (PM), hydrocarbons, and carbon monoxide (for the by-pass duct) from existing and new hazardous waste-burning cement kilns. See proposed § 63.1204. The following discussion addresses how MACT floor and beyond-the-floor (BTF) levels were established for each HAP, and EPA's rationale for the proposed standards. The Agency's overall methodology for MACT determinations has been discussed in Part Three, Sections V and VI for existing sources and in Section VII for new sources.

To conduct the MACT floor analyses presented today, the Agency compiled all available emissions data from hazardous waste-burning cement kilns. As noted earlier, the vast majority of this database is comprised of compliance test emissions data generated as a result of Boiler and Industrial Furnace (BIF) rule requirements.[74] The Agency is also aware that additional emissions data will become available. Sources of new data include test reports generated from compliance recertification testing (required every three years under the BIF rule for interim status facilities; see § 266.103(d)), results from voluntary industry initiatives and testing programs, supplemental emissions testing conducted by individual companies, and data from pilot-scale research by EPA's Office of Research and Development. As timely and appropriate, notice of these additional data, if used as a basis for standards in this rulemaking, will be published to allow for review. However, we emphasize again that, for purposes of setting MACT standards, it is preferable to have data that reflect the normal, day-to-day operations and emissions. In addition, the Agency believes that this type of data will substantially assist in the appropriate resolution of some of the issues (e.g., variability, proper identification of sources in MACT floor pools, raw material feed contributions to emissions) that are raised in the following sections. We invite commenters to submit this type of data and to discuss these issues in their comments.

In addition, the Agency requests comments on whether we should use emissions data from cement kilns that no longer burn hazardous waste for MACT floor determinations.[75] Even though these cement kilns subsequently decided to stop burning waste, we believe that their emissions data represent the level of emission control achieved at a kiln burning hazardous waste and are therefore appropriate for use in a MACT analysis. Moreover, the air pollution control equipment employed by these facilities is similar in type, design and operation to equipment employed by the waste-burning industry as a whole.

The Agency conducted a preliminary analysis of the effect on MACT floor levels of removing these emissions data from consideration, and found no significant impacts (see discussion later in this section on MACT floor levels) other than for semivolatile metals and hydrocarbons in the by-pass duct. The SVM floor would rise from 57 μg/dscm (today's proposed floor level) to approximately 1200 μg/dscm.[76] This level is much higher than the cement industry can achieve.[77] Also, the Agency notes that a SVM floor of 1200 μg/dscm may necessitate the need to consider adopting further controls under RCRA to address potential risks that SVMs (especially cadmium) may pose.[78]

In addition, the by-pass duct HC floor would be affected because two-thirds of the HC data available to the Agency were generated by these cement plants and would no longer be considered in the analysis. This may make calculation of the HC MACT floor problematic using the current MACT approach due to the limited remaining emissions data. The remainder of the HAP floors would remain roughly at today's proposed levels.

If EPA were to decide to exclude data from cement kilns that no longer burn hazardous waste, the Agency then believes that emission data from cement kilns that have made significant modifications or retrofits to their manufacturing process (e.g., replacing a raw material with one with different characteristics, installing new control equipment) since the earlier emissions data were generated must also be considered for exclusion from MACT analysis. The Agency requests comment on whether we should use these emissions data (i.e., the data generated prior to significant process changes) in MACT analysis. The commenter should also address how the Agency could identify cement kilns that have made significant process changes and the scope of modifications or retrofits that would significantly impact emissions. Finally, since changes can affect some HAP emissions and not others, the commenter should address whether this issue should be decided on an individual HAP basis.

A. Summary of Standards for Existing Cement Kilns

This section summarizes EPA's rationale for identifying MACT for existing cement kilns that burn hazardous waste and the proposed emission limits. The discussion of MACT includes discussions of "floor" controls and considerations of "beyond-the-floor" controls. Table IV.4.A.1 summarizes the proposed emission limits.

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[74] By August 21, 1992, or by the applicable date allowed by an extension by the Regional Administrator, owners and operators of BIF facilities burning hazardous waste were required to conduct compliance testing and submit a certification of compliance with the emissions standards for individual toxic metals, HCl, Cl_2, particulate matter, and CO, and where applicable, HC and dioxin/furans. See 40 CFR § 266.103(c).

[75] Cement kilns no longer burning hazardous waste include three Southdown plants (Fairborn, OH, Knoxville, TN, and Kosmosdale, KY) and North Texas Cement (Midlothian, TX).

[76] The Agency notes that we are also taking comment on a SVM floor level of 160 μg/dscm (using an alternative approach discussed later in this section). A SVM floor level of 1200 μg/dscm appears unnecessarily high considering our proposed floor analysis and that of others (e.g., see Part Four, section 9).

[77] See letter from Craig Campbell, CKRC, to James Berlow, EPA, undated but received February 20, 1996. We note that, although the Agency is proposing a SVM standard of 57 μg/dscm, we invite comment on an alternative (and potentially preferable) approach to identify MACT floor technology which would result in a floor-based standard of 160 μg/dscm. See discussion on SVM floor later in this section. Because we identified the alternative approach late in the rule development process, we are inviting comment on the higher standard rather than proposing it.

[78] The Agency doubts that a MACT beyond-the-floor level would be warranted.

TABLE IV.4.A.1.—PROPOSED EMISSION STANDARDS FOR EXISTING CEMENT KILNS

HAP or HAP surrogate	Proposed standard [a]
Dioxin/furans (TEQ)	0.20 ng/dscm (TEQ).
Particulate Matter	69 mg/dscm (0.030 gr/dscf).
Mercury	50 µg/dscm.
SVM (Cd, Pb)	57 µg/dscm.
LVM (As, Be, Cr, Sb)	130 µg/dscm.
$HCl+Cl_2$ (total chlorides).	630 ppmv.
Hydro-carbons:	
Main Stack [b]	20 ppmv.
By-pass Stack [c]	6.7 ppmv.
Carbon Monoxide:	
Main Stack	N/A.
By-pass Stack [c]	100 ppmv.

[a] All emission levels are corrected to 7 percent O_2.

[b] Applicable only to long wet and dry process cement kilns (i.e., not applicable to preheater and/or precalciner kilns).

[c] Emissions standard applicable only for cement kilns configured with a by-pass duct (typically preheater and/or precalciner kilns). Source must comply with either the HC or CO standard in the by-pass duct. A long wet or long dry process cement kiln that has a by-pass duct has the option of meeting either the HC level in the main stack or the HC or CO limit in the by-pass duct.

1. Dioxin/Furans

a. MACT Floor. The Agency's analysis of dioxin/furan (D/F) emissions from HWCs and other combustion devices (e.g., municipal waste combustors and medical waste incinerators) indicates that temperature of flue gas at the inlet of the PM control device can have a major effect on D/F emissions.[79] D/F emissions generally decrease as the gas temperature of the PM control device decreases, and emissions are lowest when the gas temperature of the PM control device are below the optimum temperature window for D/F formation—450 °F to 650 °F.[80] Given that CKs operate their ESPs and FFs under a range of temperatures (i.e., from 350 °F to nearly 750 °F), the Agency is identifying MACT floor for D/F based on temperature control at the inlet to the ESP or FF.[81]

The emissions data for CKs includes results from 58 test conditions collected from 19 cement plants, with a total of 28 kilns being tested. The Agency's database shows that the average test condition D/F emissions ranged from 0.004 to nearly 50 ng/dscm (TEQ).

Kilns emitting D/F at or below levels emitted by the median of the best performing 12 percent of kilns had flue gas temperatures at or below 418°F at the inlet to the ESP or FF, while inlet temperatures for other kilns ranged to nearly 750°F. The Agency then evaluated D/F emissions from all kilns that operated the ESP or FF at 418°F or less and determined that 75 percent had D/F emissions less than 0.2 ng/dscm (TEQ). The other 25 percent of kilns generally had TEQs less than 0.8 ng/dscm (TEQ), although one kiln emitted 4.7 ng/dscm (TEQ).

The Agency is, therefore, identifying temperature control at the inlet to the ESP or FF at 418 °F as the MACT floor control. Given that 75 percent of sources achieve D/F emissions of 0.20 ng/dscm (TEQ) at that temperature, the Agency believes that it is appropriate to express the floor as ''0.20 ng/dscm (TEQ), or (temperature at the inlet to the ESP or FF not to exceed) 418 °F''. This would allow sources that operate at temperatures above 418 °F but that achieve the same D/F emissions as the majority of sources that operate below 418 °F (i.e., 0.20 ng/dscm (TEQ)) to meet the standard without incurring the expense of lowering the temperature at the ESP or FF.

EPA estimates that over 50 percent of CKs currently are meeting the floor level. The national annualized compliance cost[82] for CKs to reduce D/F emissions to 0.20 ng/dscm (TEQ) or control ESP or FF inlet temperature to below 418 °F would be $7.3 million for the entire hazardous waste-burning cement industry, and would reduce D/F TEQ emissions nationally by 830 grams/year (TEQ) or 96 percent from current baseline emissions.

b. Beyond-the-Floor (BTF) Considerations. The Agency has identified activated carbon injection (CI) at less than 400 °F as a BTF control for D/F for cement kilns because CI is currently used in similar applications such as hazardous waste incinerators, municipal waste combustors, and medical waste incinerators. The Agency is not aware of any CK flue gas conditions that would preclude the applicability of CI or inhibit the performance of CI that has been demonstrated for other waste combustion applications.

Carbon injection has been demonstrated to be routinely effective at removing greater than 95 percent of D/F for MWCs and MWIs and some tests have demonstrated a removal efficiency exceeding 99 percent at gas temperatures of 400 °F or less.[83] To determine a BTF emission level, the Agency considered the emission levels that would be expected to result from gas temperature control to less than 400 °F combined with CI.

To estimate emissions with temperature control only, the Agency considered the MACT floor database that indicates, as noted above, 25 percent of CKs operating the ESP or FF at temperatures above 418°F could be expected to emit D/F at levels above 0.2 ng/dscm (TEQ). Although the majority could be expected to emit levels of 0.8 ng/dscm (TEQ) or below, some could be expected to emit levels as high as 4.7 ng TEQ.

When CI is used in conjunction with temperature control, an additional 95 percent reduction in emissions could be expected. Accordingly, emissions with these BTF controls could be expected to be less than a range of 0.04 to 0.24 ng/dscm (TEQ) (i.e., 95 percent reduction from 0.8 ng and 4.7 ng, respectively). Given that CI reductions greater than 95 percent are readily feasible, the Agency believes that it is appropriate to identify 0.20 ng/dscm (TEQ) as a reasonable BTF level that could be routinely achieved.

The Agency notes that, because we have assumed a fairly conservative carbon injection removal efficiency of 95 percent to identify the 0.20 ng/dscm (TEQ) level, we believe that this approach adequately accounts for emissions variability at an individual kiln because CI removal efficiency is likely to be up to or greater than 99 percent. EPA thus believes that it is not necessary to add a statistically-derived variability factor to the 0.20 ng/dscm (TEQ) level to account for emissions variability at an individual kiln. Thus,

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[79] USEPA, ''Draft Technical Support Document For HWC MACT Standards, Volume III: Selection of Proposed MACT Standards and Technologies'', February 1996.

[80] For example, consider kiln #1 at the Ash Grove Cement Company in Chanute, Kansas. During BIF certification of compliance testing in 1992, Ash Grove dioxins/furans emissions exceeded 1.7 ng/dscm (TEQ) at a control device temperature of 435 °F. Testing in 1994 at a temperature of approximately 375 °F resulted in emissions less than 0.05 ng/dscm (TEQ).

[81] The Agency notes, however, that other factors can affect D/F emissions including presence of precursors in the feed or as a result of incomplete combustion and presence of compounds thought to inhibit surface-catalyzed formation of D/F such as sulfur. Thus, D/F emissions may be low (e.g., 0.2 ng TEQ per dcsm) even though the temperature of stack gas at the inlet to the ESP or FF may exceed 400–450 °F, and D/F emissions may be relatively high (e.g., 0.3–0.5 ng TEQ per dscm) even though the temperature may be below that range.

[82] Total annual compliance costs are before consolidation and do not incorporate market exit resulting from the proposed rule. Also, CEM costs assume that no facilities currently have a HC analyzer in place. Thus, these compliance costs may result in overstated annual compliance costs. See the ''Second Addendum to the Regulatory Impact Assessment for Proposed Hazardous Waste Combustion MACT Standards'', February 1996, for details.

[83] USEPA, ''Draft Technical Support Document for HWC MACT Standards, Volume III: Selection of Proposed MACT Standards and Technologies'', February 1996.

the 0.20 ng/dscm (TEQ) BTF level represents the proposed emission standard.

EPA solicits comment on this approach, and notes that if a statistically-derived variability factor were deemed appropriate with the assumed conservative CI removal efficiency, the BTF level of 0.20 ng/dscm (TEQ) would be expressed as a standard of 0.31 ng/dscm (TEQ). We note, however, that under this approach, it may be more appropriate to use a less conservative, higher CI removal efficiency of 99 percent (i.e., because emissions variability would be accounted for using statistics rather than in the engineering decision to use a conservative CI removal efficiency). Doing so would lower the 0.20 ng/dscm (TEQ) level to approximately 0.04 ng/dscm (TEQ) (i.e., 99 percent reduction from 0.8 ng and 4.7 ng results in levels of 0.008 ng to 0.047 ng/dscm (TEQ), respectively, and 0.04 ng is a reasonable value within this range). If so, the D/F standard would be about 0.15 ng/dscm (TEQ) (i.e., 0.04 ng/dscm TEQ plus the variability factor of 0.11 ng/dscm TEQ).

We note that although CI is normally a relatively inexpensive control technology to add to sources (with flue gas above the dew point) that already have PM controls at the 69 mg/dscm level, CKs present a special situation. This is because: (1) CI will remove Hg as well as D/F (see discussion below regarding BTF control for Hg); (2) CKs recycle as much collected PM as possible because it is useful raw material and doing so reduces cement kiln dust (CKD) management cost; (3) some CKs recycle the CKD by injecting it at the raw material feed end of the kiln where the D/F may not be destroyed; and (4) to remove Hg from the recycling system to ensure compliance with the Hg standard, a portion of the CKD would have to be wasted.[84]

Accordingly, EPA has assumed that CKs that have to use CI to meet the BTF standard (i.e., those that cannot achieve the standard with temperature control alone) would install the CI system after the existing ESP or FF and add a FF to remove the injected carbon with the adsorbed D/F (and Hg). Although adding a new FF in series is an expensive approach, it would enable CKs to meet both the proposed D/F and Hg standards (as well as the PM, SVM, and LVM standards). Thus, the cost of the CI and FF systems have been apportioned among these proposed standards.

EPA estimates that 40 percent of CKs are currently meeting this BTF level. The national incremental annualized compliance cost for the remaining CKs to meet this BTF level[85] rather than comply with the floor controls would be $6.6 million for the entire hazardous waste-burning cement industry, and would provide an incremental reduction in D/F (TEQ) emissions nationally beyond the MACT floor controls of 20 grams/year (TEQ).

EPA has considered costs in relation to emissions reductions and the special bioaccumulation potential that D/F pose and determined that proposing a BTF limit is warranted.[86] D/F are some of the most toxic compounds known due to their bioaccumulation potential and wide range of health effects at exceedingly low doses, including carcinogenesis. Further, as discussed elsewhere in today's preamble, EPA's risk analysis developed for purposes of RCRA shows that emissions of these compounds from hazardous waste-burning cement kilns could pose significant risks by indirect exposure pathways, and that these risks would be reduced by BTF controls. Finally, EPA is authorized to consider this non-air environmental benefit in determining whether to adopt a BTF level. As noted earlier, exposure via these types of indirect pathways was in fact a chief reason Congress singled out D/F for priority MACT control in section 112(c)(6).

Finally, EPA's initial view is that it may need to adopt further controls under RCRA to control D/F if it did not adopt the BTF MACT standard. This would defeat one of the purposes of this proposal, to avoid regulation of emissions under both statutes for these sources wherever possible. These risks would, however, be reduced to acceptable levels if emissions levels are reduced to 0.20 ng/dscm (TEQ).

For these reasons, the Agency is proposing a BTF level of 0.20 ng/dscm (TEQ) for D/F emitted from hazardous waste-burning cement kilns.

2. Particulate Matter

a. MACT Floor. Cement kilns have high particulate inlet loadings to the control device due to the nature of the cement manufacturing process; that is, a significant portion of the finely pulverized raw material fed to the kiln is entrained in the flue gas entering the control device. CKs use ESPs or FFs to control PM to a 0.08 gr/dscf standard under the BIF rule, unless the kiln is subject to the more stringent New Source Performance Standard (NSPS) (see 40 CFR 60.60 (Subpart F)) of 0.3 lb/ton of raw material feed (dry basis) to the kiln,[87] which is generally equivalent to 69 mg/dscm or 0.03 gr/dscf.

The PM emissions data for CKs includes results from 54 test conditions collected from 26 facilities, with a total of 34 units being tested. The Agency analyzed all available PM emissions data and determined that sources with emission levels at or below the level emitted by the median of the best performing 12 percent of sources used fabric filters with air-to-cloth (A/C) ratios of 2.3 acfm/ft^2 or less. Analysis of emissions data from all CKs using FFs with the 2.3 acfm/ft^2 A/C ratio or less resulted in a level of 0.065 gr/dscf.

Because the NSPS is a federally enforceable limit that many cement kilns are currently subject to, the Agency has chosen the existing NSPS standard, not the statistically-derived limit discussed above, as MACT for existing hazardous waste-burning CKs. Thus, the Agency is identifying a MACT floor for PM and is identifying the floor level as the NSPS limit of 69 mg/dscm (0.03 gr/dscf). Given that the NSPS standard was promulgated in 1971, the Agency believes that it is reasonable to consider it as the MACT floor level. We note further that 30 percent of cement kiln test conditions currently meet the 69 mg/dscm floor level.

As mentioned above, the NSPS standard for PM is expressed as 0.3 lb/ton of raw material (dry basis) feed to the kiln. Although we are proposing to establish the floor level as the MACT standard (see BTF discussion below) expressed as 69 mg/dscm (0.03 gr/dscf), we specifically invite comment on whether the standard should be expressed in terms of raw material feed. We are proposing a ''mg/dscm'' basis for the standard because a PM concentration in stack gas is commonly used for waste combustors-hazardous waste incinerators, municipal waste

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[84] We note that most CKs currently dispose of a portion of CKD to control clinker quality (i.e., to control alkali salts). Nonetheless, the economics of CKD management are uncertain at this time given impending Agency action to ensure proper management. Thus, we believe that CKs will increase efforts in the future to minimize the amount of CKD that is disposed.

[85] We note that not every source with D/F emissions currently exceeding 0.20 ng TEQ per dscm would need to install CI to meet the standard. As noted previously in the text, 75 percent of sources could be expected to meet the standard with temperature control only. In estimating the cost of compliance with the standard, EPA considered the magnitude of current emissions and current operating temperatures to project whether the source could comply with the standard with temperature control only.

[86] We note that the D/F BTF control technology, CI, would also be used to control mercury emissions beyond the floor.

[87] See § 60.62 Standard for particulate matter for further details.

combustors, and medical waste incinerators. We note, however, that using a ''mg/dscm'' basis for the CK standard would penalize the more thermally efficient dry kilns (generally preheater and precalciner kilns). This is because these kilns have lower stack gas flow rates per ton of raw material feed because they do not need to provide additional heat (by burning hazardous waste and/or fossil fuel) to evaporate the water in the raw material slurry. Thus, wet kilns have higher gas flow rates per ton of raw material than dry kilns because of increased combustion gas and water vapor. This higher stack gas flow rate dilutes the PM emissions and effectively makes a concentration-based standard less stringent for wet kilns. Consequently, the Agency will consider whether the final rule should express the floor standard as 0.3 lb/ton of raw material (dry basis) feed to the kiln.

EPA estimates that 30 percent of cement kiln test conditions (in our database) are currently meeting the floor level. The national annualized compliance cost for the remaining CKs to reduce PM emissions to the floor level would be $6.5 million for the entire hazardous waste-burning cement industry, and would reduce PM emissions nationally by 2400 tons per year.

b. Beyond-the-Floor Considerations. EPA considered but is not proposing a more stringent beyond-the-floor level (e.g., 35 mg/dscm (0.015 gr/dscf)) for cement kilns. For this analysis, EPA determined that it does not have adequate data to ensure that, given the high inlet grain loading caused by entrained raw material, CKs can routinely achieve that emission level day-in and day-out with a single PM control device—ESP or FF. We note that, to ensure compliance with a 35 mg/dscm standard 99 percent of the time, a source with average emissions variability must be designed and operated to achieve an emission level of approximately 18 mg/dscm (or 0.008 gr/dscf). EPA estimates that 15 percent of CKs currently have average PM emissions below 18 mg/dscm.

Reducing the floor level from 69 mg/dscm to a BTF level of 35 mg/dscm would require an improved technology such as the use of more expensive fabric filter bags (e.g., bags backed with a teflon membrane) or the addition of a FF for kilns with ESPs. The addition or upgrade of FFs to all kilns could potentially be cost effective, since to meet the proposed floor for SVM and LVM, as well as the proposed BTF for D/Fs and Hg, addition of a new FF is projected for a majority of the kilns (about 80 percent). Thus, a PM BTF level of 18 mg/dscm may be the incremental cost between a fabric filter with conventional fiberglass bags and state-of-the-art membrane-type bags for those kilns currently employing FFs; the addition of new FFs with membrane bags for those kilns with ESPs; or new FFs with membrane bags for the remaining facilities which are not projected to need upgrades to meet the floor and proposed BTF levels.

At first glance it may seem cost effective, primarily since an improved BTF PM level would lead to added benefits with reduced SVM, LVM, and condensed organics emissions. However, the Agency is uncertain how facilities will meet the proposed SVM, LVM, D/FS, and Hg levels. For example, kilns could meet the mercury BTF level with feedrate control or carbon injection without addition of a new FF (potentially incurring the penalty of reduced or eliminated kiln dust recycle). Additionally, CKs could meet the D/F BTF level with PM control device temperature reduction instead of carbon injection with an add-on FF. Finally, kilns could meet the SVM and LVM floor levels with feedrate control.

Therefore, many of the kilns may not add new FFs to comply with proposed floor (e.g., SVM, LVM) or proposed BTF levels (e.g., D/FS, Hg) and EPA's estimated engineering cost to meet the floor has been conservatively overstated. Thus, it may not be accurate to conclude that the BTF for PM is close to the incremental cost between FF fabric types. Under this circumstance, the incremental cost is more accurately the cost of many new FF unit additions which the Agency believes would not be cost effective. For these reasons the Agency believes it is not appropriate to propose a BTF PM standard of 35 mg/dscm for existing CKs. EPA specifically invites comment on whether the final rule should establish a BTF standard for PM of 35 mg/dscm (or 0.15 lb/ton of raw material (dry basis) feed into the kiln).

3. Mercury

a. MACT Floor. Mercury emissions from CKs are currently controlled by the BIF rule, and CKs have elected to comply with the BIF standard by limiting the feedrate of Hg in the hazardous waste feed.[88] Thus, the MACT floor level is based on hazardous waste feed control.

Mercury emissions from cement kilns range from 3 μg/dscm to an estimated 600 μg/dscm. The Agency has Hg emissions data from 42 test conditions collected from 21 cement plants, with a total of 28 kilns being tested. Since mercury is a volatile compound at the typical operating temperatures of ESPs and baghouses, collection of mercury by these control devices is highly variable (e.g., Hg removal efficiencies ranged from zero to more than 90 percent). Most of the mercury exits the kiln system as volatile stack emissions, with only a small fraction partitioning to the clinker product or CKD.

To identify the floor level for hazardous waste feed control, the Agency determined that sources with Hg emissions at or below the level emitted by the median of the best performing 12 percent of sources had normalized hazardous waste Hg feedrates, or MTECs, (i.e., maximum theoretical emission rates[89]) of 110 μg/dscm or less. Analysis of all existing cement kiln sources using this hazardous waste feedrate control resulted in a MACT floor level of 130 μg/dscm. To meet this standard 99 percent of the time, EPA estimates that a source with average emissions variability[90] must be designed and operated to routinely achieve an emission level of 81 μg/dscm.

We note that raw materials and fossil fuels also contribute to cement kiln Hg feedrates and emissions. Given that all sources must be able to meet the floor level using the floor control, we investigated whether all CKs could meet the floor level by only controlling hazardous waste Hg feedrate to the MACT MTEC of 110 μg/dscm. We have determined that all CKs in the Hg emissions database, except for one kiln with apparently anomalous data on mercury in raw material, would be able to meet the floor level using floor control.[91] The one kiln reported substantially higher Hg feedrates in the raw material than other kilns. We believe that this data may either be erroneous or the kiln may have spiked Hg into the raw material during BIF compliance testing. We specifically invite data and comment on the issue of normal Hg content in raw material.

EPA estimates that nearly 80 percent of CKs could currently comply with the floor level. The total annualized compliance cost for the remaining kilns

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[88] BIF Hg emission limits are implemented by establishing limits, in part, on the maximum feed rate of Hg in total feedstreams. Feedstream sources of mercury include hazardous waste, Hg spiking during compliance testing, raw material, coal and other fuels.

[89] MTEC is the hazardous waste Hg feedrate divided by the gas flow rate.

[90] This represents the variability of emissions among runs within a test condition included within the expanded MACT pool.

[91] USEPA, ''Draft Technical Support Document for HWC MACT Standards, Volume III: Selection of Proposed MACT Standards and Technologies'', February 1996.

to reduce Hg emissions to the floor level is estimated to be up to $7.5 million for the entire cement industry, and would reduce Hg emissions nationally by 7,200 lbs per year, or by 58 percent from baseline emissions.

b. Beyond-the-Floor Considerations. The Agency has considered two BTF control options for improved Hg control: flue gas temperature reduction to 400°F or less followed by either carbon injection (CI) or carbon bed (CB). Either control option would be implemented in conjunction with hazardous waste feedrate control of Hg. Due to the uncertainty surrounding the actions that cement kilns will undertake in achieving increased Hg control (i.e., with respect to reducing the Hg content of the hazardous waste received at the kiln versus installing the carbon injection technology to capture volatilized mercury without reducing Hg content in the hazardous waste feed), the Agency assumed a conservative emissions level attributable to feedrate control to which the Agency applied the BTF control technology (i.e., 300 μg/dscm). EPA believes that CI systems can routinely achieve Hg emission reductions of 80 to 90 percent or better[92] and that CB systems can routinely achieve Hg emissions of 90 to 99 percent or better.[93]

The BTF level under the CI-controlled option would, therefore, be 50 μg/dscm (corresponding to a design level of 30 μg/dscm), based on 90 percent reduction after the source has controlled its Hg emissions to 300 μg/dscm by limiting Hg in the hazardous waste. As discussed later, EPA is proposing a 50 μg/dscm based on this BTF option.[94]

The BTF level under the CB-controlled option would be 8 μg/dscm (corresponding to a design level of 5 μg/dscm), based on 99 percent reduction after the source has controlled its Hg emissions to 300 μg/dscm by limiting Hg in the hazardous waste.

We note that another control option for identifying BTF levels would be to consider the floor hazardous waste feedrate control—MTEC of 110 μg/dscm or less—an initial component of BTF control followed by either CI or CB. Under this approach, BTF emission levels would be identified by first assuming sources would impose only feedrate controls to meet the floor level of 130 μg/dscm (corresponding to a design level of 81 μg/dscm). Thus, a CI injection system at 90 percent removal could be expected to achieve a standard of 13 μg/dscm (corresponding to a design level of 8.1 μg/dscm). A CB system at 99 percent removal could be expected to achieve a design level of 0.8 μg/dscm to which an emissions variability factor would be added to identify the standard. EPA solicits comment on whether this option of applying BTF reduction based on CI or CB to the floor levels should be adopted.

We also note that an alternative approach to using a statistically-derived variability factor to account for emissions variability would be to assume a more conservative control efficiency for the CI or CB BTF technology. We believe that using a more conservative removal efficiency could be a means to adequately account for emissions variability given that actual emissions using the BTF control would be expected to be lower than the assumed emission level. Under this approach, we would more conservatively assume that CI-controlled systems could achieve a removal efficiency of 80 percent and that CB-controlled systems could achieve an efficiency of 90 percent. When these removal efficiencies are applied, this would result in emission standards of 16 μg/dscm for CI-controlled systems, and 8 μg/dscm for CB-controlled systems[95]. We invite comment on these alternative approaches to account for emissions variability at an individual plant.

EPA believes that CI is a cost-effective BTF control, and is proposing a 50 μg/dscm Hg emission standard based on that control in conjunction with a preceding estimated hazardous waste feedrate control resulting in an emissions level of 300 μg/dscm prior to the CI control. We estimate that 57 percent of CKs are currently meeting this level. The incremental national annualized compliance cost for the remaining CKs to meet this level rather than comply with the floor controls would be $7.8 million, and would provide an incremental reduction in Hg emissions of 2100 lbs per year nationally beyond the MACT floor controls.

We specifically are interested in comment on whether CB is a cost effective BTF control[96]. The CB-based BTF emission level would be 8 μg/dscm (assuming 90 percent removal efficiency). We estimate that 22 percent of CKs are currently meeting this level. The incremental national annualized compliance cost for the remaining CKs to meet this level rather than comply with the floor controls (and proposed CI-based level of 50 μg/dscm) is estimated to be $34.8 million and would provide an incremental reduction in Hg emissions nationally of 5,100 lbs per year from the floor.

The Agency also invites comment on whether special consideration should be given to kilns that may burn hazardous waste with non-detect levels of Hg.[97] Such kilns could be considered to be appropriately regulated, with respect to Hg emissions, by only the standards the Agency is developing for cement kilns that do not burn hazardous waste. Thus, today's proposed Hg standards for waste-burning kilns would be waived. To minimize implementation confusion and difficulties and to accommodate enforcement concerns, if a CK at any time burns hazardous waste with detectable levels of Hg, the kiln would be subject to today's proposed rules at all times, even if it subsequently burned waste with non-detect levels of Hg. Under the waiver, the owner and operator would be required to sample and analyze the hazardous waste as necessary to document that it continues to contain non-detect levels of Hg. We invite comment on whether such a deferral to another MACT standard (yet to be proposed for non-hazardous waste-burning CKs) is workable, given the potential for piece-meal permitting and enforcement.

EPA has considered costs in relation to emissions reductions and the special bioaccumulation potential that Hg poses and determined that proposing a BTF limit is warranted. Hg is one of the more toxic metals known due to its bioaccumulation potential and the adverse neurological health effects at low concentrations especially to the most sensitive populations at risk (i.e.,

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[92] Memorandum from Frank Behan, USEPA, to RCRA Docket. Discussion of mercury removal efficiency with activated carbon injection during an emissions test at a Lafarge Corporation cement kiln. February 26, 1996.

[93] USEPA, "Draft Technical Support Document for HWC MACT Standards, Volume III: Selection of Proposed MACT Standards and Technologies", February 1996.

[94] To achieve a standard of 50 μg/dscm 99 percent of the time, a source with average emissions variability must be designed and operated to achieve an emission level of 30 μg/dscm.

[95] The same approach could also be utilized with the previously discussed approach of applying the BTF control to an assumed emission level of 300 μg/dscm. When assuming the conservative removal efficiencies of 80 percent for CI and 90 percent for CB, this would result in BTF standards of 60 μg/dscm for CI-controlled systems and 30 μg/dscm for CB-controlled systems. Again a statistically-derived variability factor would not be added because emissions variability is accounted for by assuming conservative removal efficiencies for CI and CB systems.

[96] We also note that, while the Agency does not have information to conclude that application of the carbon bed technology would be problematic for cement kilns, carbon beds have never been tested at a full-scale cement kiln. Thus, we invite comment on the technical feasibility of CB control of Hg emissions from CKs.

[97] We also invite comment on what minimum detection levels would be acceptable.

unborn children, infants and young children). A more detailed discussion of human health benefits for mercury can be found in Part Seven of today's proposal. The indirect exposure pathway resulting from airborne deposition of Hg is of particular concern, and a particular reason that Congress singled out Hg for priority regulation in section 112(c)(6). See S. Rep. No. 228, 101st Cong. 1st Sess. at 153–55, 166. EPA is specifically authorized to take into account such non-air environmental benefits in assessing when to adopt BTF standards. As noted below, hazardous waste-burning cement kilns are a significant source of Hg emissions, and the BTF option will control those emissions from 75 percent over baseline and 47 percent over the floor. EPA believes the cost of controlling this especially dangerous HAP to be warranted in light of the extent of control, magnitude of emissions, limited effect on cost of treating hazardous waste (and no net effect on the cost of cement), and the fact that the control technology, carbon injection, will also control dioxins and furans. Finally, EPA notes that control of Hg at the BTF level should eliminate the uncertainty presently involved in individual RCRA permitting decisions where permit writers may develop site-specific permit limits beyond those required by current regulations if necessary to protect human health and the environment.

4. Semivolatile Metals

a. MACT Floor. Emissions of SVM from CKs are currently controlled under the BIF rule. Kilns use a combination of hazardous waste feedrate control and PM control to comply with those standards. Accordingly, MACT floor control is based on a combination of hazardous waste feedrate control and PM control.

The SVM emissions data for CKs includes results from 45 test conditions collected from 26 cement plants, with a total of 34 kilns being tested. Baseline emissions of the semivolatile metals group (consisting of cadmium and lead) ranged from 3 μg/dscm to slightly over 6,000 μg/dscm. Cadmium and lead are volatile at the usual high temperatures within the cement kilns itself, but typically condense onto the fine particulate at baghouse and ESP temperatures, where they are collected. As a result, control of semivolatile emissions is associated with PM control. However, because of the potential for adsorption for these two metals onto the fine PM that is less effectively collected than larger-sized PM, the control efficiency for semivolatile metals is likely to be lower than that for total PM. As discussed earlier, all cement plants currently use either baghouses or ESPs to control particulate emissions.

The Agency analyzed all available Cd and Pb emissions data and determined that sources with emission levels at or below the level emitted by the median of the best performing 12 percent of sources used fabric filters with air-to-cloth (A/C) ratios of 2.1 acfm/ft^2 or less for a kiln system with a hazardous waste MTEC of 84,000 μg/dscm or less. Analysis of emissions data from all CKs using FFs with the 2.1 acfm/ft^2 A/C ratio and with a HW MTEC of 84,000 μg/dscm or less resulted in a floor level of 57 μg/dscm.

EPA notes that raw materials and fossil fuels also contribute to cement kiln SVM feedrates and emissions. Given that all sources must be able to meet the floor level using the floor control, EPA investigated whether all CKs could meet the floor level employing the MACT technologies without being forced to substitute raw materials. Our preliminary evaluation determined that about 10 percent of sources had raw material containing Cd and Pb in greater concentrations than sources in the expanded MACT pool; thus, these sources may not be able to achieve the floor with MACT alone.[98] Before we reach any final conclusions on this point, the Agency believes that further data are needed on the normal, day-to-day levels of Pb and Cd in raw material feed.

In addition, one approach to address this issue (of sources with higher levels of SVM metals in their raw materials than sources in the expanded MACT pool and that, therefore, cannot meet the floor level using floor control) is to: (1) identify the source with the highest normalized (by MTEC) feedrate of metals in raw material; (2) assume the source is also feeding hazardous waste with the floor control MTEC level of the metals; and (3) project SVM emissions from the source based on combined raw material and hazardous waste MTECs using a representative system removal efficiency (SRE) from the expanded MACT pool considering an appropriate variability factor (e.g., variability of emissions among runs within a test condition in the expanded MACT pool). The Agency has not yet conducted this type of analysis, but intends to do so. Again, we also believe that data reflecting normal, day-to-day levels of Cd and Pb in raw material feed is important in pursuing this avenue of analysis. We invite comment on this approach.

The Agency also notes that the MACT pool for SVM consists entirely of CKs employing FF controls; that is, no cement plants with ESPs are in the MACT pool or expanded MACT pool. EPA believes that well designed, operated, and maintained ESPs can achieve good control of SVMs. In fact several CKS employing ESPs in our database currently achieve the floor level of 57 μg/dscm. Because the Agency is concerned that the SVM floor analysis may be overly exclusive (because comparably designed and operated ESPs were not considered in the MACT floor analysis) in identifying the floor MACT level and technology, EPA specifically requests comment on the merits of the following alternative floor approach. This approach identifies comparably designed and operated ESPs (in our SVM database) equivalent to the MACT FF (and at the MACT MTEC) and includes these sources in the analysis as an ‘‘equivalent technology’’ of MACT. The Agency has identified an ESP with an SCA of 500 ft^2/kacfm or better as an equivalent technology to the MACT FF with an A/C ratio of 2.1 acfm/ft^2. The Agency conducted this analysis and determined that the floor level would increase from 57 to 160 μg/dscm using this approach. To meet this standard 99 percent of the time, EPA estimates that a source with average emissions variability must be designed and operated to routinely achieve an emission level of 99 μg/dscm. EPA investigated whether all CKs could meet the floor level employing the MACT technologies without being forced to substitute raw materials and determined that all CKs (in the SVM emissions database) with the exception of one kiln would be able to meet the 160 μg/dscm level using this less restrictive MACT definition. The Agency specifically requests comment on this alternative floor approach and floor level.

EPA recognizes that PM, SVM, and LVM emissions from cement kilns are similarly controlled, in part, by a good PM control (e.g., ESP, FF). The floor control for SVM (FF with an A/C ratio of 2.1 acfm/ft^2) offers slightly more control than the floor control for LVM (FF with an A/C ratio of 2.3 acfm/ft^2 or an ESP with a SCA of 350 ft^2/kacfm). Thus, the controls necessary to achieve the SVM MACT floor level would appear to be governing for control of these HAPs.

EPA estimates that 33 percent of CKs are currently meeting the floor level of 57 μg/dscm. The national annualized compliance cost for the cement kilns to

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[98] USEPA, ‘‘Draft Technical Support Document for HWC MACT Standards, Volume III: Selection of Proposed MACT Standards and Technologies'', February 1996.

reduce SVM emissions to the floor level would be $13.1 million, and would reduce national Pb and Cd emissions by 29 tons per year or 94 percent from current baseline emissions.

b. Beyond-the-Floor Considerations. The Agency considered whether to propose a more stringent level than the floor of 57 µg/dscm, but believes that it would not be appropriate. Since control of SVM emissions is associated with PM control, a more stringent BTF level would require CKs to upgrade to more expensive fabric filter bags (e.g., bags backed with a teflon membrane) or the addition of a FF for kilns with ESPs. Even though the engineering costs to comply with a BTF SVM level would be modest for CKs, the resulting incremental reduction in SVM emissions from the floor level would be minimal. Thus, the Agency believes that lowering the SVM proposed standard is not warranted based on the minimal impact on overall SVM emissions; the floor already provides substantial control by reducing baseline SVM emissions by 94 percent. Thus, the Agency is proposing a MACT floor SVM standard of 57 µg/dscm for existing cement kilns.

5. Low-Volatile Metals

a. MACT Floor. Emissions of LVM from CKs are also currently controlled under the BIF rule. Kilns use a combination of hazardous waste feedrate control and PM control to comply with those standards. Accordingly, MACT floor control is based on a combination of hazardous waste feedrate control and PM control.

The Agency has LVM emissions data which consists of 45 test conditions collected from 26 cement plants, with a total of 35 kilns being tested. Average emissions of the low volatility metals group (arsenic, antimony, beryllium, and chromium) ranged from 4 µg/dscm to 520 µg/dscm. Due to the relatively low volatility of these metals, more than 70 percent of these metals typically partition to the clinker product while the remainder typically condense onto particulate and are collected in the APCD (in this case either an ESP or baghouse). Thus, performance of the control devices is an important factor in controlling LVM emissions.

To identify MACT floor, EPA characterized the LVM controls used by kilns emitting LVM at levels at or below the level emitted by the median of the best performing 12 percent of sources. MACT floor control is thus defined as: (1) a baghouse (i.e., fabric filter) with an air-to-cloth ratio of 2.3 acfm/ft^2 or less with a hazardous waste (HW) MTEC less than 140,000 µg/dscm; or (2) an ESP with specific collection area of 350 ft^2/kacfm with a HW MTEC less than 140,000 µg/dscm. Analysis of available emissions data for all CKs employing either of these controls resulted in a floor emissions level of 130 µg/dscm.

EPA notes that raw materials and fossil fuels also contribute to cement kiln LVM feedrates and emissions. Given that all sources must be able to meet the floor level using the floor control, EPA investigated whether all CKs could meet the floor level employing the MACT controls without being forced to substitute raw material feed. EPA determined that all CKs would be able to meet the floor level using floor control without switching raw materials.[99]

EPA estimates that 80 percent of CKs are currently meeting the floor level. The national annualized compliance cost for the cement kilns to reduce LVM emissions to the floor level would be $2.8 million for the entire hazardous waste-burning cement industry, and would reduce LVM national emissions by 1.7 tons per year or 49 percent from current baseline emissions.

b. Beyond-the-Floor Considerations. The Agency considered whether to propose a more stringent level than the floor of 130 µg/dscm. We determined that proposing such a BTF level is not warranted for several reasons: (1) It would not likely be cost effective; (2) LVM are not of particular concern because they are not bioaccumulative; and (3) establishing the MACT standard at the floor would not trigger the need for a more stringent RCRA standard.

Since control of LVM emissions is associated with PM control, a more stringent BTF level would require CKs to either install new control equipment or to upgrade existing control equipment (e.g., install more expensive FF bags). Even though the engineering costs to comply with a lower LVM BTF level would be moderate, the resulting reduction in LVM emissions is minimal since CK LVM national emissions are estimated to be 1.7 tons/year for the entire industry at the floor. Thus, a LVM BTF standard is not believed to be warranted based on this limited reduction in LVM emissions.

6. Hydrochloric Acid and Chlorine

a. MACT Floor. HCl and Cl_2 (also referred to as total chlorine) emissions from CKs are currently regulated by the BIF rule. CKs use the natural alkalinity of the limestone raw material and hazardous waste feedrate control (of total chlorine and chloride) to comply with those standards. No hazardous waste-burning cement kiln currently employs a dedicated control device (e.g., wet scrubber, venturi scrubber) designed specifically to remove HCl/Cl_2 from the flue gas. Accordingly, MACT floor is based on hazardous waste feedrate control.[100]

The Agency has HCl and Cl_2 emissions data consists of 52 test conditions collected from 26 cement plants, with a total of 35 kilns being tested. Total chlorine emissions from cement kilns range from less than 0.1 ppmv to 220 ppmv. To identify MACT floor, EPA identified the highest hazardous waste feed MTEC (i.e., normalized hazardous waste feedrate of total chlorine) used by kilns emitting HCl/Cl_2 at levels at or below the level emitted by the median of the best performing 12 percent of sources—1.6 g/dscm. The analysis of all available emissions data for kilns with a hazardous waste MTEC for total chlorine of 1.6 g/dscm or less resulted in a floor emissions level of 630 ppmv. Our data indicate that 100 percent of the test conditions in the Agency's database are achieving this floor value.

This determination is confounding given that the highest average emissions from any test condition in the entire database, irrespective of hazardous waste MTEC for total chlorine, was 220 ppmv. This anomalous finding is apparently attributable to: (1) The data set having very high average within-test-condition variability; and (2) adding the average variability factor to the log mean rather than the arithmetic mean of the single test condition with the highest arithmetic mean within the expanded MACT pool (those sources using MACT floor control). If that source had unusually high emissions variability, then the log mean could be substantially higher than the arithmetic mean, resulting in an unusually high emission level to which the variability factor was added.

Because of these concerns, the Agency invites comment on alternative approaches that may identify a more reasonable floor level. One approach could be to add the average variability factor for the data set to the arithmetic mean, rather than the log mean, of the highest test condition in the expanded

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[99] USEPA, ''Draft Technical Support Document for HWC MACT Standards, Volume III: Selection of Proposed MACT Standards and Technologies'', February 1996.

[100] Although owners and operators normally have no control over the control provided by raw material alkalinity, we note that kilns equipped with FFs appear to provide better control than kilns equipped with ESPs. This may be due to the longer time of contact between the gas stream and the alkaline dust as the gases pass through the dust bed on the bags.

MACT pool. In addition, if this still resulted in a calculated floor level greater than any emission level in the database, irrespective of hazardous waste MTEC for total chlorine, the floor level could be capped at the highest emission level in the database—220 ppmv.

As for the metals EPA notes that raw materials and fossil fuels also contribute to cement kiln chlorine feedrates and emissions. Given that all sources must be able to meet the floor level using floor control, EPA investigated whether all CKs could meet the floor level employing the MACT controls without being forced to substitute raw material. As discussed above, all CKs would be able to meet the floor level using floor control without switching raw materials.

Sources would not incur cost to comply with the proposed floor level because it is higher than any baseline emission levels in the entire database, and there would be no emissions reductions at the floor level.

b. Beyond-the-Floor Considerations. The neutralization provided naturally by alkaline raw materials essentially acts as a dry scrubber to help control HCl/Cl_2 emissions. Therefore, we do not believe that substantial further reductions could be achieved with the use of dry scrubber systems. Wet scrubbers, however, could be expected to provide 99 percent or greater removal of HCl/Cl_2.

BTF control is therefore being defined as a wet scrubber in conjunction with the floor control for hazardous waste chlorine feedrate (defined by a MTEC of 1.6 g/dscm). Given that the proposed floor level based on hazardous waste chlorine feedrate control only would be 630 ppmv, the resulting BTF level would be 6.3 ppmv (at 99 percent removal).

Selecting a more effective control technology such as a wet scrubber would be expensive and the Agency believes that a BTF level would not be appropriate. For example, in one alternate investigation, we evaluated a 25 ppmv HCl level. The Agency estimated in that case the national incremental annualized compliance cost to meet this level would be $17 million. This represents HCl/Cl_2 emissions reductions of 1,900 tons per year or a 71 percent reduction from baseline emissions. The Agency believes that the total incremental costs associated with a standard of 6.3 ppmv would be approximately equal to the incremental costs at a BTF level of 25 ppmv. We also note that, at a MACT floor standard of 630 ppmv, the Agency would not be required to establish a more stringent standard under RCRA to ensure protection of human health and the environment.

In summary, the Agency is proposing a MACT floor HCl/Cl_2 standard of 630 ppmv for existing cement kilns.

7. Carbon Monoxide and Hydrocarbons

a. MACT Floor. As discussed in Section I above, the Agency believes that control of non-dioxin organic HAP emissions can be achieved, in part, by establishing emissions limits on two surrogate compounds: (1) Carbon monoxide, and (2) hydrocarbons, and also by the presence of controls for D/F. Both CO and HCs are not listed HAPs, but the Agency is using them as surrogates for the enumerated organic HAPs of § 112(b)(1) which can be non-D/F products of incomplete combustion (PICs). The Agency is not proposing main stack MACT standards on carbon monoxide for existing cement kilns for reasons discussed below; however, those kilns with by-pass ducts would be required to either comply with a separate CO or HC limit in the by-pass duct.

i. Carbon Monoxide in the Main Stack. The Agency is not proposing a main stack CO limit because CO is not a universally reliable indicator of combustion intensity and efficiency in cement kilns due to CO generation by process chemistry and evolution from the trace organics in the raw material feedstocks.[101] These feedstocks can generate large quantities of CO emissions which are unrelated to the combustion efficiency of burning the waste and fuel. Whereas all the CO from incinerators is combustion-generated, the bulk of the CO from cement kilns can be the result of process events unrelated to the combustion conditions at the burner where the wastes are introduced, or CO can be produced from CO_2 (contained in the limestone) by dissociation at high sintering conditions. As a result, few cement kilns were able to certify compliance with the CO standard in the BIF rule (§ 266.104(b)), but instead complied with the alternative carbon monoxide standard of § 266.104(c) that allowed CO to exceed the 100 ppmv limit provided that stack gas concentrations of HCs did not exceed 20 ppmv. Thus, the Agency believes it inappropriate to establish a CO standard measured in the main stack for all cement kilns.

ii. Hydrocarbons in the Main Stack. CKs emit hydrocarbon (HC) emissions that result from incomplete combustion of fuels and desorption of trace levels or organic compounds from raw materials. These HC emissions contain organic HAPs. Organics in the raw materials are believed to be primarily from kerogen in the shale and limestone which has a porous structure allowing for organic deposits. These organics cause HC emissions because they are largely not destroyed given that combustion gases flow counter-current to the raw-materials (i.e., fuels are generally fired at the opposite end from where the raw materials are fed).

Even when a CK is operated under good combustion conditions (and thus is generating low or insignificant levels of fuel-related HC), HC levels resulting from organics in the raw materials can range from 10 to 400 ppmv. This makes it problematic to use HC as the only or the principal means to ensure good combustion efficiency of hazardous waste fuels to minimize emissions of toxic PICs (i.e., non-D/F organic HAPs).

Wet Process Kilns and Long Dry Process Kilns. The BIF rule currently limits HC levels in the main stack (i.e., the only kiln off-gas stack) of wet and long dry kilns to 20 ppmv. EPA is aware of five kilns that initially had stack HC levels exceeding the 20 ppmv limit. Four of the kilns changed the source of shale used as raw material to use a shale with lower organic content. (Shale comprises a small fraction of raw material feed.) The fifth kiln feeds limestone with (relatively) high levels of organic matter and has indicated that transporting an alternative source of limestone to the site may be prohibitively expensive. Other potential options, such as installing an afterburner to destroy organics or reconstructing the kiln system to otherwise destroy HC desorbed from the limestone, may likewise be prohibitively expensive approaches.

EPA has determined that MACT floor for HC control for wet and long dry kilns should be control based on the current federally-enforceable BIF standards (i.e., control of organics in raw materials coupled with operating under good combustion practices to minimize fuel-related HC), and the floor level should be the BIF limit of 20 ppmv HC for such kilns. We note further that the source could stop burning hazardous waste and avoid having to comply with the HC floor level.

Cement Kilns with By-pass Ducts. Kilns that are equipped with a by-pass duct (typically preheater or precalciner kilns) to divert a portion of the kiln off-gas to a separate PM control device monitor fuel-related HC separately from raw material-related HC. This is because the by-pass duct diverts the kiln gas before it enters the calcining zone where

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[101] See 56 FR at 7150, 7153–55 (February 21, 1991).

the organics from the raw material are desorbed. Thus, in general, fuel-related HC can be monitored in the by-pass duct, and raw material-related HC can be monitored in the main stack. We invite comment on whether hazardous waste fuel combustion by-products (e.g., chlorine) can react with organic compounds desorbed from raw material to form organic HAPs. If the Agency determines that hazardous waste firing can substantially (adversely) affect emissions of organic HAPs from the main stack, then we will consider limiting HC to 20 ppmv. This is the limit we are proposing today for long kilns without a by-pass duct. Monitoring HC in the by-pass is discussed later in this section.

The Agency's RCRA BIF rule does not control HC in the main stack of cement kilns that comply with the BIF HC limit in the by-pass duct because, under the RCRA rule, the Agency was concerned about PICs derived from hazardous waste combustion rather than toxic organics desorbed from raw materials. Therefore, any MACT standard for HC in the main stack of these types of kilns must be a BTF standard since the floor for these sources is uncontrolled, and these CKs do not otherwise control organic HAPs in their stack emissions.

The Agency is concerned that main stack HC emissions contain HAPs for several reasons: (1) Organics desorbed from raw materials, even absent any influence from burning hazardous waste, contain HAPs; (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 HAPs; and (3) some preheater and precalciner kilns feed containers of hazardous waste at the preheater or precalciner end of the kiln near the by-pass duct entrance such that hazardous waste PICs may not have time to combust efficiently. We are concerned that these hazardous waste PICs may be emitted from the main stack, and that monitoring of the by-pass duct may not be adequate to determine if inefficient combustion occurs. This is because the by-pass duct gas may not be representative of kiln off-gas when containers of hazardous waste are fed at the off-gas end of the kiln.

However, the Agency does not now have sufficient data to quantify the contribution of hazardous waste (if there is one) to HC emissions in the main stack, and therefore to develop a MACT BTF standard for main stack HC for this class of CKs. We are thus unable to propose controls for HC from main stacks of cement kilns with by-pass stacks. We invite data to remedy this situation as well as comment on this issue. We also invite comment on an alternative of the same 20 ppmv main stack HC standard for this class of cement kilns as for the others.

iii. Emissions Standards for By-pass Ducts.[102] The Agency is proposing that cement kilns with by-pass ducts monitor and comply with either a CO or HC concentration limit in the by-pass duct because levels of CO and HC in the by-pass gas are more representative of combustion efficiency than levels in the main stack.[103] The BIF rule currently limits HC (in the by-pass duct) to 20 ppmv.[104] MACT floor control is operating under good combustion conditions, including conditions that provide adequate oxygen, temperature, turbulence, and residence time. These controls will ensure that kilns with low organic-containing raw materials are operating under good combustion conditions to control PICs formed by the combustion of hazardous waste fuel.[105]

EPA's MACT analysis of the existing by-pass duct data of the best performing sources resulted in a HC MACT floor level of 6.7 ppmv. The Agency's database for CO in the by-pass is incomplete for the purposes of calculating a statistically-derived emission limit, but we believe that it is reasonable and appropriate to establish the by-pass CO floor level at the same level allowed in the BIF rule—100 ppmv. Under this standard the facility would have the option of complying with either the CO or HC standard in the by-pass duct.

The Agency also invites comment on requiring cement kilns with by-pass ducts to comply with both the CO *and* HC standard (measured in the by-pass duct). Given that CO in the by-pass duct should be related only to fuel combustion efficiency, monitoring of CO in addition to HC may be appropriate to ensure complete combustion of organics in the kiln; however, the Agency is concerned that some CO may be generated from the CO_2 by dissociation at high sintering temperatures and thus requests information and data on this option.

Cement kiln sources would not incur costs to comply with the proposed floor level since all cement kilns with by-pass ducts (for which EPA has data) currently meet the floor level for either HC or CO. EPA also notes that approximately half of cement kilns that measured both HC and CO in the by-pass achieved the floor level.

As mentioned above, the Agency is aware of a long wet process cement kiln that is unable to comply with either the CO limit of 100 ppmv or the HC limit of 20 ppmv in the main stack. This kiln cannot achieve either of these levels due to the relatively high organic matter content in the limestone. Since the majority of the raw material fed to the kiln is limestone, substitution with an alternative source of limestone with lower organic content is not readily feasible (e.g., prohibitively expensive transportation costs of a substitute raw material). The facility attempted to retrofit the kiln with a by-pass duct thus allowing monitoring of CO or HC in the by-pass duct as permitted by current BIF regulations. However, efforts to construct and engineer this kiln with a by-pass duct were not successful due to the length of the kiln.[106]

In coordination with state and regional officials, the cement kiln was retrofitted with a mid-kiln sampling port that continuously draws off a portion of the kiln combustion gas for analysis of HC or CO. Since this sampling port does not divert a minimum of 10 percent of the kiln off-gas from the kiln, it does not meet the Agency's current definition of a by-pass duct defined in § 266.104(g). The kiln's mid-kiln sampling port diverts approximately 7 to 8 percent of the kiln off-gas. The Agency specifically invites comment on allowing sources with a mid-kiln sampling port, or other kiln gas extraction mechanism, that is capable of continuously extracting a representative sample of kiln off-gas to comply with

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[102] Most precalciner and some preheater kilns are equipped with by-pass ducts where a portion (e.g., 5 to 30 percent) of the kiln exhaust is diverted to a separate APCD, and, sometimes, a separate stack. These gases are typically diverted to avoid a build-up of metal salts that can adversely affect the calcination process.

[103] Provided that: (1) hazardous waste is fired only into the kiln (i.e., not at any location downstream from the kiln exit relative to the direction of gas flow); and (2) the by-pass duct gas is representative of kiln gas. To ensure by-pass gas is representative of kiln gas, the by-pass duct must divert a minimum of 10 percent of kiln off-gas as currently required in the BIF rule. See 266.104(g).

[104] The BIF rule provides for an alternative emissions standard for CO of 100 ppmv. See § 104(f).

[105] When the by-pass duct is vented through a separate stack, compliance with limits on CO or HC would ensure application of MACT regarding fuel-related organic HAPs. When the by-pass is routed back into the main (only) stack, compliance with limits on CO or HC will likewise ensure application of MACT regarding fuel-related organic HAPs. Absent these controls on the by-pass duct, fuel-related organic HAPs could be either: (1) masked by raw material-related HAPs, if the raw material contains substantial organics; or (2) if the raw material contains low levels of organics, the kiln could comply with the main stack standard (if one were proposed) while operating under poor fuel combustion conditions.

[106] For example, the kiln experiences a substantial increase in length due to expansion during start-up as the kiln heats up to operating levels.

the same HC and CO standards proposed for kilns with by-pass ducts. Commenters should specifically address how the gas extraction system ensures that a representable sample of the kiln's fuel combustion gas would be monitored for HC or CO.

b. Beyond-the-Floor Considerations. EPA has considered BTF control for organic HAP emissions from the main stack of all CKs (including those with by-pass ducts) based on use of a combustion gas afterburner. We believe that a BTF level for CO of 50 ppmv and for HC of 6 ppmv are readily achievable with an afterburner, but not appropriate. Therefore, we are not proposing such a BTF standard. EPA has no data indicating that any cement kilns are currently meeting these BTF levels with existing controls. The annualized engineering costs for the cement kilns to meet these BTF levels is estimated to be $280 million, and would provide an incremental reduction in HC emissions nationally beyond the floor controls of approximately 1500 tons per year and 65,000 tons per year for CO.

8. MACT Floor Cost Impacts

The total national annualized compliance costs[107] for existing cement kilns to meet all the MACT floor levels are estimated to be $34 million with the cost per cement kiln averaging $777,000. On a cost per ton of hazardous waste burned, these total compliance costs equate to $40 per ton of waste. We estimate that up to 2 cement facilities will likely cease burning hazardous waste due to the compliance costs associated at the floor.

The Agency is proposing to go beyond-the-floor for two pollutants for existing cement kilns: dioxins/furans and mercury. The total national annualized compliance costs (i.e., total costs not incremental costs from the floor levels) to meet the dioxin/furan and mercury BTF levels in addition to the MACT floor levels for the remaining HAPs are estimated to be $44 million with the cost per cement kiln averaging $1.04 million. On a cost per ton of hazardous waste burned, these total compliance costs increase to $50 per ton of waste. Again, we estimate that up to 2 cement facilities will likely cease burning hazardous waste due to the compliance costs associated with the proposed standards.

B. MACT for New Hazardous Waste-Burning Cement Kilns

This section summarizes EPA's rationale for establishing MACT for new cement kilns for each HAP, HAP surrogate, or HAP group. Table IV.4.B.1. summarizes the proposed emissions limits for new cement kilns, which were determined using the analytical process described in Part Three, Section VII and in the technical background document.

TABLE IV.4.B.1.—PROPOSED MACT STANDARDS FOR NEW CEMENT KILNS

HAP or HAP surrogate	Proposed standard [a]
Dioxin/furans (TEQ)	0.20 ng/dscm (TEQ).
Particulate Matter	69 mg/dscm (0.030 gr/dscf).
Mercury	50 µg/dscm.
SVM (Cd, Pb)	55 µg/dscm.
LVM (As, Be, Cr, Sb)	44 µg/dscm.[b]
HCl + Cl_2 (total chlorides).	67 ppmv.
Hydrocarbons:	
Main Stack [c]	20 ppmv.
By-pass Stack [d]	6.7 ppmv.
Carbon Monoxide:	
Main Stack	N/A.
By-pass Stack [d]	100 ppmv.

[a] All emission levels are corrected to 7 percent O_2.

[b] An alternative standard of 80 µg/dscm would apply if the source elects to document compliance using a multi-metals CEM.

[c] Applicable only to long wet and dry process cement kilns (i.e., not applicable to preheater and/or precalciner kilns).

[d] Emissions standard applicable only for cement kilns configured with a by-pass duct (typically preheater and/or precalciner kilns). Source must comply with either the HC or CO standard in the by-pass stack. A long wet or long dry process cement kiln that has a by-pass duct has the option of meeting either the HC level in the main stack or the HC or CO limit in the by-pass duct.

1. MACT New for Dioxins/Furans

a. MACT New Floor. As for existing cement kilns, the Agency is identifying MACT new floor for D/F based on temperature control at the inlet to the ESP or FF. EPA characterized the single best performing source with the lowest TEQ dioxin/furan emissions and determined that the best performing source had an inlet temperature of 409°F or less.

The Agency then evaluated D/F emissions from all kilns that operated the ESP or FF at 409°F or less and determined that 75 percent had D/F emissions less than 0.2 ng/dscm (TEQ). The other 25 percent of kilns generally had TEQs less than 0.8 ng/dscm (TEQ), although one kiln emitted 4.7 ng/dscm (TEQ). The Agency notes that the MACT new expanded pool was virtually identical (with the exception of two test conditions) to the expanded pool of existing sources.

The Agency is, therefore, identifying temperature control at the inlet to the ESP or FF at 409°F as the MACT floor control. Given that 75 percent of sources achieve D/F emissions of 0.20 ng/dscm (TEQ) at that temperature, the Agency believes that it is appropriate to express the floor as "0.20 ng/dscm (TEQ), or (temperature at the inlet to the ESP or FF not to exceed) 409°F". This would allow sources that operate at temperatures above 409°F but that achieve the same D/F emissions as the majority of sources that operate below 409°F (i.e., 0.20 ng/dscm (TEQ)) to meet the standard without incurring the expense of lowering the temperature at the ESP or FF.

b. Beyond-The-Floor Considerations. The Agency has identified activated carbon injection (CI) at less than 400°F as a BTF control for D/F for cement kilns because CI is currently used in similar applications such as hazardous waste incinerators, municipal waste combustors, and medical waste incinerators. The Agency is not aware of any CK flue gas conditions that would preclude the applicability of CI or inhibit the performance of CI that has been demonstrated for other waste combustion applications.

Carbon injection has been demonstrated to be routinely effective at removing greater than 95 percent of D/F and some tests have demonstrated a removal efficiency exceeding 99 percent at gas temperatures of 400°F or less. To determine a BTF emission level, the Agency considered the emission levels that could result from gas temperature control to less than 400°F combined with CI.

As discussed for existing sources, when CI is used in conjunction with temperature control, an additional 95 percent reduction in emissions could be expected. Accordingly, emissions with BTF controls could be expected to be less than a range of 0.04 to 0.24 ng/dscm (TEQ) (i.e., 95 percent reduction from 0.8 ng and 4.7 ng, respectively). Given that CI reductions greater than 95 percent are readily feasible, the Agency believes that it is appropriate to identify 0.20 ng/dscm (TEQ) as a reasonable BTF level that could be routinely achieved.

The Agency notes that, because we have assumed a fairly conservative carbon injection removal efficiency of 95 percent to identify the 0.20 ng/dscm (TEQ) level, we believe that this approach adequately accounts for emissions variability at an individual kiln because CI removal efficiency is likely to be up to or greater than 99 percent. EPA thus believes that it is not

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[107] Compliance costs represent pre-tax compliance costs. Because compliance costs are tax-deductible, the portion of pre-tax costs borne by the firm would be between 70 and 80 percent of the values shown above, depending on the specific firm's margin tax bracket. See "Regulatory Impact Assessment for Proposed Hazardous Waste Combustion MACT Standards", November 13, 1995, for details.

necessary to add a statistically-derived variability factor to the 0.20 ng/dscm (TEQ) level to account for emissions variability at an individual kiln. Thus, the 0.20 ng/dscm (TEQ) BTF level represents the proposed D/F emission standard for new cement kilns.

EPA solicits comment on this approach, and notes that if a statistically-derived variability factor were deemed appropriate, the BTF level of 0.20 ng/dscm (TEQ) would be expressed as a standard of 0.31 ng/dscm (TEQ). We note, however, that under this approach, it may be more appropriate to use a less conservative CI removal efficiency (i.e., because emissions variability would be accounted for using statistics rather than in the engineering decision to use a conservative CI removal efficiency), thus lowering the 0.20 ng/dscm (TEQ) level to approximately 0.04 ng/dscm (TEQ) (i.e., 99 percent reduction from 0.8 ng and 4.7 ng results in levels of 0.008 ng to 0.047 ng/dscm (TEQ), respectively, and 0.04 ng is a reasonable value within this range). If so, the D/F standard would be about 0.15 ng/dscm (TEQ) (i.e., 0.04 ng/dscm TEQ plus the variability factor of 0.11 ng/dscm TEQ).

For similar reasons as discussed for existing cement kilns, the Agency is proposing a BTF standard for D/F of 0.20 ng/dscm (TEQ) for new hazardous waste-burning cement kilns. Costs for new sources are discussed in ‘‘Regulatory Impact Assessment for Proposed Hazardous Waste Combustion MACT Standards’’.

2. MACT New for Particulate Matter

a. MACT New Floor. The Agency analyzed all available PM emissions data and determined that the control used by the single best performing source used a fabric filter with an air-to-cloth (A/C) ratio of 1.8 acfm/ft^2 or less. Analysis of emissions data from all CKs using FFs with the 1.8 acfm/ft^2 A/C ratio or less resulted in a level of 0.065 gr/dscf.

For similar reasons discussed for existing cement kilns, the Agency has chosen the existing NSPS standard (an established regulatory benchmark for PM), not the statistically-derived limit, as the MACT for existing hazardous waste-burning cement kilns. Thus, the Agency is identifying a MACT floor for PM and is identifying the floor level as the NSPS limit of 69 mg/dscm (0.03 gr/dscf) because it is the lowest federally enforceable emission standard.

b. Beyond-the-Floor Considerations. EPA considered but is not proposing a more stringent BTF level (e.g., 35 mg/dscm (0.0105 gr/dscf)) for new cement kilns. For the same reasons discussed for existing sources, the Agency believes that a more stringent level than the floor is not warranted.

3. MACT New for Mercury

a. MACT New Floor. As discussed earlier, hazardous waste-burning cement kilns control their mercury input (and therefore much of their emissions) through control of the mercury content in the hazardous waste. The Agency is defining the MACT floor technology as feedrate control with a hazardous waste MTEC less than 28 μg/dscm based on performance of the best performing source. Analysis of all existing cement kiln sources using this hazardous waste feedrate control resulted in a MACT new floor level of 82 μg/dscm. EPA estimates that a source with average emissions variability must be designed and operated to routinely achieve an emission level of 58 μg/dscm to meet this standard 99 percent of the time. Expanded MACT pools are identical. The MACT new floor analysis results in the same floor as existing sources because their respective expanded MACT pools are identical.

EPA solicits comment on an alternative method to establishing the MACT new floor. Under this alternative, the floor analysis would be similar to the approach proposed today except that the variability factor would be added to the average emissions from the single best performing source. By contrast, under the approach proposed today, the variability factor is added to the emissions of the highest emitting source in the expanded MACT pool. Thus, under this alternative the only purpose that expanding the MACT pool would serve is to identify the variability factor. EPA notes that this approach results in a MACT new floor of 53 μg/dscm (4.4 μg/dscm (average emissions from the best performing source) plus the statistically-derived variability factor of 49 μg/dscm).

b. Beyond-the-Floor Considerations. The Agency has considered the same BTF control alternatives for improved Hg control for new cement kilns: hazardous waste feedrate control of Hg in conjunction with flue gas temperature reduction to 400°F or less followed by either carbon injection (CI) or carbon bed (CB). The BTF design emission level under the CI-controlled option is 30 μg/dscm (assuming a source has controlled its Hg emissions to 300 μg/dscm controlling Hg feed in the hazardous waste). The BTF emission standard corresponding to a design level of 30 μg/dscm would be 50 μg/dscm[108]. The Agency is proposing 50 μg/dscm as the MACT standard for new cement kilns. The Agency specifically requests comment on establishing BTF emission standards based on the alternative approaches discussed for existing cement kilns.

4. MACT New for Semivolatile Metals

a. MACT New Floor. MACT new control is based on hazardous waste feedrate control and PM control. EPA characterized the single best performing source with the lowest SVM emissions and determined that the best performing source used a fabric filter with an air-to-cloth ratio of 2.1 acfm/ft^2 or less for a kiln system with a hazardous waste (HW) MTEC of 36,000 μg/dscm or less. Analysis of all sources (i.e., expanded MACT pool of facilities) using this technology or better resulted in a floor level of 55 μg/dscm for new cement kilns.

EPA solicits comment on an alternative method to establishing the MACT new floor. Under this alternative, the floor analysis would be similar to approach proposed today except that the variability factor would be added to the average emissions from the single best performing source. Thus, the expanded MACT pool serves only to identify the variability factor of the floor technology. EPA notes that this approach results in a MACT new floor of 39 μg/dscm (4 μg/dscm (average emissions from the best performing source) plus the statistically-derived variability factor of 35 μg/dscm).

b. Beyond-the-Floor Considerations. The Agency considered a more stringent level than the floor level of 55 μg/dscm based on improved collection efficiency of the MACT floor FF. Since this level is virtually identical to the floor level for existing sources and considering that EPA is not proposing standards more stringent than the floor for existing sources, the Agency believes for the same reasons that a more stringent floor level is not warranted for new sources as well. Finally, we note that establishing the MACT standard at the floor would not trigger the need for a more stringent standard under RCRA.

5. MACT New for Low-Volatile Metals

a. MACT New Floor. MACT new control is based on hazardous waste feedrate control and PM control. EPA characterized the best particulate control device, and identified the floor technology as a baghouse (i.e., fabric filter) with an air-to-cloth ratio of 2.3 acfm/ft^2 or less with a hazardous waste

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[108] To achieve a standard of 50 μg/dscm 99 percent of the time, a source with average emissions variability must be designed and operated to achieve an emission level of 30 μg/dscm.

(HW) MTEC less than 25,000 µg/dscm. Analysis of the expanded MACT pool resulted in a floor emissions level of 44 µg/dscm for new cement kilns.

EPA solicits comment on an alternative method to establishing the MACT new floor. Under this alternative, the floor analysis would be similar to the approach proposed today except that the variability factor would be added to the average emissions from the single best performing source. Thus, the expanded MACT pool only serves to identify the variability factor of the floor technology. EPA notes that this approach results in a MACT new floor of 30 µg/dscm (4 µg/dscm (average emissions from the best performing source) plus the statistically-derived variability factor of 26 µg/dscm).

b. Beyond-the-Floor Considerations. The Agency considered a more stringent level than the floor of 44 µg/dscm based on improved collection efficiency of the MACT floor FF. We initially determined that selecting such a BTF level is not warranted for several reasons: (1) It would not likely be cost effective considering the small increment of LVMs removed; (2) LVM are not of particular concern because they are not bioaccumulative; (3) establishing the MACT standard at the MACT new floor would not trigger the need for a more stringent RCRA standard.

The Agency is proposing an alternative compliance option for LVMs for new cement kilns. Because the Agency anticipates the likelihood of development of a multi-metals continuous emissions monitor (CEM) in the near future and considering that the estimated detection limit for the CEM to be approximately 80 µg/dscm for the LVM metals combined, the Agency is proposing an alternative standard of 80 µg/dscm should the source elect to document compliance using a multi-metals CEM. Thus, the LVM standard is different depending on the compliance method selected.

6. MACT New for Hydrochloric Acid and Chlorine

a. MACT New Floor. Cement kilns use the natural alkalinity of the limestone used as raw material and hazardous waste feedrate control to control HCl and Cl_2 emissions. Thus, the MACT floor is based on hazardous waste feedrate control.

EPA characterized the single best performing source with the lowest HCl/Cl_2 emissions and determined that the best performing source used feedrate control with a hazardous waste (HW) MTEC of 1.6 g/dscm or less. (Combined emissions of HCl and Cl_2 were expressed as HCl equivalents.) Analysis of the expanded MACT pool of facilities resulted in a floor level of 630 µg/dscm for new cement kilns, which is the same result as for existing cement kiln sources because the expanded MACT pools are identical for both existing and new cement kilns.

Again, as discussed for existing cement kilns, this determination is confounding given that the highest average emissions from any test condition in the entire database, irrespective of hazardous waste MTEC for total chlorine, was 220 ppmv. This anomalous finding is apparently attributable to: (1) The data set having very high average within-test-condition variability; and (2) adding the average variability factor to the log mean rather than the arithmetic mean of the test condition within the expanded MACT pool (those sources using MACT floor control) with the highest arithmetic mean. If that source had unusually high emissions variability, then the log mean could be substantially higher than the arithmetic mean, resulting in an unusually high emission level to which the variability factor was added.

Because of these concerns, the Agency invites comment on alternative approaches that may identify a more reasonable floor level. One approach could be to add the average variability factor for the data set to the arithmetic mean, rather than the log mean, of the highest test condition in the expanded MACT pool. In addition, if this still resulted in a calculated floor level greater than any emission level in the database, irrespective of hazardous waste MTEC for total chlorine, the floor level could be capped at the highest emission level in the database—220 ppmv.

b. Beyond-the-Floor Considerations. BTF control is being defined as a wet scrubber in conjunction with the floor control for hazardous waste chlorine feedrate. As discussed earlier for existing systems, more stringent HCl and Cl_2 control based on use of wet scrubbers is readily achievable. The Agency is aware of two cement kilns (not burning hazardous waste) that employ a wet and dry scrubber, respectively, capable of HCl/Cl_2 capture. Wet scrubber use within the hazardous waste incineration industry is well established also, often achieving capture efficiencies exceeding 99 percent. Considering that average HCl/Cl_2 emissions from existing cement kilns range from less than 1 ppmv to 220 ppmv and that a well-designed and operated wet scrubber would be expected to achieve removal efficiencies greater than 90 percent, if not higher, the Agency believes that HCl/Cl_2 control to a standard of 67 ppmv (corresponding to a design level of 25 ppmv[109]) is readily achievable.[110] Thus the Agency is proposing a HCl/Cl_2 standard of 67 ppmv for new cement kilns. See ‘‘Regulatory Impact Assessment for Proposed Hazardous Waste Combustion MACT Standards’’ for further details on the costs.

7. MACT New for Carbon Monoxide and Hydrocarbons

a. MACT Floor. The Agency believes that control of non-dioxin organic HAP emissions (i.e., non-dioxin PICs that are also HAPs) can be achieved by establishing emissions limits on hydrocarbons and carbon monoxide. As discussed earlier for existing cement kilns, the Agency is proposing a MACT standard of 20 ppmv for HCs in the main stack (not applicable for preheater and precalciner kilns), and either a CO limit of 100 in the by-pass duct or HC standard of 6.7 ppmv in the by-pass duct. Thus, the proposed standards for new cement kilns are identical to those for existing kilns.

b. Beyond-the-Floor Considerations. As for existing sources the Agency requests comment on a main stack hydrocarbon standard of 6 ppmv and a carbon monoxide standard of 50 ppmv for all new cement kilns (including those with by-pass ducts) based on performance of a combustion gas afterburner to burn-out incompletely combusted organics that escape the primary combustion zone.

8. MACT New Cost Impacts

A discussion of the costs and economic impacts for new cement kilns is presented in Part Seven of today’s proposal.

C. Evaluation of Protectiveness

In order to satisfy the Agency’s mandate under the RCRA to establish standards for facilities that manage hazardous wastes and issue permits that are protective of human health and the environment, the Agency conducted an analysis to assess the extent to which

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[109] Considering the highest total chlorine data point of 220 ppmv with a 90 percent removal efficiency yields a design level of approximately 25 ppmv.

[110] The Agency notes that assuming a 99 percent capture efficiency would result in a design level of approximately 2.2 ppmv (corresponding to an emission level of 6.7 ppmv). Since the application of wet scrubbers is still limited in the cement industry, EPA believes that a total chlorine standard of 6.7 ppmv is unnecessarily low and is thus assuming a more conservative total chlorine removal efficiency of 90 percent. In addition, the Agency notes that further controls under RCRA would not be necessary at a level of 67 ppmv (corresponding to a design level of 25 ppmv) for new cement kilns.

potential risks from current emissions would be reduced through implementation of MACT standards. The analysis conducted for hazardous waste-burning cement kilns is similar to the one described above for hazardous waste incinerators. The procedures used in the Agency's risk analyses are described in detail in the background document for today's proposal.[111] In evaluating the MACT standards, the Agency used the design value which is the value the Agency expects a source would have to design to in order to be assured of meeting the standard on a daily basis and hence is always a lower value than the actual standard for all HAPs controlled by a variable control technology.[112]

The risk results for hazardous waste-burning cement kilns are summarized in Table IV.4.C.1 for cancer effects and Table IV.4.C.2 for non-cancer effects for the populations of greatest interest, namely subsistence farmers, subsistence fishers, recreational anglers, and home gardeners. The results are expressed as a range where the range represents the variation in exposures across the example facilities (and example waterbodies for surface water pathways) for the high-end and central tendency exposure characterizations across the exposure scenarios of concern. For example, because dioxins bioaccumulate in both meat and fish, the subsistence farmer and subsistence fisher scenarios are used to determine the range.[113]

TABLE IV.4.C.1—INDIVIDUAL CANCER RISK ESTIMATES FOR CEMENT KILNS [1]

	Dioxins	Semi-volatile metals [2]	Low volatile metals [3]
Existing Sources			
Baseline	1E–8 to 9E–5	1E–9 to 4E–7	5E–11 to 5E–7
Floor	4E–9 to 2E–5 [4]	3E–9 to 1E–7	9E–9 to 4E–6
BTF	4E–9 to 2E–6 [5].		
New Sources			
Floor	4E–9 to 2E–5 [4]	3E–9 to 1E–7	3E–9 to 1E–6
BTF	4E–9 to 2E–6 [5].		
CEM Option [6]		3E–9 to 1E–7	1E–8 to 4E–6

[1] Lifetime excess cancer risk.
[2] Carcinogenic metal: cadmium.
[3] Carcinogenic metals: arsenic, beryllium, and chromium (VI).
[4] Based on 0.2 ng/dscm TEQ as a central tendency estimate and 1.4 ng/dscm TEQ as a high-end estimate.
[5] Based on 0.20 ng/dscm TEQ.
[6] Based on SVM standard of 60 µg/dscm and LVM standard of 80 µg/dscm (applicable only if the source elects to document compliance using a multi-metals CEM).

TABLE IV.4.C.2.—INDIVIDUAL NON-CANCER RISK ESTIMATES FOR CEMENT KILNS [1]

	Semi-volatile metals [2]	Low volatile metals [3]	Hydrogen chloride	Chlorine
Existing Sources				
Baseline	<0.001 to 0.06	<0.001 to 0.004	<0.001 to 0.04	<0.001 to 0.06
Floor	<0.001 to 0.004	<0.001 to 0.01	0.01 to 0.1 [4]	0.05 to 0.8 [5]
New Sources				
Floor	<0.001 to 0.004	<0.001 to 0.005	0.01 to 0.1 [4]	0.05 to 0.8 [5]
BTF			0.001 to 0.01 [4]	0.005 to 0.08 [5]
CEM Option [6]	<0.001 to 0.004	<0.001 to 0.01		

[1] Hazard quotient.
[2] Cadmium and lead.
[3] Antimony, arsenic, beryllium, and chromium.
[4] HCl + Cl_2 assuming 100 percent HCl.
[5] HCl + Cl_2 assuming 10 percent Cl_2.
[6] Based on SVM standard of 60 µg/dscm and LVM standard of 80 µg/dscm (applicable only if the source elects to document compliance using a multi-metals CEM).

The risk analysis indicates that for the semi-volatile and low-volatile metals categories, the MACT standards for cement kilns are protective at the floor for both existing and new sources. The analysis indicates that the CEM compliance option for new sources is also protective. For hydrogen chloride and chlorine (Cl_2), the MACT standards for cement kilns are also protective at the floor for both existing and new sources. However, the analysis indicates

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[111] "Risk Assessment Support to the Development of Technical Standards for Emissions from Combustion Units Burning Hazardous Wastes: Background Information Document," February 20, 1995.

[112] For the semi-volatile and low volatility metals categories, the Agency assumed the source could emit up to the design value for each metal in the category for the purpose of assessing protectiveness.

[113] For the semi-volatile and low volatility metals categories, the inhalation MEI scenarios are also used. For hydrogen chloride and chlorine (Cl_2) only the inhalation MEI scenarios are used.

that for dioxins the proposed beyond the floor standards, rather than the floor levels, are protective.

V. Lightweight Aggregate Kilns: Basis and Level for the Proposed NESHAP Standards for New and Existing Sources

Today's proposal would establish maximum achievable control technology (MACT) emissions standards for dioxin/furans, mercury, semivolatile metals (cadmium and lead), low volatile metals (arsenic, beryllium, chromium, and antimony), particulate matter (PM), acid gas emissions (hydrochloric acid plus chlorine), hydrocarbons, and carbon monoxide from existing and new hazardous waste-burning lightweight aggregate kilns (LWAKs). See proposed § 63.1205. The following discussion addresses how MACT floor and beyond-the-floor (BTF) levels were established for each HAP and EPA's rationale for the proposed standard. The Agency's overall procedural approach for MACT determinations has been discussed in Part Three, Sections V and VI for existing sources and in Section VII for new sources.

Again, the Agency wishes to emphasize that these standards were developed using a database that contains primarily short-term certification of compliance data that may not adequately reflect more normal, day-to-day operations and emissions. As noted earlier, EPA believes it preferable to use long-term, more normal operating emissions data for MACT standard-setting purposes and specifically invites commenters to submit this type of data.

A. Summary of MACT Standards for Existing LWAKs

This section summarizes EPA's rationale for establishing the MACT floor emission level and choosing MACT for existing LWAKs for each HAP, HAP surrogate, or HAP group.

Table IV.5.A.1 summarizes the MACT standards for existing LWAKs. The basis for the floor level and BTF considerations for each HAP or HAP surrogate is then discussed.

Table IV.5.A.1.—PROPOSED MACT STANDARDS FOR EXISTING LWAKS

HAP or HAP surrogate	Proposed standards [1]
Dioxin/furans	0.20 ng/dscm TEQ.
Particulate Matter	0.030 gr/dscf (69 mg/dscm)
Mercury	72 µg/dscm.
SVM [Cd, Pb]	12 µg/dscm.[2]
LVM [As, Be, Cr, Sb]	340 µg/dscm.
$HCl + Cl_2$	450 ppmv.
CO	100 ppmv.
HC	14 ppmv.

[1] All emission levels are corrected to 7 percent O_2.

[2] An alternative standard of 60 µg/dscm would apply if the source elects to document compliance using a multi-metals CEM.

1. Dioxin/Furans

a. MACT Floor. EPA has obtained dioxin/furan (D/F) emissions data for only one LWAK. The data indicated an average test condition D/F emission of 0.04 ng/dscm (TEQ). Based on the Agency's data on the performance of D/F control technology, the Agency is identifying the MACT floor for D/F based on temperature control at the inlet to the fabric filter. EPA is therefore identifying the MACT floor level for D/F emissions from LWAKs as 0.20 ng/dscm (TEQ) or (temperature at the PM control device not to exceed) 418° F.

Given that EPA is not aware of any LWAKs that exceed the floor level, the rule would not require these sources to incur costs to achieve compliance.

The Agency recognizes that its data on dioxin/furan emissions from LWAKs is limited. Therefore, the Agency is inviting commenters to submit additional performance data on LWAK D/F emissions.

b. Beyond-The-Floor Considerations. The BTF considerations for LWAKs were the same as for CKs. Therefore, EPA is proposing a BTF standard of 0.20 ng/dscm (TEQ) for the same reasons applicable to CKs. As noted above, given that EPA is not aware of any LWAKs that exceed the proposed BTF standard, LWAKs should not have to incur costs to achieve compliance. EPA notes, however, that LWAKs would nonetheless be required to comply with operating limits established during performance testing and conduct periodic D/F testing to document compliance with the rule. These costs are relatively low when compared to the cost of complying with other provisions of today's rule.

2. Particulate Matter

a. MACT Floor. LWAKs, like cement kilns, have high particulate inlet loadings to the particulate control device due to the nature of the lightweight aggregate manufacturing process; that is, a significant portion of the finely pulverized raw material fed to the kiln is entrained in the flue gas entering the control device. LWAKs are equipped with fabric filters, although one facility is equipped with a spray dryer, venturi scrubber and wet scrubber, in addition to the fabric filter, to control PM to a 0.08 gr/dscf standard under the BIF rule. The PM data for LWAKs include results from 15 test conditions collected from 6 facilities, with a total of 12 units being tested. The Agency's database shows that the average controlled PM emissions ranged from 0.0005 gr/dscf to 0.02 gr/dscf, corrected to 7 percent oxygen, dry basis.

The Agency analyzed all available PM emissions data and determined that sources with emission levels at or below the level emitted by the median of the best performing 12 percent of sources used a fabric filter with an air-to-cloth ratio of 2.8 acfm/ft2 or less. EPA's analysis of all LWAKs employing this floor technology resulted in a MACT floor emissions level of 110 mg/dscm (0.049 gr/dscf). EPA estimates that 100 percent of LWAKs are currently meeting the floor level. The national annualized compliance cost for LWAKs to meet the floor level is estimated to be $290,000 for the entire LWAK industry.

b. Beyond-The-Floor Considerations. EPA is proposing a more stringent beyond-the-floor (BTF) level of 69 mg/dscm (0.03 gr/dscf) for LWAKs. As mentioned above, since 1971, some cement kilns have been subject to the more stringent NSPS (see 40 CFR 60.60, Subpart F) of 0.3 lb/ton of raw material feed (dry basis) to the kiln, which is generally equivalent to 69 mg/dscm (0.03 gr/dscf). Because of design and process similarities between LWAKs and cement kilns, such as high inlet grain loading and similar APCDs, the Agency believes that 69 mg/dscm is achievable for LWAKs.

EPA estimates that 80 percent of LWAKs are currently meeting this BTF level. The Agency estimates that there would be no national incremental annualized compliance cost for the remaining LWAKs to meet the BTF level rather than comply with the floor controls. This is because sources are already meeting the BTF level, or they would be able to meet it with the upgrades or retrofits needed to meet the floor level. The BTF level would provide an incremental reduction of 4 tons per year, or 9 percent, in PM emissions nationally beyond that achieved with floor controls. (Note that emissions reductions estimates are based on the design level, not the standard.) Therefore, the Agency is proposing a MACT standard of 69 mg/dscm (0.030 gr/dscf) for existing LWAKs.

EPA considered but is not proposing an alternative more stringent beyond-the-floor level (e.g., 35 mg/dscm (0.015 gr/dscf)) for LWAKs. EPA notes that, to ensure compliance with a 35 mg/dscm standard 99 percent of the time, a source with average emissions variability must be designed and operated to achieve an emission level of approximately 18 mg/dscm. EPA estimates that 60 percent of LWAKs currently have average PM emissions below 18 mg/dscm.

All of the remaining LWAKs may require the installation of new fabric filters to comply with the proposed standards for all HAPs discussed in today's rule. The average emissions level for the 40 percent of LWAKs that do not meet a PM emission level of 18 mg/dscm is 28 mg/dscm. All of these LWAKs would require an upgrade from fiberglass bags to improved performance filter media on the newly installed fabric filters. Although the engineering costs to comply with a PM design level of 18 mg/dscm is modest for LWAKs, the resulting reduction in PM emissions is minimal because 40 percent of the kilns are emitting at an average emission level slightly above the BTF level. Lowering the PM design level to 18 mg/dscm may not be appropriate based on this minimal impact on overall PM emissions.

Thus, EPA specifically invites comment on whether the final rule should establish BTF standard for PM of 35 mg/dscm (or 0.15 lb/ton of raw material (dry basis) feed into the kiln).

3. MACT for Mercury

a. MACT Floor. Mercury emissions from LWAKs are currently controlled by the BIF rule, and LWAKs have elected to comply with the BIF standard by limiting the feedrate of Hg in the hazardous waste.[114] Thus, the MACT floor is based on hazardous waste feed control.

The LWAK mercury emissions data reflect results from 13 test conditions collected from 6 facilities, with a total of 10 kilns being tested. The average mercury emissions for the test conditions ranged from 0.4 µg/dscm to 560 µg/dscm.

To identify the floor level for hazardous waste feed control, the Agency determined that sources with Hg emissions at or below the level emitted by the median of the best performing 12 percent of sources had normalized hazardous waste feedrates (i.e., MTECs) [115] of Hg of 17 µg/dscm or less. Analysis of all LWAKs using this level of hazardous waste feedrate of Hg, or less (i.e., sources having a MTEC of 17 µg/dscm or less), resulted in a MACT floor level of 72 µg/dscm. To meet this standard 99 percent of the time, EPA estimates that a source with average emissions variability among runs of a test condition would need to design and operate the kiln to meet a level of 36 µg/dscm.

EPA estimates that approximately 70 percent of LWAKs can meet this floor level. The national annualized compliance cost of the remaining LWAKs to reduce mercury emissions to the floor level is estimated to be $1.6 million for the entire hazardous waste-burning LWAK industry, and would reduce mercury emissions by 540 pounds per year or by 86 percent from current baseline emissions.

EPA notes that it considered whether all LWAKs would be likely to be able to meet the floor level of 72 µg/dscm using control of hazardous waste feed for Hg at an MTEC of 17 µg/dscm, given that Hg emissions also result from Hg in the raw material feed. EPA has determined that all LWAKs should be able to meet the floor level using the floor control without substituting raw material.

b. Beyond-The-Floor Considerations. The Agency has considered beyond-the-floor (BTF) control for Hg using carbon injection (CI) in combustion gas at temperatures below 400°F, coupled with the MACT floor level control of Hg in the hazardous waste feed. As discussed for CKs, EPA believes that CI can control Hg emissions at or above 90 percent removal efficiency.

To identify a BTF level, EPA considered two approaches that would result in virtually the same BTF standard—6 µg/dscm. Under one approach, EPA would apply a 90 percent removal efficiency for CI to the floor design level of 36 µg/dscm to identify a BTF standard of 6 µg/dscm, which includes a statistically-derived variability factor.

Under a second approach, EPA could account for emissions variability by using a conservative CI removal efficiency of 80 percent to identify a BTF emission standard of 7.2 µg/dscm (based on a design floor level of 36 µg/dscm). Under this approach, a statistically-derived variability factor would not be added.

EPA invites comment on which approach would be more appropriate for identifying a BTF level. EPA, however, is not proposing a BTF standard.

In conjunction with earlier evaluations, the Agency has evaluated the cost and emissions reductions associated with an emission standard of 8 µg/dscm. Although the BTF levels presented above are somewhat different, EPA does not believe that the difference is large enough to significantly affect the information presented below.

One of 11 LWAKs in the database would be able to meet a BTF level of 8 µg/dscm currently. The national annualized compliance cost for the remaining LWAKs to meet the BTF level is estimated to be $4.4 million for the entire hazardous waste-burning LWAK industry. The BTF level would provide an incremental reduction of 60 pounds per year (72 percent) in Hg emissions nationally beyond that achieved with floor controls.

EPA has considered the costs in relation to emissions reductions and the special bioaccumulation potential that Hg poses and has decided that the floor level of 72 µg/dscm best balances those factors. Mercury is one of the more toxic metals known due to its bioaccumulation potential and the neurological health effects at low concentrations. For further discussion see the mercury benefits discussion in Section VII of today's preamble. EPA invites comment, however, on whether there are cost-effectiveness or other factors that would lead the Agency to promulgate a final rule based on the BTF level.

4. Semivolatile Metals

a. MACT Floor. Emissions of SVM from LWAKs are currently controlled under the BIF rule. LWAKs use a combination of hazardous waste feedrate control and PM control to comply with those standards. Accordingly, MACT floor control is based on hazardous waste feedrate control and PM control.

The LWAK semivolatile metals (SVM) (consisting of cadmium and lead) data reflect results from 13 test conditions collected from 6 facilities, with a total of 10 units being tested. Average emissions of the SVM group ranged from 1 µg/dscm to 1670 µg/dscm. Control of semivolatile emissions is associated with PM control (see discussion of SVM control for existing cement kilns). All LWAKs are equipped with a fabric filter as the air pollution control device, although one facility is equipped with a spray dryer, venturi scrubber and wet scrubber in addition to the fabric filter.

The Agency analyzed all available lead and cadmium emissions data and determined that sources with emission levels at or below the level emitted by

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[114] EPA notes that one LWAK is equipped with a venturi scrubber that can provide control of Hg. That kiln, however, is the highest Hg-emitting kiln in our database because, EPA believes, it burns waste with high levels of Hg.

[115] MTEC, or maximum theoretical emission concentration, is calculated as the feedrate of (Hg) divided by the gas flow rate. It is used to normalize feedrates of Hg (and other metals and chlorine) across sources with different waste (or fuel) burning capacities.

the median of the best 12 percent of sources employed either: (1) A fabric filter with an air-to-cloth ratio of 1.5 acfm/ft ^{2} or less with a hazardous waste MTEC less than 270,000 µg/dscm; or (2) a fabric filter and venturi scrubber with an air-to-cloth ratio of 4.2 acfm/ft ^{2} or less with a hazardous waste MTEC less than 54,000 µg/dscm. Analysis of emissions data from all LWAKs using these MACT technologies resulted in a floor level of 12 µg/dscm.

EPA notes that raw materials and fossil fuels also contribute to LWAK SVM feedrates and emissions. Given that all sources must be able to meet the floor level using the floor control, EPA investigated whether all LWAKs could meet the floor level employing the MACT floor technologies without being forced to substitute raw material. EPA preliminary evaluation determined that 25 percent of sources in the SVM emissions database had raw material containing Cd and Pb in greater concentrations than sources in the expanded MACT pool; thus, these sources may not be able to achieve the floor with MACT alone.[116] However, the Agency believes that the data on which this preliminary finding is based may not reflect the normal, day-to-day Pb and Cd levels in raw material feed.

As noted in the earlier section on cement kilns, one approach to address this issue (of sources with higher levels of SVM metals in their raw materials than sources in the expanded MACT pool and that, therefore, cannot meet the floor level using floor control) is to: (1) Identify the source with the highest normalized (by MTEC) feedrate of metals in raw material; (2) assume the source is also feeding hazardous waste with the floor control MTEC level of the metals; and (3) project SVM emissions from the source based on combined raw material and hazardous waste MTECs using a representative system removal efficiency (SRE) from the expanded MACT pool considering an appropriate variability factor (e.g., variability of emissions among runs within a test condition in the expanded MACT pool). The Agency has not yet conducted this type of analysis, but intends to do so in the near future. EPA also believes that data reflecting normal, day-to-day levels of Pb and Cd in raw materials would be important for this type of analysis, and specifically invites commenters to submit such data as well as their views on the approach suggested above.

EPA estimates that 38 percent of LWAKs are currently meeting the floor level. The national annualized compliance cost of the remaining LWAKs to reduce SVM emissions to the floor level is estimated to be $2.1 million for the entire LWAK industry, and would reduce lead and cadmium emissions nationally by 0.66 tons per year, or by 97 percent from current baseline emissions.

The Agency is proposing an alternative compliance option for SVMs. Since the Agency anticipates the likelihood of development of a multi-metals continuous emissions monitor (CEM) in the near future, the Agency is proposing establishing a higher standard for sources using a properly designed and operated multi-metals CEM. This alternative compliance option would be based on the minimum detection limit of the device, which is estimated to be 60 µg/dscm for SVMs combined.

b. Beyond-The-Floor Considerations. The Agency considered whether to propose a more stringent level than the floor of 12 µg/dscm. EPA has determined that a BTF standard would not be appropriate. Since control of semivolatile emissions is associated with PM control, a more stringent SVM BTF level would require LWAKs to upgrade to more expensive fiberglass bags (e.g., bags backed with teflon membranes) or the addition of newly installed FFs with improved performance media. Although the engineering costs to comply with a BTF SVM level are moderate, the resulting incremental reduction in SVM emissions from the floor level is minimal because the floor level already provides substantial control by reducing baseline emissions by 97 percent. Thus, the Agency believes a SVM BTF standard is not appropriate and is proposing a SVM MACT standard of 12 µg/dscm for existing LWAKs.

5. Low-Volatility Metals

a. MACT Floor. Emissions of LVM from LWAKs are also currently controlled under the BIF rule. LWAKs use a combination of hazardous waste feedrate control and PM control to comply with those standards. Accordingly, MACT floor control is based on hazardous waste feedrate control and PM control.

The low volatility metals (LVM) (consisting of arsenic, antimony, beryllium, and chromium) data reflect results from 13 test conditions collected from 6 facilities, with a total of 10 units being tested. Average emissions of the LVM group ranged from 10 µg/dscm to 289 µg/dscm. Due to the relatively low volatility of these metals, performance of the APCD is the most important factor in controlling LVM emissions.

The Agency analyzed all available LVM emissions data and determined that sources with emission levels at or below the level emitted by the median of the best 12 percent of sources used a fabric filter with an air-to-cloth ratio of 1.8 acfm/ft ^{2} or less with a hazardous waste MTEC less than 46,000 µg/dscm. Analysis of available emissions data for all LWAKs employing these controls resulted in a floor emission level of 340 µg/dscm.

EPA notes that raw materials and fossil fuels also contribute to LWAK LVM feedrates and emissions. Given that all sources must be able to meet the floor level using the floor control, EPA investigated whether all LWAKs could meet the floor level employing the MACT floor technologies without being forced to substitute raw material. EPA's preliminary evaluation determined that one of the sources in the LVM emissions database had raw material containing LVM in greater concentrations than sources in the expanded MACT pool; thus, this sources may not be able to achieve the floor with MACT alone.[117] EPA requests comments on addressing this issue.

One approach to address this issue (of sources with higher levels of LVM metals in their raw materials than sources in the expanded MACT pool and that, therefore, cannot meet the floor level using floor control) is to: (1) Identify the source with the highest normalized (by MTEC) feedrate of metals in raw material; (2) assume the source is also feeding hazardous waste with the floor control MTEC level of the metals; and (3) project LVM emissions from the source based on combined raw material and hazardous waste MTECs using a representative system removal efficiency (SRE) from the expanded MACT pool considering an appropriate variability factor (e.g., variability of emissions among runs within a test condition in the expanded MACT pool). The Agency has not yet conducted this type of analysis but intends to do so in the near future. EPA also believes that data reflecting normal, day-to-day levels of LVM in raw materials would be important for this type of analysis and specifically invites commenters to submit such data as well as their views on the approach suggested above.

EPA estimates that 92 percent of LWAKs are currently meeting the floor level. The national annualized cost of

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[116] USEPA, ''Draft Technical Support Document for HWC MACT Standards, Volume III: Selection of Proposed MACT Standards and Technologies'', February 1996.

[117] USEPA, ''Draft Technical Support Document for HWC MACT Standards, Volume III: Selection of Proposed MACT Standards and Technologies'', February 1996.

the remaining LWAKs to reduce LVM emissions to the floor level is estimated to be $380,000 for the entire hazardous waste-burning LWAK industry; this would reduce LVM emissions nationally by 0.011 ton per year or by 5 percent from current baseline emissions.

b. Beyond-The-Floor Considerations. The Agency considered whether to propose a more stringent level than the floor of 340 µg/dscm. Since control of low-volatile emissions is associated with PM control, a more stringent LVM BTF level would require LWAKs to upgrade to more expensive fiberglass bags (e.g., bags backed with teflon membranes) or the addition of newly installed FFs with improved performance media. Although the engineering costs to comply with a BTF LVM level are moderate, the resulting reduction in LVM emissions is minimal since LWAK LVM national emissions are estimated to be 0.2 tons per year for the entire industry at the floor level. Thus, the Agency believes a LVM BTF standard is not appropriate and is proposing a LVM MACT standard of 340 µg/dscm for existing LWAKs.

6. Hydrochloric Acid and Chlorine

a. MACT Floor. HCl and Cl_2 emissions from LWAKs are currently regulated by the BIF rule. Only one LWAK facility currently utilizes a venturi scrubber, which is a dedicated control device, designed specifically to remove HCl/Cl_2 (referred to as total chlorine where combined HCl and Cl_2 levels are expressed as HCl equivalents) from the flue gas.

The total chlorine emission database reflects results from 13 test conditions collected from 6 facilities, with a total of 10 units being tested. Average total chlorine emissions range from 13 ppmv to 2080 ppmv. The Agency analyzed all available total chlorine emissions data and determined that sources with emission levels at or below the level emitted by the median of the best 12 percent of sources used either: (1) Hazardous waste feedrate control of total chlorine with a MTEC less than 1.5 g/dscm; or (2) venturi scrubber with hazardous waste MTEC less than 14 g/dscm. The analysis of all available emissions data for LWAKs using these technologies resulted in a floor emissions level of 2100 ppmv, which the Agency has identified as the MACT floor level. To meet this standard 99 percent of the time, a source with average within test condition emission variability would need to be designed and operated to achieve an emission level of 1400 ppmv.

EPA notes that raw materials and fossil fuels also contribute to LWAK chlorine feedrates and emissions. Given that all sources must be able to meet the floor level using the floor control, EPA investigated whether all LWAKs could meet the floor level employing the MACT floor technologies without being forced to substitute raw material. EPA determined that all LWAKs in the total chlorine emissions database would be able to meet the floor level using floor control [118] without switching raw material.

EPA estimates that 85 percent of LWAKs are currently meeting the floor level. The national annualized compliance cost of the remaining LWAKs to reduce total chlorine emissions to the floor level is estimated to be $890,000 for the entire hazardous waste-burning LWAK industry; this would reduce total chlorine emissions nationally by 190 tons per year or 6 percent from current baseline emissions.

b. Beyond-The-Floor Considerations. The Agency has considered BTF controls for improved total chlorine control using a dry scrubber or spray tower scrubber. A dry scrubber should achieve a total chlorine removal efficiency of 90 percent, and a spray tower scrubber should achieve a removal efficiency of 99 percent. Applying the 90 percent removal factor (the more conservative of the two removal efficiencies) [119] to the highest test condition in the database resulted in a BTF standard of 450 ppmv. To meet this standard 99 percent of the time, EPA estimates that a source with average emissions variability (among runs within a test condition) would need to meet a design level of 210 ppmv.

EPA believes that dry scrubbers or spray tower scrubbers are appropriate controls and is proposing a 450 ppmv total chlorine emission standard based on these controls. EPA estimates that 38 percent of LWAKs are currently meeting this BTF level. The national annualized compliance cost for the remaining LWAKs to meet this BTF level rather than comply with the floor controls is estimated to be $5.0 million for the entire hazardous waste-burning LWAK industry. This BTF level would provide an incremental reduction of 2200 tons per year (80 percent) in total chlorine emissions nationally beyond that achieved with the floor controls.

The Agency believes that both wet and dry scrubbing control techniques are applicable to LWAKs for chlorine control. Dry scrubbing is being used at some hazardous waste-burning LWAKs. Control efficiency and outlet chlorine emissions levels are unclear due to conflicting trial burn results, however. One potential problem with the application of dry scrubbing to LWAKs is contamination of the captured LWAK dust with dry sorbent. This may affect whether captured dust can be recycled back into the kiln or incorporated into the final light weight aggregate product. The addition of dry scrubbing could force some kilns either to add a separate, additional FF dedicated to capturing the dry sorbent or dispose of the mixed sorbent and LWAK dust. The Agency invites comment on the effectiveness (and implications on dust management) of dry scrubbing for control of chlorine in hazardous waste-burning LWAKs.

The Agency also considered an additional BTF level of 25 ppmv for LWAKs based on wet scrubbing alone. A further reduction from the proposed BTF design level of 210 ppmv (based on dry scrubbing or spray tower scrubbing) to 25 ppmv would require all thirteen LWAK sources to either install new control equipment, or modify existing control equipment. The incremental cost of this enhanced control would be moderate to high for each of the individual LWAK sources. Although the engineering cost for each facility is moderate to high, the overall cost for LWAKs as a group is high since upgrades are required by every facility. The Agency believes that the resulting moderate decrease in total chlorine emissions may not justify this relatively high engineering cost.

Based on cost-effectiveness considerations, EPA has determined that proposing a BTF standard of 450 ppmv is warranted. As discussed elsewhere in today's preamble, EPA's risk analysis developed for purposes of RCRA shows that the emissions of total chlorine from hazardous waste-burning LWAKs could pose significant risks by direct inhalation, and these risks would be reduced by BTF controls.[120] Thus, the BTF controls would make separate RCRA standards unnecessary.

Additionally, the Agency requests comments on an alternative option to identify the BTF level. Under this

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[118] USEPA, ''Draft Technical Support Document for HWC MACT Standards, Volume III: Selection of Proposed MACT Standards and Technologies'', February 1996.

[119] The Agency believes that many, but not all, LWAKs could use a dry scrubber without adversely affecting the quality of the LWAK dust (which is primarily raw material) for incorporation into products or recycling back into the kiln. See discussion in the text below.

[120] EPA notes that under the BIF regulations, LWAKs are currently subject to site-specific, risk-based emissions standards for HCl/Cl_2. EPA is uncertain why our risk assessment to consider RCRA concerns under today's proposed rule shows that baseline emissions for some LWAKs can pose significant risk.

option the 90 percent reduction in emissions provided by a dry scrubber or spray tower scrubber would be applied to the floor level resulting from hazardous waste feedrate control of total chlorine—2100 ppmv. Thus, at 90 percent control efficiency, the BTF emission standard would be 210 ppmv. To comply with this standard 99 percent of the time, a source with average within test condition emissions variability would need to be designed and operated to meet an emission level of approximately 140 ppmv. EPA invites comment on whether this option is more appropriate to establish the BTF level than applying the BTF percent reduction to the test condition in the database with the highest emissions.

As discussed above, EPA believes that a dry scrubber or spray tower scrubber (in conjunction with the levels achieved using MACT floor controls) are appropriate alternative controls. EPA estimates that 38 percent of LWAKs are currently meeting this alternative BTF level of 210 ppmv. EPA estimates that this BTF level would provide a further incremental reduction in total chlorine emissions nationally beyond that achieved with the proposed BTF standard of 450 ppmv. EPA invites comment on this alternative approach to identify the BTF level.

7. Carbon Monoxide and Hydrocarbons

The Agency is proposing to use carbon monoxide (CO) and hydrocarbons (HC) as surrogates for non-D/F organic HAPs.[121]

a. MACT Floor.

i. Carbon Monoxide. The BIF rule currently limits CO emissions from LWAKs to 100 ppmv on an hourly rolling average (HRA). See § 266.104(b). However, the BIF rule provides an alternative standard that allows higher CO levels if HC levels are less than 20 ppmv.

LWAKs generally have low CO levels (i.e., less than 100 ppmv HRA) achieved by operating under good combustion practices. Good combustion practices include techniques such as thorough fuel, air, and waste mixing; adequate excess oxygen; maintenance of adequate combustion temperature; and blending of waste fuels to minimize combustion perturbations. Accordingly, operating under good combustion practices is identified as the floor control.

Given that 10 of 12 LWAKs for which EPA has CO emissions data have maximum hourly rolling averages for the test condition of less than 100 ppmv, EPA believes it is reasonable and appropriate to identify the floor level as the BIF limit of 100 ppmv. Two LWAKs have CO levels exceeding the 100 ppmv level, however, and these higher levels (i.e., 190 ppmv and 1900 ppmv) are allowed under the BIF rule. EPA is not sure whether these elevated CO levels were caused by operating under poor combustion conditions, or by trace levels of organics desorbing from the raw materials.

If the CO were caused by organics desorbing from raw material, EPA would consider this situation analogous to CKs that do not have a by-pass duct (and thus stack emissions are affected by organics desorbed from raw material). Accordingly, such LWAKs would be exempt from the CO limit (and would be subject to a HC limit of 20 ppmv). (In this situation, floor control (i.e., good combustion practices) could not be used to meet the floor level.) EPA invites comment on how to distinguish between LWAKs that have elevated CO levels because of poor combustion (and that should be subject to the 100 ppmv floor level) and LWAKs that have elevated CO levels because of desorption of organics from raw material (and that should be exempt from the 100 ppmv floor level). If an effective approach to distinguish between these situations is developed, the final rule could distinguish among LWAKs based on those high levels of organics in raw material versus those with low levels.

EPA estimates that over 80 percent of LWAKs are currently meeting the proposed standard. The national annualized compliance cost of the remaining LWAKs to reduce carbon monoxide emissions to the floor level[122] is estimated to be $1.4 million for the entire LWAK industry; this would reduce carbon monoxide emissions nationally by 600 tons per year, or 81 percent from current baseline emissions.

ii. Hydrocarbons. As discussed above, the BIF rule limits HC levels to 20 ppmv HRA when CO exceeds 100 ppmv HRA. As with CO, floor control is operating under good combustion practices. EPA believes it is appropriate to establish the floor level at the lower of the BIF emission limit or the levels that sources actually achieved. An analysis of the available HC data determined that sources with emission levels at or below the level emitted by the median of the best 12 percent of sources used good combustion practices as the control technology. The analysis of all available emissions data for LWAKs believed to be using good combustion practices resulted in a floor emissions level of 14 ppmv.[123]

EPA estimates that 86 percent of LWAKs are currently meeting the floor HC level. The national annualized compliance cost of the remaining LWAKs to reduce hydrocarbon emissions to the floor level is estimated to be $760,000 for the entire LWAK industry; this would reduce hydrocarbon emissions nationally by 14 tons per year, or 31 percent from current baseline emissions.

b. Beyond-The-Floor Considerations. EPA considered BTF levels for CO of 50 ppmv and for HC of 6 ppmv. Control of organic HAP emissions would require the use of a combustion gas afterburner. Addition of an afterburner to a LWAK would be expensive due to the requirement of a large amount of auxiliary fuel to reheat the kiln exit flue gas to temperatures required for organics burnout. Preliminary estimates suggest that going beyond-the-floor for CO and HC would more than double the national costs of complying with the proposed rule. EPA believes that a BTF standard is not appropriate.

EPA estimates that 29 percent of LWAKs are currently meeting the BTF level of 6 ppmv for HC and that 46 percent of LWAKs are currently meeting the BTF levels of 50 ppmv for CO. The Agency has determined that selecting these BTF levels is not appropriate. Therefore, the Agency is proposing a MACT standard for hydrocarbons of 14 ppmv HRA and for carbon monoxide of 100 ppmv HRA.

8. MACT Floor Cost Impacts

The total national annualized compliance costs for existing LWAKs to meet all the MACT floor levels are estimated to be $3 million with the cost per kiln averaging $390,000. These total compliance costs equate to $39 per ton of hazardous waste burned. EPA estimates that one LWAK facility may cease burning hazardous waste due to the compliance costs associated at the floor.

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[121] This is in addition to controlling PM as a surrogate for (condensed) semivolatile HAPs.

[122] EPA assumed that the LWAK with CO levels of 1900 ppmv would need to install an afterburner to meet the floor level. EPA acknowledges that this is inappropriate because all sources must be able to meet the floor level using floor control—good combustion practices. As discussed in the text, EPA invites comment on how to identify appropriate MACT floor levels for sources that may have elevated CO levels due to desorption of organics from raw material.

[123] EPA notes that one of seven LWAKs in the HC database had substantially higher test condition maximum HC levels (i.e., 13 ppmv HRA) than the other sources (i.e., 6 to 8 ppmv HRA). As discussed in the text above for CO, it is not clear whether the elevated HC levels were caused by operating under poor combustion conditions or desorption of organics from raw material. EPA invites comment on how to address this situation.

The Agency is proposing to go beyond-the-floor for three pollutants for existing LWAKs: dioxin/furans, mercury, and total chlorine. The total national annualized compliance costs to meet the dioxin/furan, mercury and total chlorine BTF standards in addition to the MACT floor standards for the remaining HAPs are estimated to be $4 million with the cost per kiln averaging $670,000. These total compliance costs increase the cost per ton of hazardous waste burned to $56. EPA estimated that one LWAK facility may cease burning hazardous waste due to the compliance costs associated with this suite of floor and BTF standards.

B. MACT for New Sources

This section summarizes EPA's rationale for establishing MACT for new LWAKs for each HAP, HAP surrogate, or HAP group. Table V.5.B.1 summarizes the proposed MACT standards for new LWAKs, which were determined using the analytical process described in Part Three, Section VII and in ''Draft Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies''.

TABLE IV.5.B.1.—PROPOSED EMISSION LEVELS FOR NEW LWAKS

HAP or HAP Surrogate	Proposed Standards [1]
Dioxin/furans	0.20 ng/dscm TEQ.
Particulate Matter	0.030 gr/dscf (69 mg/dscm).
Mercury	72 µg/dscm.
SVM [Cd, Pb]	5.2 µg/dscm [2].
LVM [As, Be, Cr, Sb]	55 µg/dscm [3].
HCl + Cl_2	62 ppmv.
CO	100 ppmv.
HC	14 ppmv.

[1] All emission levels are corrected to 7 percent O_2.

[2] An alternative standard of 60 µg/dscm would apply if the source elects to document compliance using a multi-metals CEM.

[3] An alternative standard of 80 µg/dscm would apply if the source elects to document compliance using a multi-metals CEM.

1. MACT New for Dioxin/Furan

a. MACT NEW Floor. EPA used the Agency's data on the performance of D/F control technology to identify MACT floor controls and the floor level for new facilities. The MACT floor level for D/F emissions from LWAKs is 0.20 ng/dscm (TEQ) or (temperature at the PM control device not to exceed) 418 °F.

b. Beyond-The-Floor Considerations. The BTF considerations for new LWAKs were the same as for CKs. Therefore, EPA is proposing a BTF standard for new LWAKs of 0.20 ng/dscm (TEQ) for the same reasons applicable to CKs.

2. MACT New for Particulate Matter

a. MACT New Floor. EPA's analysis of available PM data shows that the single best APCD for controlling particulate emissions is a fabric filter with an air-to-cloth ratio less than 1.5 acfm/ft^2 which represents MACT technology for new sources. An evaluation of all sources employing this technology shows that this technology can consistently achieve a PM emission of 0.054 gr/dscf.

b. Beyond-The-Floor Considerations. For the same reasons as discussed for existing LWAKs, the Agency is proposing a lower BTF standard for new LWAKs. Therefore, the Agency is proposing the MACT standard of 69 mg/dscm (0.03 gr/dscf) for new LWAKs.

As discussed above for existing LWAKs, EPA specifically invites comment on whether the final rule should establish an alternative BTF standard for PM of 35 mg/dscm (or 0.15 lb/ton of raw material (dry basis) feed into the kiln).

3. MACT New for Mercury

a. MACT New Floor. The MACT new floor analysis is the same as existing sources because the expanded pools for each, based on the single best performing source, are identical. As discussed earlier, LWAKs control their mercury input (and therefore much of their emissions) through the control of the mercury content in the hazardous waste. The Agency is defining the MACT floor technology as feedrate control with a hazardous waste MTEC less than 17 µg/dscm based on performance of the single best performing source. Analysis of all existing LWAK sources using this hazardous feedrate control resulted in a MACT floor level of 72 µg/dscm.

b. Beyond-the-Floor Consideration. The Agency is considering the same two BTF options for new LWAKs as discussed for existing sources—Option 1 is 6 µg/dscm, and Option 2 is 7.2 µg/dscm. The Option 1 mercury BTF level of 6 µg/dscm is achievable based on the use of some degree of hazardous waste feedrate control and/or add-on mercury control with injection of activated carbon, assuming a 90 percent reduction. The Option 2 level of 7.2 µg/dscm represents an achievable level based on both achievement of floor levels and use of carbon injection, assuming conservative 80 percent reduction.

Therefore, EPA is proposing a mercury MACT standard of 72 µg/dscm for existing LWAKs and requesting comments on possible BTF standard of 6 µg/dscm and 7.2 µg/dscm.

4. MACT New for Semivolatile Metals

a. MACT New Floor. EPA characterized the single best performing source with the lowest SVM emissions and determined that the best performing source used a fabric filter with an air-to-cloth ratio of 1.5 acfm/ft^2 or less for a kiln system with a hazardous waste (HW) MTEC of 270,000 µg/dscm or less. Analysis of all sources using this technology or better (i.e., expanded MACT pool of facilities) resulted in a floor level of 5.2 µg/dscm for new LWAKs.

The Agency recognizes that 5.2 µg/dscm is a low floor level and is concerned about potential problems in its approach to setting the MACT floor level. The expanded MACT pool included only one other test condition besides the single best source, and EPA is concerned that this low data set resulted in a low floor level. In addition, EPA is concerned that the single best performing source may have low SVM feedrates in the raw material, which could result in a floor level that is unachievable. EPA invites comment on how to address these potential issues.

The Agency is proposing an alternative compliance option for SVMs. Since the Agency anticipates the likelihood of development of a multi-metals continuous emissions monitor (CEM) in the near future, the Agency is proposing establishing a higher standard for sources using a properly designed and operated multi-metals CEM. This alternative compliance option would be based on the minimum detection limit of the device which is estimated to be 60 µg/dscm for SVMs combined.

b. Beyond-the-Floor Considerations. EPA has determined that proposing a BTF standard is not warranted for the same reasons that a more stringent level was not proposed for existing sources. Therefore, the Agency is proposing a semivolatile metals MACT standard of 5.2 µg/dscm for new LWAKs.

5. MACT New for Low-Volatile Metals

a. MACT New Floor. EPA characterized the best particulate control device and identified the floor technology as a fabric filter with an air-to-cloth ratio of 1.3 acfm/ft^2 or less with a hazardous waste (HW) MTEC less than 37,000 µg/dscm. Analysis of all existing LWAK sources employing either of these technologies resulted in a floor emissions level of 55 µg/dscm for new LWAKs.

The Agency is proposing an alternative compliance option for LVMs. Since the Agency anticipates the likelihood of development of a multi-metals continuous emissions monitor

(CEM) in the near future, the Agency is proposing establishing a higher standard for new sources using a properly designed and operated multi-metals CEM. This alternative compliance option would be based on the minimum detection limit of the device which is estimated to be 80 µg/dscm for these LVM metals combined.

b. Beyond-the-Floor Considerations. EPA has determined that proposing a BTF standard is not warranted for the same reasons that a more stringent level was not proposed for existing sources. Therefore, the Agency is proposing a low-volatile metals MACT standard of 55 µg/dscm for new LWAKs.

6. MACT New for Hydrochloric Acid and Chlorine

a. MACT New Floor. EPA characterized the single best performing source with the lowest HCl/Cl_2 (total chlorine) emissions and determined that the best performing source used a venturi scrubber with a hazardous waste (HW) MTEC of 14 g/dscm or less. Analysis of all sources using this technology or better (i.e., expanded MACT pool of facilities) resulted in a floor level of 62 ppmv for new LWAKs.

b. Beyond-the-Floor Considerations. The MACT floor is characterized by a technology that is able to achieve a 99 percent removal efficiency. A BTF level is not warranted because the floor level is based on a technology that is able to achieve the highest removal efficiency for HCl/Cl_2. Therefore, the Agency is proposing a HCl/Cl_2 MACT standard of 62 ppmv for new LWAKs.

7. MACT New for Carbon Monoxide and Hydrocarbons

a. MACT New Floor. The Agency believes that control of non-dioxin organic emissions can be achieved by establishing emissions limits on hydrocarbons and carbon monoxide. As discussed earlier for existing LWAKs, the Agency is proposing a MACT standard of 14 ppmv for HC and of 100 ppmv for CO, based on floor levels

b. Beyond-the-Floor Considerations. EPA considered control for organic HAP emissions based on the use of a combustion gas afterburner. Even though EPA believes that BTF levels for CO of 50 ppmv and for HC of 6 ppmv are achievable with an afterburner, using these values for a BTF standard is not appropriate and is not warranted at this time (see discussion for existing LWAKs). Therefore, EPA is proposing a MACT standard of 14 ppmv for HC and of 100 ppmv for CO for new LWAKs.

8. MACT New Cost Impacts

A detailed discussion of the costs and economic impacts for new LWAKs is presented in Part Seven of today's proposal and ''Regulatory Impact Assessment for Proposed Hazardous Waste Combustion MACT Standards''.

C. Evaluation of Protectiveness

In order to satisfy the Agency's mandate under the Resource Conservation and Recovery Act to establish standards for facilities that manage hazardous wastes and issue permits that are protective of human health and the environment, the Agency conducted an analysis to assess the extent to which potential risks from current emissions would be reduced through implementation of MACT standards. The analysis conducted for hazardous waste-burning LWAKs is similar to the one described above for hazardous waste incinerators and cement kilns. The procedures used in the Agency's risk analyses are discussed in detail in the background document for today's proposal.[124] In evaluating the MACT standards, the Agency used the design value which is the value the Agency expects a source would have to design to in order to be assured of meeting the standard on a daily basis and hence is always a lower value than the actual standard for all HAPs controlled by a variable control technology.[125]

The risk results for hazardous waste-burning lightweight aggregate kilns are summarized in Table V.5.C.1 for cancer effects and Table V.5.C.2 for non-cancer effects for the populations of greatest interest, namely subsistence farmers, subsistence fishers, recreational anglers, and home gardeners. The results are expressed as a range representing the variation in exposures across the example facilities (and example waterbodies for surface water pathways) for the high-end and central tendency exposure characterizations across the exposure scenarios of concern. For example, because dioxins bioaccumulate in both meat and fish, the subsistence farmer and subsistence fisher scenarios are used to determine the range.[126]

TABLE V.5.C.1.—INDIVIDUAL CANCER RISK ESTIMATES FOR LIGHTWEIGHT AGGREGATE KILNS[1]

	Dioxins	Semi-volatile metals[2]	Low volatile metals[3]
Existing Sources			
Baseline	2E–9 to 4E–7	1E–8 to 5E–7	9E–10 to 4E–7.
Floor	1E–8 to 2E–6[4]	1E–8 to 6E–8	5E–7 to 1E–5.
BTF	1E–8 to 2E–6[5]		
New Sources			
Floor	1E–8 to 2E–6[4]	6E–9 to 3E–8	7E–8 to 2E–6.
BTF	1E–8 to 2E–6[5]		
CEM Option[6]		6E–8 to 3E–7	2E–7 to 5E–6.

[1] Lifetime excess cancer risk.
[2] Carcinogenic metal: cadmium.
[3] Carcinogenic metals: arsenic, beryllium, and chromium (VI).
[4] Based on 0.2 ng/dscm TEQ as both a central tendency and high-end estimate.
[5] Based on 0.20 ng/dscm TEQ.
[6] Based on SVM standard of 60 µg/dscm and LVM standard of 80 µg/dscm (applicable only if the source elects to document compliance using a multimetals CEM).)

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[124] ''Risk Assessment Support to the Development of Technical Standards for Emissions from Combustion Units Burning Hazardous Wastes: Background Information Document'', February 20, 1996.

[125] For the semi-volatile and low volatility metals categories, the Agency assumed the source could emit up to the design value for each metal in the category for the purpose of assessing protectiveness.

[126] For the semi-volatile and low volatility metals categories, the inhalation MEI scenarios are also

TABLE V.5.C.2—INDIVIDUAL NON-CANCER RISK ESTIMATES FOR LIGHTWEIGHT AGGREGATE KILNS[1]

	Semi-volatile metals[2]	Low volatile metals[3]	Hydrogen chloride	Chlorine
Existing Sources				
Baseline	<0.001 to 0.006	<0.001 to 0.007	0.1 to 4	0.03 to 0.3.
Floor	<0.001	<0.001 to 0.08	0.8 to 1[4]	4 to 7[5].
BTF			0.1 to 0.2[4]	0.6 to 1[5].
New Sources				
Floor	<0.001	<0.001 to 0.01	0.02 to 0.04[4]	0.1 to 0.2[5]
BTF			0.01 to 0.02[4]	0.07 to 0.1[5]
CEM Option[6]	<0.001 to 0.001	<0.001 to 0.03		

[1] Hazard quotient.
[2] Cadmium and lead.
[3] Antimony, arsenic, beryllium, and chromium.
[4] HCl + Cl_2 assuming 100 percent HCl.
[5] HCl + Cl_2 assuming 10 percent Cl_2.
[6] Based on SVM standard of 60 µg/dscm and LVM standard of 80 µg/dscm (applicable only if the source elects to document compliance using a multi-metals CEM).

The risk analysis indicates that for the semi-volatile and low volatility metals categories, the MACT standards for lightweight aggregate kilns are protective at the floor for both existing and new sources. The analysis indicates that the CEM compliance option for new sources is also protective. The analysis also indicates that for dioxins, both the floor levels and the proposed beyond the floor standards are protective. The analysis also indicates that for hydrogen chloride and chlorine (Cl_2), the proposed beyond-the-floor standards for existing sources, rather than the floor levels, are protective.

VI. Achievability of the Floor Levels

As discussed in sections III, IV, and V above, the MACT floor levels were selected for each source category by identifying the best performing sources for each individual HAP or HAP surrogate. This is the approach typically used by the Agency in establishing MACT standards.

Nonetheless, the Agency recognizes that this approach raises the question of whether the selected floor levels will be achievable simultaneously.

An alternative approach that would ensure simultaneous achievability of the floor levels would be to identify the best performing sources for a particular HAP or HAP surrogate (e.g., D/F or PM) and to consider emissions only from those sources[127] to establish floor levels for the other HAPs or HAP surrogates. EPA

To address concerns relating to the simultaneous achievability of the proposed standards, which are a combination of floor and BTF emissions levels, the Agency investigated whether sources could achieve the proposed standards without making any upgrades to existing equipment. It is important to note that, under the current approach used by the agency in establishing MACT standards (i.e. the HAP by HAP approach—utilizing the highest emitting source in the expanded MACT pool), approximately 5 to 8 percent of the facilities currently operating will meet all of the proposed standards. Furthermore, subject to the data caveats noted for certain HAPs and source categories (which the Agency believes can be resolved properly), it is the opinion of the Agency that 100 percent of the facilities who use MACT floor and beyond-the-floor technologies can meet all of the proposed standards simultaneously.

Specific information and data pertaining to the analysis of simultaneous achievability can be found in ‘‘Regulatory Impact Assessment for Proposed Hazardous Waste Combustion MACT Standards’’.

VII. Comparison of the Proposed Emission Standards With Emission Standards for Other Combustion Devices

Although not explicitly part of the MACT standard setting process, EPA believes, for perspective, it is appropriate to compare the proposed emissions standards to those of other waste-burning devices and similar devices. (In some cases, such a comparison may show that a particular technology or level of performance is demonstrated as well.) The standards used for comparison have either been proposed by EPA or are guidelines promulgated by the European Union (EU). The standards for these various type of devices will be different for reasons including: (1) Different statutory authorities and requirements; (2) different levels of emission control for existing sources; and (3) different potential to emit high levels of specific HAPs. Nonetheless, EPA believes a comparison of standards is instructive.

Tables VII.1 and VII.2 contain the standards for municipal waste combustors (MWCs), medical waste incinerators (MWIs), EU hazardous waste combustors, and the standards proposed here for existing and new facilities, respectively.

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[127] Another option would be to consider emissions from other sources that employ equivalent or better control for the other HAPs or HAP surrogates. has not used this approach because it would result in establishing unreasonably high floor levels for most HAPs or HAP surrogates that arbitrarily reflect the control devices (and emission levels) that happen to be used by sources that are

TABLE VII.1.—COMPARISON OF STANDARDS FOR EXISTING SOURCES

	Large MWCs	Proposed MWIs	EU HWCs (1)	Proposed HW incinerators	Proposed HW cement kilns	Proposed HW LWAKs
Dioxin/Furan: ng/dscm TEQ and/or Total congeners.	30 Total (or 15 if testing less frequent).	1.9 TEQ or 80 Total.	0.19 TEQ	0.20 TEQ.		
PM, mg/dscm	27	30	13 24-hr avg 13-39 30-min avg (2).	69 2-hr avg		
Hg, µg/dscm	80 or 85% Reduct	470 or 85% Reduct..	130	50 10-hr avg		72 10-hr avg.
SVM, µg/dscm	Cd: 40 Pb: 49	Cd: 50 Pb: 100	Cd: 65 Tl: 65 Pb: 130 (3)	270	57	12.
LVM, µg/dscm	none	none	1170 (3)	210	130	340.
CO, ppmv	50 to 250 4 to 24 hr avg.	50 12-hr avg	52, 24 hr avg 104, 30 min avg (4). 156, 10 min avg (4).	100 1 hr avg.	Wet and Long, Dry Kilns None. Kilns with By-pass 100 in by-pass duct (or HC cannot exceed 6.7) 1 hr avg.	100 1 hr avg.
HC, ppmv	None	None	8, 24 hr avg 8–16, 30 min avg (2).	12 1 hr avg	Wet and Long, Dry Kilns 20 in main stack 1 hr avg. Kilns with By-pass 6.7 in by-pass (or CO cannot exceed 100) 1 hr avg.	14 1 hr avg.
HCl and Cl$_2$, ppmv as HCl equivalents (5).	31 or 95% Reduct	42 or 97% Reduct	8, 24-hr avg 8–48, 30 min avg (2).	280	630	450.

Notes: [1] The EU HWC guidelines have been corrected from the European basis of 11% O$_2$ and 0°C to the US basis of 7% O$_2$ and 20°C. Both are expressed on dry emissions.

[2] The EU HWC PM, HC, and HCl guidelines are based either 97 % compliance with the lower number or 100% compliance with the higher number on a 30-minute average over a year.

[3] The EU LVM guideline is 1300 µg/dscm and includes Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V, Sn. If all metals are emitted equally, their contribution is 130 $_2$g/dscm. Pb, a SVM, was subtracted from this group, resulting in the 1170 µg/dscm level.

[4] The EU HWC CO guideline is based on either 95% compliance with the 156 ppm level on a 10 minute average or 100% compliance with the 104 ppm level on a 30-minute average in any day.

[5] The proposed MWC and MWI and the EU MWC guideline are for HCl only.

TABLE VII.2.—COMPARISON OF STANDARDS FOR NEW SOURCES

	Large MWCs	MWIs	EU HWCs[1]	Proposed HW incinerators	Proposed HW cement kilns	Proposed HW LWAKs
Dioxin/Furan: ng/dscm TEQ, and/or Total congeners	13 Total (or 7 if testing less frequent)	1.9 TEQ or 80 Total	0.19 TEQ	0.20		
PM, mg/dscm	24	30	13 24-hr avg 13–39 30-min avg[2].	69 2-hr avg		
Hg, µg/dscm	80 or 85% Reduct	470 or 85% Reduct.	6.5	50 10-hr avg		72 10-hr avg.
SVM, µg/dscm	Cd: 20 Pb: 20	Cd: 50 Pb: 100	Cd: 3.25 Tl: 3.25 Pb: 65[3]	62	55	5.2.
LVM, µg/dscm	None	None	585[3]	60	44	55.
CO, ppmv	50 to 150 4 to 24 hr avg.	50 12-hr avg	52, 24-hr avg 104, 30 min avg[4] 156, 10 min avg[4]	100 1 hr avg	Wet and Long, Dry Kilns None Kilns with By-pass 100 in by-pass duct (or HC cannot exceed 6.7) 1 hr avg.	100 1 hr avg.

Table VII.2.—Comparison of Standards for New Sources—Continued

	Large MWCs	MWIs	EU HWCs[1]	Proposed HW incinerators	Proposed HW cement kilns	Proposed HW LWAKs
HC	None	None	8, 24 hr avg 8–16, 30 min avg[2].	12 1 hr avg	Wet and Long, Dry Kilns 20 in main stack 1 hr avg Kilns with By-pass 6.7 in by-pass (or CO cannot exceed 100) 1 hr avg	14 1 hr avg.
HCl and Cl_2, ppmv as HCl equivalents[5]	25 or 95% Reduct	42 or 97% Reduct	8, 24-hr avg 8–48, 30 min avg[2]	67		62.

Notes:

[1] The EU HWC guidelines have been corrected from the European basis of 11% O_2 and 0°C to the US basis of 7% O_2 and 20°C. Both are expressed on dry emissions.

[2] The EU HWC PM, HC, and HCl guidelines are based either 97 % compliance with the lower number or 100% compliance with the higher number on a 30-minute average over a year.

[3] The EU LVM guideline is 650 µg/dscm and includes Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V, Sn. If all metals are emitted equally, their contribution to the guideline is 65 µg/dscm. Pb, a SVM, was subtracted from this group, resulting in the 585 µg/dscm level.

[4] The EU HWC CO guideline is based on either 95% compliance with the 156 ppm level on a 10 minute average or 100% compliance with the 104 ppm level on a 30-minute average in any day.

[5] The proposed MWC and MWI standards and the EU HWC guideline are for HCl only.

VIII. Alternative Floor (12 Percent) Option Results and Option to Address Variability

As described in Part 3, Section 5, EPA considered another approach (termed the ‘‘12 percent approach’’) to establishing the MACT floor. In this approach, the Agency selected an emissions floor level based on the average emissions of the 12 percent MACT pool and the average variability within the pool. As in the other approaches, the standards are based on HW MTEC where appropriate, 3-run averages, and a 99th percentile confidence interval.

Through the evaluation of the emissions database using this 12 percent approach, it was determined that various sources equipped with floor controls would be unable to meet the floor emission limits. EPA believes that, if this approach is used to determine emission standards, a situation would be created that is arguably inconsistent with the spirit of the Act. Furthermore, it could subject the regulated community to an undue burden—one in which some facilities in the MACT floor pool must add control equipment in addition to the recognized floor controls in order to meet the floor levels. It could also place EPA in a position of defending a floor-based standard in which the identified floor control technology does not clearly achieve the specified floor emissions levels for all of the facilities in the MACT floor pool. Although we are inclined not to use this evaluation method due to these concerns, we invite comment on this approach versus other MACT floor approaches.

Additionally, information regarding the level of protection these standards provide can be found in U.S. EPA, ‘‘Risk Assessment Support to the Development of Technical Standards for Emissions from Combustion Units Burning Hazardous Wastes: Background Information Document’’, February 20, 1996.

A. Summary of Results of 12 Percent Analysis

Table VIII.1 shows the results of the 12 percent floor analysis for existing sources:

Table VIII.1.—12 Percent Approach MACT Floor Results[1]

HAP	Units	Incinerators	Cement kilns	LWA kilns
		Stnd	Stnd	Stnd.
D/F	µg TEQ	0.25	0.23	0.23.
Hg	µg/dscm	13	32	32.
HCl/Cl_2	ppmv	23	25	1800.
SVM	µg/dscm	53	240	61.
LVM	µg/dscm	61	46	57.
PM	gr/dscf	0.024	0.03	0.012.
CO	ppmv	100	n/a	100.
HC	ppmv	12	Main[2]:20 by pass[3]:6.7 (or CO 100).	14.

[1] All emissions levels are corrected to 7 percent O_2.

[2] Applicable only to long wet and dry process cement kilns (i.e., not applicable to preheater and/or precalciner kilns).

[3] Emissions standards applicable only for cement kilns configured with a by-pass duct (typically preheater and/or precalciner kilns). Sources must comply with either the HC or CO standard in the by-pass stack.

Table VIII.2 shows the results of the 12 percent approach considering BTF analyses for select HAPs for existing sources:

TABLE VIII.2.—12 PERCENT APPROACH BTF OPTION[1]

HAP	Units	Incinerators	Cement kilns	LWA kilns
		Stnd	Stnd	Stnd
D/F	µg TEQ	0.25	0.23	0.23.
Hg.				
Hg	µg/dscm	13	8	8.
HCl/Cl_2	ppmv	23	25	67.
SVM	µg/dscm	53	240	61.
LVM	µg/dscm	61	46	57.
PM	gr/dscf	0.024	0.03	0.012.
CO	ppmv	100	n/a	100.
HC	ppmv	12	Main[2]:20 bypass [3]:6.7 (or CO 100).	14.

[1] All emissions are corrected to 7 percent O.

[2] Applicable only to long wet and dry kilns (i.e., not applicable to preheater and/or precalciner kilns).

[3] Emissions standard applicable only for cement kilns configured with a by-pass duct (typically preheater and/or precalciner kilns). Source must comply with either the HC or CO standard in the by-pass stack.

Information pertaining to the calculation of these floor emission levels can be found in U.S. EPA, ‘‘Draft Technical Support Document for HWC MACT Standards, Volume III: Selection of Proposed MACT Standards and Technologies’’.

B. Summary of MACT Floor Cost Impacts and Emissions Reductions.

Under the 12 percent approach, the total national annualized compliance costs for existing sources to meet the MACT floor levels are estimated to be: (1) for incinerators, $28 million, with the cost per facility averaging $971,000; (2) for cement kilns, $59 million, with the cost per facility averaging $879,000; and (3) for LWAKs, $3 million, with the cost per facility averaging $860,000. These total compliance costs equate to $49 per ton of hazardous waste burned for incinerators, $65 per ton of hazardous waste burned for cement kilns, and $52 per ton of hazardous waste burned for LWAKs. EPA estimates that up to four commercial incinerators will cease burning hazardous waste due to the compliance costs associated at the floor, in addition to three cement kilns and one lightweight aggregate kiln. However, we also believe that the these estimates are exaggerated because they are based on emissions levels determined during trial burns and compliance performance tests, which produce emissions far in excess of the emission levels most facilities achieve in day-to-day operation.

There would be substantial emissions reductions at the MACT floor level, compared to baseline emissions. Table VIII.3 summarizes the estimated national emissions for incinerators if the facilities were operating at a level to meet the 12 percent MACT floor level. Also, the estimated percent reduction of HAP emissions from baseline are shown. Tables VIII.4 and VIII.5 show similar results for cement and lightweight aggregate kilns.

TABLE VIII.3.—NATIONAL EMISSIONS ESTIMATES FOR INCINERATORS 12 PERCENT MACT APPROACH

HAP	Annual emissions at MACT floor level	Percent reduction from baseline emissions (percent)
Dioxin/Furans (TEQ)	3.0 grams TEQ/yr	96
Mercury	0.2 tons/year	96
SVM (Cd, Pb)	1.0 tons/year	98
LVM (As, Cr, Sb, Be)	0.8 tons/year	97
HCl/Cl_2	293 tons/year	83
Particulate Matter	650 tons/year	67

TABLE VIII.4.—NATIONAL EMISSIONS ESTIMATES FOR CEMENT KILNS 12 PERCENT MACT APPROACH

HAP	Annual emissions at MACT floor level	Percent reduction from baseline emissions (percent)
Dioxin/Furans (TEQ)	7.0 grams TEQ/yr	99
Mercury	1.7 tons/year	71
SVM (Cd, Pb)	4.0 tons/year	87
LVM (As, Cr, Sb, Be)	0.9 tons/year	73
HCl/Cl_2	761 tons/year	71
Particulate Matter	1877 tons/year	56

TABLE VIII.5.—NATIONAL EMISSIONS ESTIMATES FOR LWAKS 12 PERCENT MACT APPROACH

HAP	Annual emissions at MACT floor level	Percent reduction from baseline emissions
Dioxin/Furans (TEQ)	(not determined)[128]	(not determined)
Mercury	0.03 tons/year	91%.
SVM (Cd, Pb)	0.04 tons/year	94%.
LVM (As, Cr, Sb, Be)	0.07 tons/year	67%.
HCl/Cl_2	2760 tons/year	9%.
Particulate Matter	26 tons/year	45%.

C. Alternative Floor Option: Percent Reduction Refinement

The Agency is also considering whether to use a refinement technique in establishing the MACT floor that would modify either the 6 percent approach, used as the basis of today's proposal, or the 12 percent option discussed previously. This refinement attempts to address the unfavorable conditions (i.e. worst-case trial burn or COC testing) under which the emissions data was generated.

As discussed elsewhere, EPA is concerned that our hazardous waste emissions database is biased high due to the operating conditions that generated the data (e.g., metals and chlorine spiking, non-optimal APCD performance). Therefore, the analysis of this database results in floor levels that are artificially inflated and not adequately representative of day-to-day emissions levels. One simplified option to address this concern is to apply a ''percent reduction'' to the calculated floor levels derived from either the 6 percent or 12 percent approach. We invite comment on this approach particularly with respect to the appropriate percent reduction(s) to be applied. We also solicit information and data based on routine facility operations and emissions levels that could be used to calculate MACT floors that better reflect day-to-day operations and that would avoid the potential difficulties in attempting to determine the appropriate percent reduction(s) to be used.

IX. Additional Data for Comment

The Agency has received submissions from various stakeholders detailing alternative approaches to establish MACT floor and beyond-the-floor levels. The Agency has placed these submissions into the docket[129] for this rulemaking and specifically requests comment on the approaches used and the emission levels identified. This section provides some information on analyses conducted by the Cement Kiln Recycling Coalition and Waste Technologies Industries to determine MACT and MACT floor levels.

A. Data from Cement Kiln Recycling Coalition

The Cement Kiln Recycling Coalition (CKRC) is a trade association with a membership comprised of cement companies that burn hazardous waste fuel and related companies engaged in the processing and marketing of these fuels. CKRC conducted a technical analysis of the hazardous waste-burning cement kiln's emissions database, identified the best performing sources and MACT control technology, and determined MACT floor emission levels for dioxin and furans and six metal HAPs. CKRC's initial analysis specified separate MACT floor levels based on cement kiln process type (i.e., separate floors were developed for cement kilns employing dry production processes and wet production processes).[130] The MACT floor results are provided in Table IX.A.1 below.

TABLE IX.A.1.—CKRC'S PROPOSED MACT FLOOR EMISSION LEVELS FOR EXISTING CEMENT KILNS (BASED ON DRY AND WET PROCESS SUB-CATEGORIES)

HAP	Dry process CKs	Wet Process CKs
Arsenic	3 µg/dscm	32 µg/dscm.
Beryllium	0.3 µg/dscm	24 µg/dscm.
Cadmium	30 µg/dscm	62 µg/dscm.
Chromium	485 µg/dscm	125 µg/dscm.
Chromium (VI)	8 µg/dscm	29 µg/dscm.
Lead	143 µg/dscm	911 µg/dscm.
Mercury	NA	96 µg/dscm.
Dioxins/Furans	1.7 ng/dscm (TEQ)	2.0 ng/dscm (TEQ).

While CKRC states that sub-categorization is appropriate, they have analyzed recent data based on no sub-categorization and arrived at the floor levels and (generally) achievable beyond-the-floor (BTF) levels presented in Table IX.A.2.[131] Note that this subsequent re-analysis does not differentiate cement kilns by process type (i.e., wet and dry process). CKRC also emphasizes that the levels identified in Table IX.A.2 were derived assuming testing under normal facility operating conditions using hazardous waste as a fuel and does not reflect use

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[128] The database is insufficient to make a realistic determination of the emissions at the baseline or for the 12 percent option.

[129] In addition to the submission discussed in this section, the petitions in the docket for this rulemaking include: (1) Hazardous Waste Treatment Council (now Environmental Technology Council), ''Petition for Rulemaking under the Resource Conservation and Recovery Act to Establish Uniform National Performance Standards for all Combustion Facilities based on the Best Available Technology'', May 18, 1994; and (2) Cement Kiln Recycling Coalition, ''Petition for Rulemaking under the Resource Conservation and Recovery Act to Modify the Rules for the Burning of Hazardous Waste'', January 18, 1994.

[130] Environmental Risk Sciences Incorporated (prepared for CKRC), ''An Analysis of Technical Issues Pertaining to the Determination of MACT Standards for the Waste Recycling Segment of the Cement Industry'' (Volumes I–III), May 3, 1995.

[131] Letter from Craig Campbell, CKRC, to James Berlow, U.S. EPA, undated but received February 20, 1996.

of continuous emissions monitors for PM or individual HAPs. In addition, CKRC emphasizes that, because of natural variations found in the cement industry (e.g., high levels of metals in some raw materials), not all kilns may be able to achieve these levels. CKRC believes this reinforces the need for the ability to make site-specific adjustments to the limits.

TABLE IX.A.2.—CKRC'S ALTERNATE MACT FLOOR AND BEYOND-THE-FLOOR LEVELS FOR EXISTING CEMENT KILNS (NO SUB-CATEGORIZATION)

HAP	MACT floor level	BTF levels
Particulate matter	0.030 gr/dscf	0.025 gr/dscf.
Mercury	118 µg/dscm	80 µg/dscm.
Semivolatile metals	261 µg/dscm	150 µg/dscm.
Low-volatile metals	229 µg/dscm	130 µg/dscm.

We invite comment on CKRC's approach to identify MACT floor and BTF levels.

CKRC presented this re-analysis of MACT emissions levels in tandem with a recommendation that monitoring metals levels in collected cement kiln dust (CKD) is a more effective approach to ensure compliance with metals emission standards than monitoring the feedrate of metals in all feedstreams. CKRC suggested that CKD monitoring for metals should be used until CEM technologies become a workable alternative. Although CKD monitoring for metals is currently allowed under the BIF rule in lieu of feedstream monitoring and the same methodology is incorporated into today's proposal (see proposed § 63.1210(n)(2)), CKRC has suggested revisions to the methodology to make it more workable. See Part Five, Section II.C.4.c.v of this preamble for a discussion of CKRC's recommendations.

B. Data from Waste Technologies Industries

Waste Technologies Industries (WTI) has submitted data and information to the Agency pertaining to identification of MACT floor levels for incinerators.[132] WTI raises the following issues: (1) in determining MACT floor, the Agency has not considered all of WTI's emissions data that have been submitted to the Agency; and (2) the Agency should subdivide the incinerator source category to develop separate MACT standards for commercial versus on-site incinerators.

We have investigated WTI's concern about not considering its emissions data and, based on a preliminary analysis, determined that WTI's data would not affect the MACT floor levels that the Agency has identified for existing or new incinerators.[133]

WTI is recommending that the Agency subdivide incinerators to develop separate standards for commercial and on-site sources. WTI notes that its emissions levels are substantially lower than the standards that (it believes) EPA is considering for proposal. In addition, WTI presents what it believes are appropriate MACT limitations for existing commercial, off-site incinerators.[134] The table below compares WTI's suggested MACT limitations for commercial incinerators to the Agency's proposed standards:

Pollutant	WTI's recommended standard	EPA's proposed standard
PM (mg/dscm)	33 (0.01 gr/dscf)	69 (0.03 gr/dscf).
SVM (µg/dscm)	167	270.
LVM (µg/dscm)	72	210.

We invite comment on whether incinerators should be subdivided by commercial, off-site units versus on-site units. Commenters should consider the criteria EPA uses to determine whether to subdivide a source category as discussed above in Section I of Part Four of this preamble. We also invite comment on WTI's approach to identify MACT limitations for commercial, off-site incinerators.

PART FIVE: IMPLEMENTATION

I. Selection of Compliance Dates

Sections A and B below explain when existing and new facilities, respectively, would have to document compliance with the proposed MACT standards. Section C presents a proposal for a one year compliance extension in order to institute pollution prevention/waste minimization measures.

EPA is proposing a different definition of compliance date for HWCs than is provided by existing 40 CFR § 63.2. Although that section defines compliance date as the date when a source must be in compliance with the standards, 40 CFR § 63.7 requires performance testing to document compliance with the emission standards (and performance evaluations to document compliance with requirements for continuous monitoring systems) after the compliance date. This use of the term ''compliance date'' is not consistent with the current RCRA definition and regulatory requirements for HWCs.

To achieve more consistency and to avoid potential duplication and conflict, the Agency is proposing to define compliance date for HWCs in § 63.1201 as the date when a HWC must submit the initial notification of compliance. In addition, notification of compliance would be defined as a notification in which the owner and operator certify, *after completion of performance evaluations and tests,* that the HWC meets the emissions standards, CMS, and other requirements of Subpart EEE, Part 63, including establishing operating limits to meet standards for which compliance is not based on a CEM.

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[132] Letter from Barry Direnfeld, Swidler & Berlin, to Michael Shapiro, dated January 23, 1996, with an attached letter from Fred Sigg, Von Roll/WTI, to Sally Katzen, Office of Management and Budget, dated January 19, 1996.

[133] See memorandum from Bruce Springsteen, EER, to Shiva Garg, EPA, dated February 26, 1996, entitled ''Determination of the effects of the inclusion of new WTI test burn data on the MACT floors.''

[134] See letter from Gary Liberson, Environmental Risk Sciences, to Michael Shapiro, EPA, dated February 21, 1996.

For HWCs, initial compliance would thus mean that a facility has: (1) completed all modifications necessary to meet the standards; (2) conducted all emissions tests to verify compliance and set operating limits; (3) installed and satisfactorily performance tested all continuous monitoring systems (CMS) including continuous emissions monitors (CEMS); and (4) postmarked a letter to the director that transmits the (successful) emission results of the initial comprehensive performance test, performance test results for CMS, and all operating limits, and that states the facility is in compliance. Requirements to ensure compliance after the initial compliance notification are discussed in the preamble in Section II of Part Five.

A. Existing Sources

EPA proposes that a facility be in compliance with these standards within three years after the date of publication of the final rule in the Federal Register (which is also the effective date of the rule). See proposed § 63.1206(a). EPA believes that the vast majority of sources (approximately 90 to 95 percent) would require substantial modifications to operating and/or emission control equipment to comply with the proposed standards. Three years is a reasonable estimate of the time it will take for a facility to: read and analyze the final rule; conduct tests to identify cost-effective approaches to comply with the standards; complete the engineering analysis and design; fabricate, install, start up and shake down the modified facility; conduct preliminary emissions tests; conduct formal compliance testing; analyze samples and evaluate test results; prepare the notification of compliance; and obtain management certification of the results.

Nonetheless, the Agency believes that some sources would be able to comply with the rule (i.e., submit a notification of compliance) before three years after the date of publication of the final rule. For example, some sources may require only minor modifications to emission control equipment and could comply substantially sooner than sources that need a major retrofit. Accordingly, we invite comment on how such sources could be identified and strategies that could be used to encourage or require them to comply at the earliest possible date.

We note that the CAAA allows a maximum compliance period of three years (see § 112(I)(3)(A)), unless a waiver is granted on a case-specific basis. Section 63.6(i)(4)(i)(A) provides for a one year time extension ‘‘if such additional time period is necessary for the installation of controls.’’ If an owner or operator needs to modify the RCRA permit in order to allow modifications to the facility necessary to comply with the MACT standards, we believe inability to comply with the MACT standards within three years because of the need to modify the RCRA permit could constitute a valid reason for granting a time extension under § 63.6(i). See discussion below. That is, the modification to the RCRA permit would be needed ‘‘for the installation of controls.’’

Sources with RCRA permits can modify their facilities only after complying with the permit modification procedures of 40 CFR 270.42. If an owner and operator make a good faith effort to obtain the permit modification in time to submit a notification of compliance under today's proposed rule within three years of the effective date but cannot do so for reasons beyond their control (for example, the state in which the facility is located is in the process of receiving oversight authority, or the Agency is unable to respond in a timely manner to all permit modification requests), the Administrator may grant a one-year time extension.

Note also that, as discussed above, the one-year time extension provided by § 63.6(i) applies to a different definition of compliance than that proposed by today's rule for HWCs. By the date of compliance under this proposal, a HWC must have submitted a notification of compliance as defined above. Thus, although we are proposing a one-year time extension for initial compliance for HWCs using the procedures established in existing § 63.6(i), a HWC must submit a notification of compliance by the end of the time extension, if granted, while other MACT sources would continue under the current rules unamended (i.e., they would conduct their performance test after the end of the time extension). See existing § 63.7(a).

A special case for HWCs exists for an existing unit that would not be subject to regulation on the effective date of this rule because it does not burn a hazardous waste but which subsequently becomes subject to regulation under today's proposed MACT standards because one of its waste streams later becomes a newly identified or listed hazardous waste. In this case, we propose that the facility be considered an ‘‘existing source’’, since it would be inappropriate to apply new source MACT to a facility which has not altered its conduct, and which only becomes subject to this rule because of additional regulatory action taken by EPA (or an authorized state). Such a facility would have three years after the date of publication in the Federal Register of the final rule listing the waste as hazardous to come into compliance with these regulations.[135]

Finally, EPA wants to ensure that only those facilities that plan to comply with the new regulations are allowed to burn hazardous waste during the compliance period. Accordingly, the rule would provide that, if the owner or operator of an existing source did not submit a notification of compliance by the applicable date, the source must immediately stop burning hazardous waste when the owner or operator first determines that the notification will not be submitted by the applicable date (i.e., following the effective date, but well before the compliance deadline) and could not resume burning hazardous waste except under the requirements for new MACT sources. To comply with the deadline for the initial notification of compliance, a source will have had to begin making preparations well in advance of the deadline. We invite comment on strategies that could be used to determine when a source could realistically determine whether or not it will meet the notification deadline and comply with the new standards.

We note that there would also be substantial RCRA implications for a facility that does not comply with the applicable deadlines in a timely fashion. In particular, the source could not resume burning hazardous waste without being issued a RCRA operating permit. Further, if the source had already been issued a RCRA operating permit, hazardous waste could only be burned (after missing the deadline for submitting an initial notification of compliance) for a total of 720 hours and only for the purpose of pretesting or comprehensive performance testing. Finally, if a source with a RCRA operating permit failed to submit an initial notification of compliance by the deadline, the source must, within 90 days of missing the initial notification of compliance, either submit a notification of compliance with MACT new standards or begin RCRA closure procedures unless the Administrator grants an extension of time in writing prior to the 90-day deadline for good cause. Examples of good cause that the Agency would be willing to evaluate

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[135] Note that in other cases, an existing source that begins to burn hazardous waste after the effective date of this rule (and therefore changes its conduct) is classified as a new source and would have to comply with today's rules when the hazardous waste is first burned. The source would also have to obtain a RCRA operating permit before commencing hazardous waste management activities since it would be ineligible for interim status (assuming it is conducting no other hazardous waste management activities).

are: the facility now must undergo significant modifications in order to comply with the more stringent MACT new standards that will take longer to complete than the deadline allows, or the facility must contract for substantial new services in order to show compliance with the new standards.

EPA believes that these requirements are necessary to ensure that owners and operators that elect not to comply with the standards do not continue to burn hazardous waste beyond the date on which the source determines that they will not comply with the promulgated standards.

B. New Sources

Section 63.6 states that new or reconstructed sources ''shall comply with such standard[s] upon startup of the source.'' See also proposed § 63.1206(b). One exception, *available only to facilities which commence construction between proposal and promulgation,* is in the instance where a standard more stringent than the one proposed is promulgated. In this instance, three years can be granted for the new source to be in compliance with the standard which is more stringent. The new source shall be in compliance upon startup with all standards which are not more stringent than those proposed. Section 63.2 defines new source as ''* * * any affected source the construction or reconstruction of which is commenced after the Administrator first proposes a relevant emission standard * * * .'' For discussion on reconstruction, see section VII.C. of this part of this preamble.

C. One Year Extensions for Pollution Prevention/Waste Minimization

EPA is also seeking comment on a proposal to consider extension of compliance deadlines for up to one year beyond the three year deadline from the date of promulgation of this rule, on a case-by-case basis, for facilities which request an extension to implement pollution prevention/waste minimization measures that will enable the facility to meet MACT standards and that cannot practically be implemented within the three year compliance deadline.

During development of the Hazardous Waste Minimization National Plan (released in 1994), some companies pointed out that short compliance deadlines after the promulgation of some rules have precluded them from completing necessary pollution prevention planning and implementation that would facilitate meeting compliance requirements through source reduction and environmentally sound recycling. As a result, companies opt for installing often expensive ''end-of-pipe'' pollution controls in order to meet compliance deadlines. In addition, once capital has been sunk into end-of-pipe pollution controls which are large enough to handle current and future waste volumes, there is little incentive for companies to then spend money exploring pollution prevention/waste minimization options.

EPA believes that the three year compliance deadline for meeting the MACT standards in this rulemaking should in most cases be sufficient for a facility to complete the pollution prevention planning and implementation that might be necessary to meet MACT standards. In cases where facilities can provide information that shows that additional time is necessary to complete this process, EPA is proposing to grant up to a one year extension for facilities to complete pollution prevention planning and implementation, and to satisfy all of the procedures in this rule for demonstrating compliance. This proposed extension is consistent with other portions of today's proposal, including the section on permitting procedures which describes pollution prevention/waste minimization options during the permitting process.

II. Selection of Proposed Monitoring Requirements

Section 114(a) of the CAA requires monitoring to ensure compliance with the standards and the submission of periodic compliance certifications for all major stationary sources. Given that all HWCs are subject to regulation as major sources, the proposed compliance monitoring requirements discussed below would apply to all HWCs.

In this section we discuss the following: (a) the compliance monitoring hierarchy; (b) how operations during comprehensive performance testing would be used to establish limits for operating parameters; (c) for each emission standard, requirements for continuous emissions monitors (if any) and limits on operating parameters to ensure compliance; (d) compliance with controls on fugitive combustion emissions; (e) requirements for automatic waste feed cutoffs and emergency safety vent openings; (f) quality assurance requirements for continuous monitoring systems (CMS); and (g) protocols to ensure and document compliance.

A. Monitoring Hierarchy

The proposed compliance monitoring requirements were developed by examining the hierarchy of monitoring options available for specific processes, pollutants, and control equipment. The approach involves describing, on an emission standard specific basis, what monitoring is required for a source to be in compliance. This approach was also used for the secondary lead smelter MACT (59 FR at 29772, June 9, 1994), another rule where the sources process hazardous waste.

The monitoring hierarchy is three-tiered. The top tier of the monitoring hierarchy is the use of a continuous emissions monitor system (CEMS, also known as ''CEM'') for that HAP or standard. In the absence of a CEMS for that HAP or standard, the second tier is the use of a CEMS for a surrogate of that HAP or standard and, when necessary, setting some operating limits to account for the limitations of using surrogates. Lacking a CEMS for either, EPA sets appropriate feedstream and operating parameter limits to ensure compliance and requires periodic testing of the source. In developing this proposal each tier of the hierarchy was evaluated relative to its technical feasibility, cost, ease of implementation, and relevance to its underlying process emission limit or control device.

The proposed standards for hazardous waste combustors contain monitoring requirements for process stack emissions and combustion fugitive emissions. The proposed standards require either pollutant monitoring directly through the use of a CEMS, surrogate monitoring through the use of a CEMS, and/or parameter monitoring that indicates proper operation and maintenance of a control device. Recordkeeping is also required to ensure that specific work practices are being followed. Section VI of this part discusses recordkeeping.

B. Use of Comprehensive Performance Test Data to Establish Operating Limits

Limits on operating parameters (e.g., feedrate limits, temperature limits) would be based on levels that are achieved during the comprehensive performance test. See section III of this part for the discussion on comprehensive performance tests.

1. Averaging Periods for Limits on Operating Parameters

The Agency is proposing various averaging periods for the limits on operating parameters: a ten-minute rolling average; a one-hour rolling average; and a 12-hour rolling average.[136] To show compliance with any of these rolling averages with respect to operating parameters that are established based on levels achieved during the comprehensive performance test (rather than on manufacturer specifications), the monitor must make a measurement of the parameter at least once each 15 seconds, and four 15-second measurements must be averaged each minute to determine a one-minute average. Then, each one-minute average is considered along with the previous one-minute averages over the averaging period to calculate a new rolling average level each minute. Thus, irrespective of the averaging period, a new rolling average level is calculated each minute.

The duration of the averaging period affects the number of one-minute averages used to calculate the level. For example, if a limit is based on a 12-hour rolling average, each new one-minute average is added to the previous 719 one-minute average values to calculate a new 12-hour rolling average value each minute.

A ten-minute average is proposed when the Agency is concerned that short-term perturbations above the limit will result in high emissions that cannot be offset by lower emissions during periods of more appropriate operation.[137] Since the ten-minute average is used to control short-term perturbations and does not control average emissions, it will always be used with a one hour average designed to control average emissions. (An exception is when the 10-minute average is used to control a design specification of the APCD manufacturer. In this event, a ten-minute average may be used alone.) It could be argued that a short term averaging period other than ten minutes could be used. However, the Agency is concerned about setting the averaging period shorter than 10 minutes. Shorter averaging periods would result in more extreme (i.e., absolute maximum or minimum) limits and could lead to higher emissions. Conversely, EPA could set a short-term averaging period longer than ten minutes, but believes that ten minutes is an appropriate, achievable, conservative, and reasonable duration for the short averaging period.

A one-hour averaging period is proposed in instances where the Agency is less concerned about perturbations and/or wants to limit average emissions.[138] Hourly rolling averages are currently required under the BIF rule and are required for some incinerators. The value of one-hour averages will tend to be less extreme than 10-minute averages since perturbations are averaged out over more normal data and, thus, are better at controlling average emissions than 10-minute averages. It could be argued that an averaging period shorter than one hour would be appropriate, but EPA is selecting a ten-minute average to control perturbations and believes this is sufficient. It could be argued that averaging periods longer than one hour could also be appropriate, but setting limits on operating parameters is at the bottom of the monitoring hierarchy and, as such, a conservative approach is preferable.

The twelve-hour averages are being proposed in instances when the Agency wants to control average emissions and is concerned that the one-hour average may not be achievable or may be overly restrictive. Twelve-hour averages are proposed only for feedrates: metals and chlorine. For each of these, feedstream analysis is necessary to determine the concentration in each of the feedstreams and this makes using an averaging period shorter than twelve hours problematic. EPA could use an averaging period longer than twelve hours, but believes that twelve hours is achievable. EPA is concerned about this 12-hour average in that it may be inconsistent with averaging periods for CEMS; namely, it is longer than the metals, HCl, Cl_2, or PM averaging periods. A 12-hour average is inconsistent because, at the top of the monitoring hierarchy, CEMS averaging periods should be longer, i.e., less conservative, than feedstream monitoring, at the bottom of the hierarchy. EPA invites comment on this issue. Alternate averaging periods for chlorine and metals feedrates are discussed below in the appropriate sections.

As noted earlier, for compliance with these averaging periods, EPA proposes that averages be calculated every minute on a rolling-average basis. It is also proposed that the one-minute average be the average of the previous four measurements taken at 15-second intervals. This is the approach required by the BIF rule. All 15-second measurements would be used without smoothing, rounding, or data checks. No 15-second observations may be ‘‘thrown out’’ for any reason.

2. How Limits Would Be Established from Comprehensive Test Data

This section explains how operating limits for the averaging periods discussed above are established from the comprehensive test data. Note that all averages are rolling averages, based on a one-minute average.

Ten-minute rolling averages would be established as the average over all comprehensive test runs of the highest or lowest (as specified) ten-minute rolling average for each run.

One of two approaches would be specified to establish limits on an hourly rolling average basis: an average level or an average of the highest or lowest (as specified) hourly rolling average. In most cases, it is derived by averaging all of the one-minute averages during all the runs of the comprehensive performance test. In the few cases when an average of the maximum hourly rolling averages is specified, the limit is derived by taking the average of the highest hourly average for each run of the comprehensive performance test.

Twelve-hour rolling averages for feedstreams would be derived by averaging all of the one-minute averages during all the runs of the comprehensive performance test irrespective of the total duration of the test.[139] Separate twelve-hour averages would apply to all feed locations.

3. Example of How Limits Would Be Established

For example, if a facility were to have a fabric filter (FF), it might have a limit on maximum FF inlet temperature on a ten-minute average to ensure compliance with the dioxin and furan standard. If this is the case, during the comprehensive performance test, the facility would monitor FF inlet temperature. The facility would then take the highest single ten-minute rolling averages of FF inlet temperature from each of the three comprehensive test runs and average them together. If these single largest ten minute rolling averages from each of the three runs were 140, 150, and 160°C, then the maximum ten-minute rolling average for FF inlet temperature would be 150°C.

If the same parameter were also to have an hourly rolling average based on all data from all runs, the facility would

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[136] We note that today’s rule would establish an instantaneous limit, i.e., a limit where no averaging is allowed, to ensure that less than ambient pressure is maintained in the combustion system at all times to control fugitive combustion emissions.

[137] An example is for inlet temperature to dry PM APCDs to control dioxin. Dioxin increases exponentially with increasing temperature, so a short-term increase in temperature will not be offset by short-term decreases in dioxin emissions.

[138] An example is flue gas flowrate. This parameter is important, but slight increases in flow rate can be offset by proportionate decreases in flowrate. Therefore, average flowrate is important without regard to perturbations.

[139] Or, if the source elects to define different operating modes and conduct performance testing under each mode, the one-minute averages would be averaged for all runs for each test condition (representing each mode of operation).

sum up all one-minute averages occurring during the comprehensive performance test and average them together. This would become the hourly rolling average for this parameter.

Twelve-hour feedrate limits are calculated similarly. For SVM, the facility would sum the total feed from all runs of the comprehensive performance test and divide that sum by the number of minutes of all three runs of the comprehensive test. For this example, assume that both Cd and Pb are fed during the comprehensive performance test, that the feedrate for Cd was 5, 30, and 25 and for Pb was 100, 70, and 85 for each of the three runs of the comprehensive performance test and that the time duration of each run was 205, 230, and 195 minutes. The total amount of SVM fed would be 315 and the time duration of the test would be 630 minutes. Therefore, the SVM limit would be 315, divided by 630 minutes, or 0.50. During normal operation the SVM feedrate would be calculated every minute to ensure it does not exceed the 0.50 SVM limit by averaging the current and previous 719 one-minute averages.

C. Compliance Monitoring Requirements

Monitoring requirements are proposed to ensure compliance with the following emission standards: dioxin and furan (D/F), mercury (Hg), semivolatile metals (SVM), low-volatile metals (LVM), carbon monoxide (CO), hydrocarbons (HC), hydrochloric acid (HCl) and chlorine gas (Cl2) (combined and reported as HCl), and particulate matter (PM). See proposed § 63.1210. Monitoring requirements for combustion fugitive emissions are proposed as well.

Table V.2.1 summarizes today's proposed compliance monitoring requirements.

1. Continued Applicability of RCRA Omnibus Authority

When a RCRA operating permit is issued under Part 270 after a source has submitted its initial notification of compliance with the proposed MACT standards, a permit writer would continue to have the discretion currently provided by § 264.345(b)(6) of the incinerator standards and §§ 266.102(e) subparagraphs (2)(i)(G), (3)(i)(E), (4)(ii)(J), (4)(iii)(J), and (5)(i)(G) of the BIF standards to supplement these operating parameter limits as necessary to protect human health and the environment on a site-specific basis to ensure that today's proposed emission standards are being met. This means the RCRA permit writer's authority to use instantaneous limits or averaging periods other than those specified here, or require operating parameters in addition to those specified here, is maintained during the RCRA permitting process. See proposed §§ 264.340(b)(2)(iii) and 266.102(a)(2)(ii).

TABLE V.2.1.—SUMMARY TABLE OF PROPOSED MONITORING REQUIREMENTS

Device	Parameter	D/F	Hg	PM	SVM	LVM	CO & HC	HCl & Cl_2	Limits from	Avg period	Limits set as
Continuous Monitor.	Stack CEMS	....	✔	✔	(1)	(1)	✔	(1)	CEMS Stnds.	varies	Units of Standard.
	Max Inlet Temp to Dry PM APCD.	✔	(2)	....	✔	✔	....	....	Comp Test.	10 min 1 hour	Avg of Max 10 min RA. Avg over all runs.
Carbon Injection.	Min Carbon Injection Feedrate (Carbon Feed through Injector).	✔	(2)	....	....	....	....	....	Comp Test.	10 min 1 hour	Avg of Min 10 min RA. Avg over all runs.
	Min Carrier Fluid Flowrate or Nozzle Pressure Drop.	✔	(2)	....	....	....	....	....	Manuf Spec.	10 min	
	Carbon Specs	✔	(2)	....	....	....	....	....	Comp Test.	n/a	Same brand and type.
Carbon Bed.	Max Age of Carbon (Time in-use).	✔	(2)	....	....	....	....	....	Initial Comp Test.	n/a	Manuf specs (no C aging).
		....							Conf Tests.	n/a	Normal C Change-out Schedule.
		....							Sub. Comp. Tests.	n/a	Max C Age is the age during subsequent Comp Tests.
	Carbon Specs	✔	(2)	....	....	....	....	....	Comp Test.	n/a	Same brand and type.
Dioxin Inhibitor.	Min Inhibitor Feedrate.	✔	....	....	....	....	....	....	Comp Test.	10 min 1 hour	Avg of Min 10 min RA. Avg over all runs.
	Inhibitor Specifications.	✔	....	....	....	....	....	....	Comp Test.	n/a	Same brand and type.

TABLE V.2.1.—SUMMARY TABLE OF PROPOSED MONITORING REQUIREMENTS—Continued

Device	Parameter	D/F	Hg	PM	SVM	LVM	CO & HC	HCl & Cl_2	Limits from	Avg period	Limits set as
Catalytic Oxidizer.	Min Fine Gas Temp at Entrance.	✓							Comp Test.	10 min 1 hour	Avg of Min 10 min RA. Avg over all runs.
	Max Age (Time in-use).	✓							Manuf Spec.	As specified..	
	Catalyst Replacement Specs:. —Catalytic Metal Loading (each metal). —Space Time —Substrate Construction (mat'ls, pore size).	✓							Comp Test.	n/a	Same as used during previous Comp Test.
	Max Flue Gas Temp at Entrance.	✓							Manuf Spec.	10 min	As specified.
Good Combustion.	Maximun Batch Size, Feeding Frequency, and Minimum Oxygen Concentration.	✓							Comp Test.	n/a	Lightest batch fed. Least frequent feeding Highest O_2 level.
	Max Waste Feedrate.	✓							Comp Test.	1 hour	Avg of Max 1 hour RA.
	Min Comb Chamber Temp (Exit of Each Chamber).	✓							Comp Test.	10 min 1 hour	Avg of Min 10 min. RA Avg over all runs.
Good Combustion and APCD Efficiency.	Max Flue Gas Flowrate or Production Rage.	✓	(2)	(2)	(2)	(2)		✓	Comp Test.	1 hour	Avg of Max 1 hour RA.
Feed Control.	Max Total Metals Feedrate (all streams).		(2)		✓	✓			Comp Test.	12 hour	Avg over all runs.
	Max Pumpable Liquid Metals Feedrate.					✓					
	Max Total Ash Feedrate (all streams).			(2)					Comp Test.	12 hour	Avg over all runs.
	Max Total Chlorine Feedrate (all streams).				✓	✓		✓	Comp Test.	12 hour	Avg over all runs.
Wet Scrubber.	Min Press Drop Across Scrubber.	(2)	(2)	(2)	(2)	(2)		✓	Comp Test.	10 min 1 hour	Avg of Min 10 min RA Avg over all runs.
	Min Liquid Feed Press.	(2)	(2)	(2)	(2)	(2)		✓	Manuf Spec.	10 min	n/a
	Min Liquid pH		(2)					✓	Comp Test.	10 min 1 hour	Avg of Min 10 min RA Avg over all runs.
	Min Blowdown (Liq Flowrate) or Max Solid Content in Liq.	(2)	(2)	(2)	(2)	(2)			Comp Test.	10 min 1 hour	Avg of Min/Max 10 min RA Avg over all runs.

TABLE V.2.1.—SUMMARY TABLE OF PROPOSED MONITORING REQUIREMENTS—Continued

Device	Parameter	D/F	Hg	PM	SVM	LVM	CO & HC	HCl & Cl_2	Limits from	Avg period	Limits set as
	Min Liq Flow to Gas Flow Ratio.	(2)	(2)	(2)	(2)	(2)	....	✔	Comp Test.	10 min 1 hour	Avg of Min 10 min RA Avg over all runs.
Ionizing Wet Scrubber.	Min Press Drop Across Scrubber.	(2)	(2)	(2)	(2)	(2)	....	✔	Comp Test.	10 min 1 hour	Avg of Min 10 min RA Avg over all runs.
	Min Liquid Feed Pressure.	(2)	(2)	(2)	(2)	(2)	....	✔	Manuf Spec.	10 min	n/a
	Min Blowdown (Liq Flowrate) or Max Solid Content in Liq.	(2)	(2)	(2)	(2)	(2)	....	....	Comp Test.	10 min 1 hour	Avg of Min/Max 10 min RA Avg over all runs.
	Min Liq Flow to Gas Flow Ratio.	(2)	(2)	(2)	(2)	(2)	....	✔	Comp Test.	10 min 1 hour	Avg of Min 10 min RA Avg over all runs.
	Min Power Input (kVA: current and voltage).	(2)	(2)	(2)	(2)	(2)	....	....	Comp Test.	10 min 1 hour	Avg of Min 10 min RA Avg over all runs.
Dry Scrubber.	Min Sorbent Feedrate.	....	....	....	....	....	....	✔	Comp Test.	10 min 1 hour	Avg of Min 10 min RA. Avg over all runs.
	Min Carrier Fluid Flowrate or Nozzle Pressure Drop.	....	....	....	....	....	....	✔	Manuf Spec.	10 min	n/a
	Sorbent Specifications.	....	....	....	....	....	....	✔	Comp Test.	n/a	Same brand and type.
FF	Min Press Drop Across Device.	(2)	(2)	(2)	(2)	(2)	....	....	Comp Test.	10 min 1 hour	Avg of Min 10 min RA. Avg over all runs.
ESPs	Min Power Input (kVA: current and voltage).	(2)	(2)	(2)	(2)	(2)	....	....	Comp Test.	10 min 1 hour	Avg of Min 10 min RA. Avg over all runs.

Notes:

[1]=Stack CEMS is optional for the SVM, LVM, and HCl and Cl_2 standards. If a CEMS is used for compliance, none of the feedstream and operating parameters for that HAP would apply.

(2)=If CEMS are not required in the final rule for PM and/or Hg, the operating limits for these parameters would apply.

Definitions:

"Comp Test"=Comprehensive Performance Test.

"Conf Test"=Confirmatory Performance Test.

2. Dioxin and Furan (D/F)

EPA is proposing that sources comply with the D/F standard by establishing and complying with limits on operating parameters and performing D/F test every 18 months (or 30 months for small on-site facilities). Table V.2.2 summarizes these limits. See also proposed § 63.1210(j).

TABLE V.2.2.—SUMMARY OF PROPOSED DIOXIN AND FURAN MONITORING REQUIREMENTS

	Compliance using	Limits from	Avg. period	How limit is established from comp performance test
Particulate Matter (PM) Control.	PM CEMS	Comp Test	10 min	Avg of Max 10-min RAs.
			1 hour	Avg over all runs.
Good Combustion	CO and HC CEMS	MACT Std	1 hour	N/A.
	Min comb chamber tempt: CMS at exit of each chamber.	Comp Test	10 min	Avg of Max 10-min RAs.
			11 hour	Avg over all runs.
	Max waste feedrate CMS	Comp Test	1 hour	Avg of Max 1 hour RAs.

TABLE V.2.2.—SUMMARY OF PROPOSED DIOXIN AND FURAN MONITORING REQUIREMENTS—Continued

	Compliance using	Limits from	Avg. period	How limit is established from comp performance test
	For batch fed sources: limit on batch size, feeding frequency, and minimum oxygen.	Comp Test	None	N/A.
Max Inlet Temp to Dry PM APCD.	Temp CMS	Comp Test	10 min	Avg of Max 10 min RAs.
			1 hour	Avg over all runs.
Max Flue Gas Flowrate or Production Rate.	Flowrate CMS or Production Rate.	Comp Test	1 hour	Avg of Max 1 hour RAs.
Min Carbon Injection Feed	Feedrate CMS	Comp Test	10 min	Avg of Min 10 min RAs.
			1 hour	Avg over all runs.
Min Carrier Fluid Flowrate or Nozzle Pressure Drop.	same	Manuf Spec	10 min	N/A.
Carbon Specs	Brand and Type	Comp Test	N/A	Same brand and type.
Max Carbon Age, Carbon Bed.	Max Carbon Lifetime	Initial Comp Test	N/A	Manuf Specs (no C aging).
		Conf Tests	N/A	Normal C Change-out Schedule.
		Sub. Comp Tests	N/A	Max C Age is the age during sub. Comp Tests.
Min Flue Gas Temp, Catalytic Oxidizer.	Inlet to Catalyst	Comp Test	10 min	Avg of Min 10 min RAs.
			1 hour	Avg over all runs.
Max Age, Catalytic Oxidizer	Time in use	Manuf Spec	As specified..	
Catalyst Replacement Specs.	Catalytic Metal Loading	Comp Test	N/A	Same as used during comp test.
	Space Time			
	Substrate Construct: mat'ls, pore size.			
Max Flue Gas Temperature, Catalytic Oxidizer.	Inlet to Catalyst	Manuf Spec	10 min	As specified.
Min Inhibitor Feedrate	Feedrate CMS	Comp Test	10 min	Avg of Min 10 min RAs.
			1 hour	Avg over all runs.
Inhibitor Specs	None	Comp Test	N/A	Same brand and type.

a. Evaluation of Monitoring Options. D/F partitions into two phases in stack emissions: a portion is adsorbed onto particulate and a portion is emitted as a vapor (gas). Given that there is no CEMS for D/F, the Agency is proposing to require a combination of approaches to control D/F emissions: (1) compliance with a site-specific PM limit to control adsorbed D/F; (2) operation under good combustion conditions to minimize D/F precursors; (3) temperature control at the PM control device to limit D/F formation in the control device; and (4) compliance with operating limits on D/F control equipment (e.g., carbon injection) that a source may elect to use.

b. Operating Parameter Limits. Today's proposed rule would limit the following operating parameters to satisfy the combination of approaches discussed in the previous paragraph.

i. Control of PM Emissions: To control D/F and other PICs that are adsorbed to PM, the rule would require that sources limit PM emissions to the site-specific level that occurs when demonstrating compliance with the D/F (and SVM and LVM) emission standards. The site specific operating limit for PM would be capped at (i.e., could not exceed) the proposed national MACT standard of 69 mg/dscm. See section 7 of this section for a discussion on the control of PM emissions.

ii. Good Combustion: CO and HC Limits. EPA is proposing CO and HC standards to ensure good combustion to help minimize D/F precursors. See discussion below (section 5 of this section) for the explanation of the CO and HC emission standards.

iii. Good Combustion: Maximum Waste Feedrate. An increase in waste feedrate without a corresponding increase in combustion air can cause inefficient combustion that may produce (or incompletely destroy) D/F precursors. Therefore EPA proposes to limit waste feedrate. For incinerators, waste feedrate limits would be established for each combustion chamber to minimize combustion perturbations. For CKs and LWAKs waste feedrate limits would be established for each location where waste is fed (e.g., the hot end where product is discharged, mid-kiln, and at the cold end where raw material is fed.[140]

Feedrate limits would be established on an hourly rolling average basis as the average of the highest hourly rolling average for each run. We specifically invite comment on whether it would be more appropriate to establish the limit based on the average hourly rolling average over all runs. EPA is not proposing this more stringent approach because we consider waste feedrate to be a secondary control parameter that may not require such strict control.

See also the discussion in section II.F.2 below for other requirements to document compliance with feedrate limits.

iv. Good Combustion: Combustion Zone Temperature. As combustion zone temperatures decrease, combustion efficiency can decrease resulting in an increase in formation of (or incomplete destruction of) D/F precursors. For this reason, the Agency proposes limiting combustion zone temperature in each

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[140] Waste feedrate limits would also be established for waste fed into a preheater or precalciner system of a cement kiln facility.

chamber to the minimum level occurring during the comprehensive performance test documenting compliance with the D/F standard.

BIFs and incinerators are already required to monitor combustion zone temperature for compliance with metals emissions standards and destruction and removal efficiency (DRE). Monitoring of combustion zone temperature has been 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 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 are concerned that monitoring at such remote locations may not accurately reflect changes in combustion zone temperatures. For example, a reduction in heat transfer chain in a wet cement kiln due to wear over time or decreasing raw material feedrate (at a fixed heat input) in a cement or lightweight aggregate kiln may increase temperature at the kiln outlet even if combustion conditions actually caused a decrease in combustion zone temperature.

We specifically invite comment on how to address this issue. For example, the final rule could require the owner or operator 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. The final rule could also enable the Director 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. In that case, the Director may determine that the source could not comply with the regulations and, thus, could not burn hazardous waste.

Note also that, in the final rule, we would revise the existing BIF and incinerator rules to conform with the approach used in the final MACT rule. Those conforming revisions would become effective six months from the date of publication of the final rule in the Federal Register and would remain in effect until the MACT standards take effect.

The temperature limit(s) would apply to each combustion zone into which hazardous waste is fired. As examples, for incinerators with a primary and secondary chamber, separate limits would be established for the combustion zone in each chamber. For kilns, separate temperature limits would apply at each location where hazardous waste may be fired (e.g., the hot end where clinker is discharged; the mid-point of the kiln; and the cold end of the kiln where raw material is fed).

EPA proposes that a ten-minute average be used to control perturbations in combustion chamber temperature and that an hourly rolling average be used to control average combustion chamber temperature. The ten-minute average would be established as the average of the minimum ten-minute rolling average for each run of the comprehensive performance test. The hourly average would be established as the average over all runs.

v. Good Combustion: Maximum Flue Gas Rate or Production Rate. Flue gas flowrates in excess of those that occur during performance testing reduce the time that combustion gases are exposed to combustion chamber temperatures. Thus, combustion efficiency can decrease causing an increase in D/F precursors.[141] Accordingly, today’s rule would limit flue gas flowrate based on levels that occur during the comprehensive performance test.

For CKs and LWAKs, the rule would allow 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). However, production rate may not relate well to flue gas flowrate in situations where the moisture content of the feed to the combustor changes dramatically. Therefore, EPA invites comment on how to address moisture content in feeds.

The gas flowrate or production rate limit would be established as the average of the maximum hourly rolling average for each run of the comprehensive performance test.

vi. Good Combustion: Batch Size, Feeding Frequency, and Minimum Oxygen. Some HWCs burn waste or non-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 D/F precursors.[142] To ensure that D/F precursors are not increased over levels that occur during the comprehensive performance test, the rule would establish site-specific limits on maximum batch size, batch feeding frequency, and minimum oxygen concentration at the end of the combustion chamber into which the batch is fed, at the time the batch is fed.[143]

This requirement would apply to all HWCs that burn any waste or non-waste fuel in batches (i.e., ram or equivalent feed systems) or containers. For example, incinerators that use a ram to charge batches of hazardous or nonhazardous waste would be subject to these requirements. Cement kilns that feed containers of fuel at mid-kiln or at the ‘‘cold’’, raw material feed end would also be subject to these requirements, as would hazardous waste-burning cement kilns that feed tires in batches.

The rule would provide a conditioned exemption from the (site-specific) oxygen limit, however, for cement kilns that feed up to 1-gallon containers into the ‘‘hot’’, clinker discharge of the kiln. We do not believe that it is necessary to control the oxygen content of combustion gases when these containers are fed into the hot end of the kiln given that the oxygen demand from waste in the containers would be insignificant compared to the oxygen demand from other (non-containerized) fuel burned at this location. The frequency of firing the containers would, however, be limited to the rate occurring during the performance test.

There would be no averaging period associated with the limits on these operating parameters. The maximum batch size a facility could burn during normal operations would be limited by mass and would be established based on the container or batch fired during the test having the lowest mass. The minimum batch feeding interval (i.e., the minimum period of time between batch feedings) a facility could burn

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

[142] The requirements would apply when either hazardous or non-hazardous waste fuels are batch fed because the potential for oxygen-deficient conditions and an increase in D/F precursors is present irrespective of whether the material fed is classified as a hazardous waste.

[143] EPA considered whether it would be practical to establish a national minimum oxygen level for all HWCs in this proposed rule and believes it is not practical. A limit on minimum oxygen content would have to be established on a case-specific basis given that the minimum oxygen level necessary for good combustion will vary from source to source within a given source category, and will vary within a given source over time as the type or volume of waste or fuel varies. The Agency invites comment on whether the final rule should require a case-specific limit on minimum oxygen content for all HWCs rather than as proposed for only batch-fired HWCs. If so, the limits would be established on a ten-minute and an hourly rolling average as proposed for combustion chamber temperature.

during normal operations would be established as the longest interval of time between batch feedings during the comprehensive performance test. The minimum oxygen content at which a facility would charge a containerized waste into the burner during normal operations would be the highest instantaneous oxygen level observed when any batch was fed during the comprehensive performance test.

EPA specifically invites comment on whether the bases of these three parameters are overly conservative. Rather than basing maximum batch size on the smallest container fed during the comprehensive test, EPA could establish maximum batch size based on the average container mass. Feeding frequency could be based on the average time interval between batches during the comprehensive test. Oxygen concentration could be the average oxygen level occurring during the test. To address this issue, EPA needs to know whether the proposed requirements are overly conservative and why, or conversely, whether the options described in this paragraph are not restrictive enough.

EPA specifically invites comment on other approaches to establish limits for these parameters, and whether (and how) it would be necessary to limit maximum volatility of the batch-fired material.

vii. Dry PM Collection Device Inlet Temperature. Formation of D/F emissions on particulate matter increases with increasing temperature. Above 350°F and up to approximately 700°F, emissions of D/F can increase a factor of 10 for every 125°F increase in temperature.[144] Consequently, today's rule would limit temperature at the inlet to a dry PM control device to the maximum levels that occurred during the comprehensive performance test.

It is proposed that a ten-minute rolling average be used to control perturbations in temperatures and that a one-hour rolling average be used to control the average temperature. The ten-minute rolling average limit would be established as the average of the highest ten-minute average for each run. The hourly average would be established as the average of over all runs.

viii. Carbon Injection. Facilities may use carbon injection to meet the D/F standard. Today's rule would limit the following carbon injection parameters: minimum carbon injection rate; minimum carrier fluid flowrate or nozzle pressure drop, and adsorption characteristics of the carbon.

A minimum carbon feedrate limit is necessary to ensure that facilities maintain the same D/F removal efficiency as was demonstrated during the comprehensive performance test. It is proposed that minimum carbon injection rate be maintained on a ten-minute and one-hour average. The ten-minute average would be established as the average of the minimum 10-minute rolling average for each run, and the one-hour average would be established as the average over all runs.

A carrier fluid, gas or liquid, is necessary to transport and inject the carbon into the gas stream. EPA proposes that either minimum carrier gas flowrate or pressure drop across the nozzle be maintained to ensure good flow of the injected carbon into the flue gas stream. It is proposed that either limit be established on a 10-minute rolling average and that the limit be based on the carbon injection manufacturers specifications.

Finally, to ensure that D/F removal efficiency is maintained after the performance test, carbon used after the test must have the same or better adsorption properties as carbon used during the test. Thus, the rule would require that facilities continue to use the same brand and type of carbon that was used during the comprehensive test. The rule would allow a source to obtain a waiver from this requirement from the Director, however, if the owner or operator: (1) documents by data or information key characteristics of carbon which affect removal of D/F from combustion gas; (2) documents by data or information specification levels corresponding to those characteristics; and (3) complies with the specification.

ix. Carbon Bed. Some sources may elect to use a carbon bed to control D/F. Today's rule would limit the age of the carbon and the adsorption characteristics of the carbon to ensure that D/F control is maintained.

Since carbon beds work by adsorbing certain chemicals, e.g., dioxin and mercury, and the carbon in the bed becomes less effective as the active sites for adsorption become occupied, an appropriate control parameter for carbon beds is the amount of time the carbon in use. EPA is particularly concerned about a facility's ability to know when a carbon bed is spent, i.e., when enough active sites get occupied to make the device inadequate for removing dioxin or mercury, and knowing how often carbon must be replaced from the bed to ensure this does not occur. This cannot be determined during the initial comprehensive performance test. For that reason, the Agency proposes that facilities follow the carbon bed manufacturer's specifications for the initial comprehensive performance test.

No carbon aging would be required for this initial test. For confirmatory tests, facilities would be required to follow the normal change-out schedule specified by the manufacturer. For subsequent comprehensive tests, the Agency proposes that the D/F test be conducted at maximum carbon age, i.e., at the least frequent carbon change-out, and that this age be maximum age allowable under normal operation.

Alternately, the Agency could use some form of a breakthrough calculation and use this to assure compliance with the D/F standard. A breakthrough calculation would give a theoretical minimum carbon change-out schedule which the facility could use to ensure that breakthrough, i.e., the dramatic reduction in efficiency of the carbon bed due to too make active sites being occupied, does not happen. However a breakthrough calculation can only be done after experimentation determines the relationship between incoming adsorbed chemicals and the adsorption rate of the carbon. The adsorption rate of carbon can be determined experimentally, but the speciation of adsorbed chemicals in a flue gas stream is site-specific and may vary greatly within a given site over time. Therefore, EPA proposes using this alternative only for the initial comprehensive test, when site data is not available and the carbon bed is not aged. EPA believes that, for subsequent comprehensive tests, the proposed option is preferable, since it provides for the setting of the minimum carbon change-out on subsequent D/F tests. EPA does not believe it is appropriate to use breakthrough calculations for the second and subsequent comprehensive test(s) since they do not take into account facility specific characteristics, like the concentration of adsorbed chemicals in the flue gas. EPA invites comment on an approach which would use breakthrough calculations alone, to see if it can become workable in another form than the Agency has envisioned.

An issue that is difficult to address is that carbon age is dependant not only on time in service, but also the carbon bed inlet concentration of substances (e.g., metals, PM) which adsorb or absorb onto the carbon. There may be other factors that affect D/F removal efficiency of the bed. The Agency invites comment on how to address these issues.

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[144] See Chapter 7.2 of "Draft Technical Support Document for HWC MACT Standards, Volume IV: Compliance with the Proposed MACT Standards", February 1996.

Another issue is whether it is necessary to control temperature at the inlet to the carbon bed. EPA does not believe this is necessary since facilities will need a PM control device upstream of a carbon bed and temperature at the inlet to dry PM APCDs is proposed to be controlled. However, the consequences of a temperature spike at the carbon bed can be severe: a temperature spike may cause adsorbed D/F and Hg to de-adsorb and re-enter the gas stream, resulting in a significant amount of D/F and Hg being emitted at the stack at once. For this reason, the Agency invites comment on whether controlling temperature at the inlet to a carbon bed is necessary.

Finally, as the case with carbon injection, to ensure that D/F removal efficiency is maintained after the performance test, carbon used post-test must have the same or better adsorption properties as carbon used during the test. Thus, the rule would require that facilities continue to use the same brand and type of carbon as was used during the comprehensive test. The rule would allow a source to obtain a waiver from this requirement, however, as discussed above.

x. Catalytic Oxidizer. Some facilities may use a catalytic oxidizer to meet the D/F standard. Catalytic oxidizers used to control stack emissions are similar to those used in automotive and industrial applications. The flue gas passes over a 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 just as automotive and industrial catalysts are.

The rule would require sources to establish site-specific limits on the following operating parameters for catalytic oxidizers: minimum flue gas temperature at the inlet of the catalyst, maximum age in use, catalyst replacement specifications, and maximum flue gas temperature at the inlet of the catalyst. The rule would allow a waiver from these provisions if the owner documents to the Director that establishing limits on other operating parameters would be more appropriate to ensure that the D/F destruction efficiency of the oxidizer is maintained after the performance test. The owner or operator would provide such documentation, including how limits on the alternative operating parameters would be established and appropriate averaging periods, and a request for a waiver as part of the notification to conduct the comprehensive performance test and draft test protocol. The Director would grant the waiver in writing, if warranted.

Minimum flue gas temperature at the inlet of the catalyst is necessary 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. EPA proposes that minimum flue gas temperature be maintained on both a ten-minute and one-hour average. The ten-minute average limit would be established as the average of the minimum ten-minute rolling average for each run during the comprehensive performance test. The hourly average limit would be established as the average hourly average over all runs.

Due to poisoning and general degradation of the catalyst, manufacturers often establish a maximum time in-use for the catalyst. EPA proposes that the manufacturer’s specification for maximum age be used as maximum age of the catalyst.

When a catalyst is replaced, it must be of the same design of the previous catalyst to ensure that the replacement catalyst will work as efficiently as the previous one. Therefore, EPA proposes that the following design parameters be used in specifying replacement catalysts: loading of catalytic metals; space time; and monolith substrate construction.

Catalytic metal loading is important because, without sufficient catalytic metal on the catalyst, it would not properly function. Also, some catalytic metals are more efficient than others. Therefore, EPA proposes that replacement catalysts 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. It is proposed that replacement catalysts have at the same or lower space time as the one used during the comprehensive performance test.

Substrate construction is also an important parameter. 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, EPA proposes that the same materials of construction, monolith or pellets and metal or ceramic, be used as was used during the comprehensive performance test. Monoliths also form a honeycomb like structure when viewed from one end. The pore density, i.e., number of pores per square inch, is critical because they 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 a monolith substrate is used, EPA proposes that the same pore density as the one used during the comprehensive performance test. Finally, catalysts are supported by a washcoat, typically alumina. EPA proposes that replacement catalysts have the same type and loading of washcoat as was on the catalyst used during the comprehensive performance test.

Finally, EPA believes it is also important to control maximum flue gas temperature into the catalyst. This is because sustained high flue gas temperature can result in sintering of the catalyst, degrading its performance. The Agency proposes that maximum flue gas temperature into the catalyst be controlled and that it be a ten-minute rolling average, based on manufacturer specifications.

xi. D/F Inhibitor. Some facilities may use a D/F inhibitor (e.g., sulfur) to meet the D/F standard. In such cases, the rule would establish a minimum inhibitor feedrate. Limits would be established on both a ten-minute and one-hour average. The ten-minute average limit would be established as the average of the minimum ten-minute rolling average for each run, and the one-hour average limit would be established as the average over all runs. See also the discussion in section II.F.2 below for other requirements to document compliance with feedrate limits.

This minimum inhibitor feedrate pertains to additives to feedstreams, not naturally occurring inhibitors that may be found in fossil fuels or hazardous waste. It is conceivable that a facility would choose to burn high sulfur fuel or waste specially during the comprehensive test and switch back to low sulfur fuels or waste after the test, thus reducing D/F emissions during the comprehensive test to levels that would not be maintained after the test. EPA invites comment on whether and how to address this concern, including whether it would be appropriate to establish limits on the amount of naturally occurring inhibitor, either during performance testing or as an operating limit. Comments and documentation are also requested to help identify such inhibitors.

As was the case with carbon used in carbon injection and carbon beds, EPA is concerned that facilities may use a less effective, and presumably less expensive, D/F inhibitor during normal operation than was used during the comprehensive performance test. For this reason, the rule would require that facilities continue to use the same type and brand of inhibitor as was used during the comprehensive test. The rule would allow a source to obtain a waiver from this requirement from the Director, however, if the owner or operator: (1) documents by data or information key characteristics of the inhibitor which inhibit formation of D/F; (2) documents by data or information specification levels corresponding to those characteristics; and (3) complies with the specification.

xii. Rapid Quench. Some facilities may elect to use a rapid quench to lower flue gas temperature to meet the D/F standard. The rule would not establish limits on operating parameters for rapid quench systems because we believe that a maximum dry PM control device temperature is sufficient to ensure that the quench was adequate. We note, however, that a facility may use a rapid quench for control of D/F emissions yet not have a dry PM control device. One way to address this situation is to require that a maximum flue gas temperature be established at the stack.

EPA doubts, however, that there will be any facilities which use a rapid quench without a dry PM control device. Consequently, we invite comment on whether the final rule should establish a maximum flue gas temperature limit that would address such apparently hypothetical situations.

xiii. Consideration of Feed Restrictions on Metals, Halogens, and Dioxin Precursors. The rule would not establish feedrate limits on metals, halogens, or D/F precursors to ensure compliance with the D/F standard. Some research indicates that certain metals, copper for instance, in the feed may catalyze the formation of D/F. However, this research is inconclusive and there is not yet a consensus among the research community that catalytic metal in the feed necessarily causes increased D/F emissions.[145] Therefore, EPA proposes not limiting the feed of catalytic metals in the feed.

Research and common sense has also indicated that the presence of halogens, such as chlorine, in the feed may contribute to the production of halogenated D/F. While the presence of chlorine in the feed is necessary for the formation of chlorinated D/F, current science seems to support the view that there is not a clear correlation between the level of chlorine in the feed and the level of dioxin in the flue gas. In other words, increasing halogen feedrate above *de minimis* levels does not appear to cause increased emissions of chlorinated D/F.[146] Therefore, the rule would not limit the amount of chlorine fed to ensure compliance with the D/F standard, particularly in light of the suite of other compliance assurance measures.

Nonetheless, we believe that it is prudent to require that chlorine be fed at normal levels (or greater) during the D/F comprehensive performance test. This is because, while more chlorine does not necessarily form more dioxin, some chlorine is needed to form chlorinated D/F. We invite comment on how to ensure that normal levels of chlorine are fed during the comprehensive performance test. For sources that do not elect to use a CEMS for SVM, LVM, HCl and Cl_2 and, thus, must maximize chlorine feedrate during the test, this is not an issue. We believe that the vast majority of sources will be in this situation. For sources that elect to use such CEMS (assuming that multi-metal and Cl_2 CEMS become commercially available), defining normal chlorine feedrates is an issue.

Some arguments have been made that the presence of organic dioxin precursors in the feed would result in an increased level of D/F in the flue gas. EPA has briefly examined certain facilities which feed dioxin or known organic dioxin precursors (e.g., chlorophenol and chlorobenzene) to those which are known not to feed organic dioxin precursors. Although our limited study suggests that no strong correlation exists between the level of dioxins or organic dioxin precursors in the feed and D/F emissions, we do not believe the issue has been sufficiently examined in detail (indeed, other evidence suggests that a correlation might exist). EPA invites comment on whether feed restrictions on D/F and organic dioxin precursors are warranted and, if so, whether this should be an operating parameter or a feed requirement during the comprehensive test (such as proposed for chlorine).

3. Mercury (Hg)

Table V.2.3 Summarizes the proposed compliance monitoring requirements and other options being considered for Hg. See also proposed § 63.1210(k).

TABLE V.2.3.—PROPOSED HG MONITORING REQUIREMENTS AND OTHER OPTIONS BEING CONSIDERED

		Compliance using	Limits from	Avg. period	Operating limit avg pd basis
Proposed Requirement	CEMS	Total Hg or Multi-metal CEMS.	CEMS Std.	10 hour.	
Option 1: Elemental Hg CEMS.	Surrogate CEMS	Elemental Hg CEMS	Comp Test	10 hour	Avg over all runs.
	Max Flue Gas Flowrate or Production Rate.	Same	Comp Test	1 hour	Avg of Max 1 hour RAs.
	Min Press Drop, Wet Scrubber.	Pressure Drop Across Scrubber.	Comp Test	10 min 1 hour	Avg of Min 10 min RAs. Avg over all runs.
	Min Liq Feed Press, Wet Scrubber.	Pressure	Manuf Spec	10 min.	
	Min Liq pH	pH	Comp Test	10 min	Avg of Min 10 min RAs.

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[145] See Chapter 7.2 of USEPA, ''Draft Technical Support Document for HWC MACT Standards, Volume IV: Compliance with the Proposed MACT Standards'', February 1996.

[146] See Chapter 7.3 of USEPA, ''Draft Technical Support Document for HWC MACT Standards, Volume IV: Compliance with the Proposed MACT Standards'', February 1996.

TABLE V.2.3.—PROPOSED HG MONITORING REQUIREMENTS AND OTHER OPTIONS BEING CONSIDERED—Continued

		Compliance using	Limits from	Avg. period	Operating limit avg pd basis
Option 2: No CEMS				1 hour	Avg over all runs.
	Min Liq/Gas Ratio, Wet Scrubber.	Scrubber Liquid and Flue Gas Flowrate.	Comp Test	10 min 1 hour	Avg of Min 10 min RAs. Avg over all runs.
	Max Total Hg Feedrate, all streams.	Feedstream Analysis	Comp Test	12 hour	Avg over all runs.
	Max Inlet Temp to Dry PM APCD.	Temp	Comp Test	10 min 1 hour	Avg of Max 10 min RAs. Avg over all runs.
	Min Carbon Injection Rate.	Feedrate CMS	Comp Test	10 min 1 hour	Avg of Min 10 min RAs. Avg over all runs.
	Carbon Specs	Brand and Type	Comp Test	N/A	N/A.
	Min Carrier Fluid Flowrate or Nozzle.	Same	Manuf Spec	10 min	N/A
	Max Carbon Age	Max Carbon	Initia Conf Tests Subsequent Comp Tests.	N/A N/A N/A	Manuf Specs. Normal C Change-out Schedule. Max C Age is the age during subsequent Comp Tests.
	Max Flue Gas Flowrate of Production Rate.	Flowrate CMS or Production Rate.	Comp Test	1 hour	Avg of Max 1 hour RAs.
	Min Press Drop, Wet Scrubber.	Pressure Drop Across Scrubber.	Comp Test	10 min 1 hour	Avg of Min 10 min RAs. Avg over all runs.
	Min Liq Feed Press, Wet Scrubber.	Pressure	Manuf Spec	10 min.	
	Min Liq pH, Wet Scrubber.	pH	Comp Test	10 min 1 hour	Avg of Min 10 min RAs. Avg over all runs.
	Min Liq/Gas Ratio, Wet Scrubber.	Scrubber Liquid and Flue Gas Flowrate.	Comp Test	10 min 1 hour	Avg of Min 10 min RAs. Avg over all runs.

a. Evaluation of Monitoring Options. Several types of CEMS exist or are under development which measure Hg. Therefore, the rule proposes use of a Hg CEMS to document compliance with the Hg standard.[147]

The rule would allow two alternative CEMS approaches: the use of a multi-metal CEMS or the use of a total Hg CEMS. (In addition, we discuss below our concerns with allowing the use of an elemental Hg CEMS.) If a facility elects to use a multi-metal (MM) CEMS for compliance with the SVM and LVM standards, the MM CEMS can be used for compliance with the Hg standard as well. See the discussion below on SVMs and LVMs for discussion on MM CEMS. If a facility elects not to use a MM CEMS, the source may use a total Hg CEMS.

In case the final rule does not require compliance with the Hg standard using a CEMS, we also invite comment on ensuring compliance by establishing limits on operating parameters.

b. Total Mercury CEMS. The rule would require use of a CEMS to monitor Hg emissions (see below, small-on site sources could obtain a waiver from the CEMS requirement.) If a facility elects not to use a MM CEMS for compliance with all of the metals standards, EPA recommends that facilities use a total Hg CEMS.

An example of such a unit is a total Hg CEMS made by the German company Verewa and marketed in the US by Euramark. The device has recently been certified by TUV, a quasi-governmental German agency charged with approving compliance devices and methods. The CEMS uses wet chemistry techniques prior to an elemental Hg UV absorption analyzer to convert all species of Hg into elemental Hg. The analyzer then determines the total Hg in the flue gas.

The performance specification for a total Hg CEMS are proposed here as Part 60, Appendix B, Performance Specification 12. In addition, the appendix to Part 63, Subpart EEE, Quality Assurance for CEMS would require quarterly testing of the analyzer and relative accuracy testing of the total system every 3 years (or 5 years for small on-site facilities).

Also, EPA invites comments on allowing small on-site sources (defined in § 63.1208(b)(1)(ii) in the proposed regulations) to obtain a waiver from the requirement of installing Hg CEMS. If the waiver is promulgated and granted by the permitting authority, the facility would demonstrate compliance with the Hg standard by establishing operating parameter limits described in subsection d, ‘‘Alternative to a CEMS,’’ below.

c. Elemental Mercury CEMS. EPA invites comment on another approach to continuously monitor Hg emissions, the use of an elemental Hg CEMS. Although the elemental Hg CEMS may be less expensive than a total Hg CEMS, EPA has several concerns with allowing the use of an elemental Hg CEMS.

An elemental Hg CEMS does not measure species other than elemental, or metallic Hg. It does not measure Hg

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[147] In February 1996, the Agency initiated a demonstration program to determine whether Hg (and PM) CEMS can comply with the performance specifications proposed today. The demonstration will also evaluate long-term durability (e.g., 6 months or longer) of the CEMS. Results of the demonstration will be made available for review and comment prior to promulgation of the final rule.

salts such as mercuric chloride ($HgCl_2$). Therefore, it would be necessary for the facility to measure elemental Hg using the CEMS and elemental and Hg salts separately using manual methods during the comprehensive performance test.

Data from the comprehensive test would be used to identify the elemental Hg emission level at which the facility is considered to be in compliance with the total Hg standard. However, following the comprehensive test a facility could have higher levels of undetectable Hg salt emissions than occurred during the comprehensive test. This could happen in one of two ways: the scrubber may not be working as effectively; or the Hg and halogen feed may have increased such that, at a fixed scrubber efficiency, more Hg salts are emitted as a result. Ensuring that the scrubber efficiency is maintained at performance test levels can be accomplished using the parameters described above. However, it is difficult to determine whether the same amount of Hg salts, relative to the amount of total Hg, is being emitted. One could correlate Hg and halogen feed with scrubber efficiency at various scrubber conditions, but this would require many data points and seems infeasible from a monetary and technical standpoint. Even if an approach can be developed, the Agency is inclined to believe it would require a lot of oversight to ensure it is done properly.

If the issue of correlating total Hg emissions to an elemental Hg CEMS can be successfully addressed, establishing the site-specific limit and the averaging period for the elemental Hg standard would then have to be addressed. Facilities would be able to use the mean of the results during the test, along with a variability factor, as their site-specific elemental Hg level. The averaging period could be the time duration of three runs of the comprehensive performance test, but manual methods tests do not end on the exact hour and there may be more than one comprehensive test with, likely, different sampling periods. So, a problem would arise as to what averaging period to use.

For these reasons, EPA believes the use of an elemental Hg CEMS is infeasible to implement under self-implemented MACT standards. Nonetheless, if these issues can be resolved, the final rule may allow some use of an elemental Hg CEMS.

d. Alternative to a CEMS. If the final rule does not require that Hg emissions be continuously monitored, the rule would ensure compliance with the Hg standard by establishing limits on operating parameters. Also if the provision allowing small on-site facilities (defined in § 63.1208(b)(1)(ii) of the proposed regulations) to waive the Hg CEMS requirement is promulgated and such a facility elects not to use an Hg CEMS, the facility would have to establish these operating parameter limits to document compliance with the Hg standard. The proposed operating limits are: maximum Hg feedrate, Hg scrubber operating parameters, maximum flue gas feedrate, minimum carbon injection rate, and carbon bed operating parameters.

i. Maximum Hg Feedrates. Absent a requirement to monitor Hg emissions with a CEMS, the final rule would establish a maximum Hg feedrate limit. This is because the amount of Hg fed into the combustor directly affects emissions and the ability of control equipment to remove Hg. This maximum feedrate pertains to all feeds into the combustor: hazardous waste, raw materials, additives, and fossil fuels. Feedrate sampling and analysis protocols would be described in the facility's waste analysis plan. The limit would be based on a twelve-hour average and established as twelve times the hourly average feedrate during all runs of the comprehensive performance test. See also the discussion in section II.F.2. below for other requirements to document compliance with feedrate limits.

As mentioned above in Subsection B, this twelve-hour average is inconsistent with the ten hour averaging period for metals CEMS. CEMS should have longer averaging periods than operating parameters such as feedrates. Therefore, EPA invites comment on whether the averaging period for Hg feedrate should be promulgated at six, instead of 12, hours. EPA believes a six-hour averaging period for Hg feedrate is sufficiently conservative, relative to the CEMS averaging period and achievable.

ii. Max Inlet Temp to Dry PM APCD. High inlet temperatures to dry PM APCDs can cause low recovery of Hg in the APCD. This is because Hg volatility increases with increasing temperature. Therefore, absent a requirement to monitor Hg emissions with a CEMS, the final rule would control inlet temperature to a dry PM APCD. Limits would be based on both a 10-minute and a one-hour average. The 10-minute average would be the average of the maximum PM APCD inlet temperatures experienced during each compliance test run and the one-hour average would be the average over all runs.

iii. Carbon Injection. Some facilities may need to use carbon injection as an aftertreatment to comply with the Hg standard. Absent a Hg CEMS requirement, the final rule would establish controls on the following carbon injection operating parameters: minimum carbon injection rate, carbon specifications, and minimum carrier flowrate or nozzle pressure drop. The controls would be established under the same approach as proposed for carbon injection used for D/F control. See the previous discussion.

iv. Carbon Bed. Rather than carbon injection, some facilities may elect to use a carbon bed to control Hg emissions. Absent a requirement to monitor Hg emissions with a CEMS, the final rule would establish controls on carbon bed operating parameters under the same approach as proposed for carbon beds used for D/F control. See the previous discussion.

v. Maximum Flue Gas Flowrate or Production Rate. As discussed above for compliance with the D/F standard, an increase in flue gas flowrate can decrease collection efficiency of the emission control device. Accordingly, absent a requirement to monitor Hg emissions continuously, the final rule would limit flue gas flowrate or production rate under the same approach as proposed for D/F compliance. See the previous discussion.

vi. Wet Scrubber Parameters. The efficiency of wet scrubbers directly affects the removal of Hg salts from flue gas. Key operating parameters would include: maximum flue gas flowrate or production rate, minimum pressure drop across the wet scrubber, minimum liquid feed pressure, minimum liquid pH, and minimum liquid to gas ratio. Refer to the section below on compliance requirements for the HCl and Cl_2 standard for discussion on these parameters. Absent a requirement to monitor Hg emissions continuously, the final rule would establish limits on these parameters under the same approach as proposed for compliance with the HCl and Cl_2 standard.

4. Semivolatile Metals (SVM) and Low Volatile Metals (LVM)

Table V.2.4 Summarizes the proposed compliance monitoring requirements and other options being considered. See also proposed § 63.1210 (l) and (m).

TABLE V.2.4.—SUMMARY OF PROPOSED SVM AND LVM COMPLIANCE MONITORING REQUIREMENTS AND OTHER OPTIONS BEING CONSIDERED

		Compliance using	Limit from	Avg period	Operating limit avg pd basis
Proposed Option 1 (Facility Choice).	CEMS	Multi-metal CEMS	CEMS Std	10 hour.	
Proposed Option 2 (Facility Choice).	Good PM Control	PM CEMS (see PM for Others).	Comp Test	10 min	Avg of Max 10 min RAs.
				1 hour	Avg over all runs.
	Max Inlet Temp to Dry PM APCD.	Same	Comp Test	10 min	Avg of Max 10 min RAs.
				1 hour	Avg over all runs.
	Max Total SVM and LVM Feedrates.	Feedstream Analysis	Comp Test	12 hour	Avg over all runs.
	Max Pumpable LVM Feedrate.	Feedstream Analysis	Comp Test	12 hour	Avg over all runs.
	Max Chlorine Feedrate.	Feedstream Analysis	Comp Test	12 hour	Avg over all runs.

a. Evaluation of Monitoring Options. EPA proposes two compliance options for the SVM and LVM standards: use of a multi-metal CEMS (MM CEMS) or compliance with limits on operating parameters. A facility would be allowed to use either of these options to demonstrate compliance. We are not proposing to require the use of a CEMS because a CEMS is not commercially available for LVMs and SVMs at this time, and the Agency is uncertain whether a CEMS that could meet the proposed performance specifications discussed below would be available at promulgation of the final rule.

b. Option 1: Use of a Multi-metal CEMS to Document Compliance. EPA is proposing to allow the use of a MM CEMS for compliance with the Hg, SVM, and LVM standards. If a facility elects to use a MM CEMS, limits on operating parameters would not be required.[148]

EPA is proposing to allow the use of a MM CEMS (and may require the use of MM CEMS if they would be commercially available by the promulgation date of the final rule) because it is difficult to ensure compliance with the emission standards by limiting operating parameters. Sampling and analysis of feedstreams to monitor metals feedrate has drawbacks in that representative sampling is sometimes difficult and expensive to achieve,[149] and the available analytical methods may not extract all metals from some feedstreams (and thus metal feedrates may be higher than indicated by analysis). In addition, it is often difficult to use limits on operating parameters of the metal emission control device to ensure that collection efficiency is maintained. It is also difficult to ensure that the other major factors that can affect metals emissions are adequately addressed by operating limits. For example, factors that affect metal volatility and subsequently metals emissions may include chlorine feedrates, combustion chamber temperature, and temperature at the inlet of the emission control device. Finally, the common process of spiking metals during compliance testing to ensure an adequate operating envelope is expensive, potentially dangerous to the testing crew that must handle the toxic metals, and causes higher than normal emission rates during compliance testing. If a MM CEMS were available, there would not be a need to spike metals during compliance testing.

i. How to Address Metals that a CEMS May Not Be Able to Measure. Several MM CEMS are currently under development, and not all of them will be able to measure all metals in the SVM (Pb and Cd) and LVM (As, Be, Cr, and Sb) groupings. Clearly, a MM CEMS cannot be used to document compliance for a metal it cannot measure. For metals a MM CEMS cannot measure, it is proposed that facilities assume that all of that metal fed is emitted at the stack and that this metal feedrate be used in calculating the emissions for the metal group. Alternately, EPA could decide that a MM CEMS which does not measure all the metals could not be used as CEMS for compliance with the SVM and LVM standards. EPA invites comment on this issue.

For example, x-ray fluorescence analyzers do not measure Be. If a facility chooses to use a MM CEMS which employs an x-ray fluorescence analyzer, it would take the MM CEMS results for As, Cr, and Sb, and the mass feedrate for Be (corrected to effluent concentrations by dividing by the average gas flowrate) and sum the four together. This would constitute the LVM emissions for the averaging period that would be used to determine compliance.

ii. Performance Specifications for a MM CEMS. The performance specification for a MM CEMS is proposed here as Part 60, Appendix B, Performance Specification (PS) 10. Lacking a commercially available MM CEMS to test prior to developing the performance specification created unique challenges to developing a MM CEMS PS. The Agency's approach to developing the PS was to base performance criteria as much as possible on existing performance specifications. The Agency also worked closely with MM CEMS developers, through the American Society of Mechanical Engineers, to ensure that the MM CEMS PS would be representative of the performance of commercially available devices. EPA specifically invites comment on the performance specification.

It is also proposed that special quality assurance (QA) requirements also pertain to MM CEMS. (See subsection F.1. of this section for more information on CEMS QA requirements.) We propose that the owner/operator perform a relative accuracy test audit (RATA) on the MM CEMS at least once every three years (five years for small on-site facilities). The RATA compares the output of the MM CEMS to the reference method. For the purposes of these source categories, the reference method for stack metals determinations is the current BIF Method 0012 (SW–846 Method 0060). The QA requirements also propose that an absolute calibration audit (ACA) be conducted in years the RATA is not

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[148] Although a site-specific limit on PM would also not be required for compliance with the SVM and LVM emission standards, it would be needed to comply with the D/F standard.

[149] We note that several cement and light-weight aggregate kilns have been fined because of inadequate feedstream analysis plans.

conducted. The ACA would involve making nine measurements using an NIST traceable calibration standard at three levels for each metal the CEMS measures. NIST traceable solutions of metals are currently available which challenge the analyzer device only. EPA is currently developing the NIST traceable metal standard which will challenge the entire system, not just the analyzer.

c. Option 2: Use of Limits on Operating Parameters to Document Compliance. If a source elects not to use a MM CEMS (or a CEMS is not commercially available), the rule would require the source to establish a site-specific PM limit and comply with limits on metals feedrate, chlorine feedrate, and maximum temperature at the inlet to the PM control device. These limits would be established during the comprehensive performance test when the source demonstrates compliance with the emission limits by manual stack sampling.

i. PM Limit. SVM and LVM (and adsorbed D/F) are controlled by the PM control device. To ensure that the collection efficiency of the PM device is maintained after the comprehensive performance test, EPA is proposing to require that a PM limit be established as the lower of the level occurring during the SVM, LVM, and D/F performance testing or the MACT standard. For PM monitoring requirements see section 7, below.

ii. Maximum Inlet Temperature to Dry PM APCDs. High inlet temperatures to dry PM APCDs can cause low recovery of metals in the APCD because at higher temperatures a larger portion of some metals will be in the vapor phase. (Dry PM control devices do not control vapor phase metals.) This happens because metal volatility increases with increasing temperature. Therefore, EPA proposes that the inlet temperature to a dry PM APCD be maintained at a level no higher than that during the comprehensive performance test.

The Agency proposes that maximum inlet temperature to a dry PM APCD be maintained on both a 10-minute and a one-hour average. The 10-minute average would be the average of the maximum inlet temperatures experienced during each compliance test run and the one-hour average would be the average over all runs.

iii. Maximum SVM and LVM Feedrate Limits. Given the correlation between feedrate and emission rate, the rule would limit feedrate of SVM and LVM to levels fed during the comprehensive performance test. For LVM, feedrate limits would be set on both pumpable liquids and total feedstreams separately. A separate limit is proposed 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.

For SVM, the feedrate limit would apply to all feedstreams. Separate limits would not be established for pumpable versus total feedstreams. This is because partitioning between the combustion gas and bottom ash or product does not appear to be affected by the physical state of the feedstream.[150]

Sources would be required to perform sampling and analysis of all feedstreams (including hazardous waste, raw materials, and other fuels and additives) for SVM and LVM content to document compliance with the feedrate limits. See also the discussion in section II.F.2. below for other requirements to document compliance with feedrate limits.

The rule would base the feedrate limit for SVM and LVM on a twelve-hour average basis. The limit would be established as twelve times the average hourly feedrate during the comprehensive performance test. Also, facilities would be required to record not only the total feed at each individual feed location for SVM and LVM, but the total sum of the SVM feed and the LVM feed at the various locations.

As mentioned above in Subsection B, this twelve-hour average is inconsistent with the ten-hour averaging period for metals CEMS. CEMS should have longer averaging periods than operating parameters such as feedrates. Therefore, EPA invites comment on whether the averaging period for all SVM and LVM feedrates should be promulgated at six, instead of 12, hours. EPA believes a six-hour averaging period for all SVM and LVM feedrates is sufficiently conservative, relative to the CEMS averaging period and achievable.

The grouping of metals by volatility means that it is possible for one metal within the volatility group to be used during performance testing as a surrogate for other metals in that volatility group. For instance, As may be used as a surrogate during the comprehensive performance test for all LVMs. Similarly, lead could be used as a surrogate for Cd, the other SVM. In addition, either SVM could be used as a surrogate for any LVM. This will help alleviate concerns facilities have voiced regarding the need to spike each metal during BIF certification of compliance testing. Facilities would not need to spike each metal to comply with today's rule, but only one metal within the group (or potentially one SVM for both categories).

iv. Maximum Chlorine Feedrate. The rule would establish a maximum feedrate for total chlorine and chloride based on the level fed during the comprehensive performance test. A limit on maximum chlorine feed is necessary because most metals are more volatile in the chlorinated form. Although most of the volatilized SVM and LVM will condense to particulate form before entering the PM control device, the metals condense in a fine particulate fume that is more difficult for most PM control devices to collect than larger particulate.

The rule would require sampling and analysis of each feedstream for total chlorine and chloride to document compliance with the feedrate limit for total feedstreams. The maximum feedrate would be based on a twelve-hour average, and would be established as twelve times the hourly average feedrate during the comprehensive performance test. Note also the requirements for documenting compliance with feedrate limits discussed in section II.F.2.

Again, this twelve-hour average is inconsistent with the one-hour averaging period for HCl and Cl_2 CEMS. CEMS should have longer averaging periods than operating parameters such as feedrates. Therefore, EPA invites comment on whether the averaging period for chlorine feedrate should be promulgated at one, instead of 12, hours. EPA believes a twelve-hour averaging period for chlorine feedrate is not be sufficiently conservative, relative to the one-hour CEMS averaging period. However, EPA also believes that a shorter averaging period for feedrates may be difficult for some facilities, particularly those with diverse feedstreams, to achieve routinely. For this reason, the twelve-hour average is proposed and comment is sought on the one hour-average.

We note that if a facility uses a CEMS for compliance with the Hg, SVM, LVM, and HCl and Cl_2 standards, there would be no need for the facility to establish a total chlorine and chloride feedrate limit.

v. Special Requirements for Cement and Lightweight Aggregate Kilns that Recycle Collected Particulate Matter. Cement kilns and lightweight aggregate kilns that recycle collected particulate matter (which is primarily raw material that is entrained in kiln gas) pose a

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[150] See USEPA, ''Draft Technical Support Document for HWC MACT Standards, Volume IV: Compliance with the Proposed MACT Standards'', February 1996.

special problem to ensure compliance with metals emission standards. These sources (particularly cement kilns) feed a variety of feedstocks which makes feedstream analysis problematic. Also, when these sources spike metals in feedstreams for purposes of performance testing, it may take several hours or days to reach steady-state emissions.

Under the BIF rule, these sources must comply with one of three requirements: (1) Daily monitoring of collected PM to ensure that metals levels do not exceed limits that relate concentration of the metal in the collected PM to emitted PM; (2) daily stack sampling for metals; or (3) conditioning of the furnace system prior to performance testing to ensure that metals emissions are at equilibrium with metals feedrates. See 56 FR 7176–78 (February 21, 1991), existing § 266.103(c)(6), and proposed § 63.1210(n). We propose to continue to require that these sources comply with one of the three BIF alternative approaches for compliance with the MACT metals standards.

We understand, however, that the approach of daily monitoring collected PM to document compliance with the BIF metal standards (see Section 10 of Appendix IX to Part 266, ‘‘Alternative Methodology for Implementing Metals Controls’’) is not currently being used by any facility because it is too complicated and burdensome. (The methodology involves empirically relating the concentration of each metal in the emitted PM to the concentration of the metal in collected PM (i.e., the enrichment factor).) The Cement Kiln Recycling Coalition (CKRC) has suggested several revisions to the methodology[151] including: (1) Reduced testing frequency to establish and periodically confirm the enrichment factor; (2) assuming PM emissions[152] are at normal levels rather than maximum allowable levels; (3) a less conservative approach to estimate the enrichment factor for nondetect metals in collected PM (based on new sampling and analysis techniques and improved understanding of metals behavior); and (4) allowing all kilns to comply with a revised methodology, not just kilns that recycle collected PM. (The Agency believes the approach may, in fact, be appropriate for any HWC and invites comment on this matter.) In addition, CKRC raises several questions regarding the statistical foundations of the methodology.

The Agency invites comment on CKRC's recommendations to improve the collected PM monitoring methodology and on other approaches to make the methodology a more workable but effective compliance approach in lieu of monitoring feedrates of metals in feedstreams.

5. Carbon Monoxide (CO), Hydrocarbons (HC), and Oxygen (O_2)

EPA is proposing that facilities demonstrate compliance with the CO and HC standards by using CEMS. See proposed § 63.1210(p) and (q). EPA is not proposing a standard for O^2,[153] but all of the standards are based on correction to 7 percent O^2. Therefore, EPA proposes facilities monitor O_2 by using a CEMS. Many HWCs are already equipped with these monitors to comply with the existing incinerator or BIF regulations.

EPA proposes performance specifications for CO and O_2 CEMS in Performance Specification 4B of Appendix B, Part 60. EPA proposes a total hydrocarbon (THC) CEMS performance specifications based on the use of a heated flame ionization detector (i.e., heated FID). The HC PS will be Performance Specification 8A contained in Appendix B, Part 60. Both PSs are similar to those currently used for BIFs. The minor proposed changes are discussed below.

a. Averaging Period for CO and HC CEMS. The averaging period for CO and HC CEMS is proposed to be a one-hour rolling average. This is because this a one-hour rolling average is the same averaging period currently used in the BIF rule. Changing the averaging period would necessitate changing the emission standard (see Part Four, Section II) to maintain the same stringency for the different averaging period. EPA does not believe this is warranted, so the one-hour rolling average is proposed.

b. CO and HC CEMS Performance Specifications. Performance specifications for CO and O_2 CEMS are proposed here as Performance Specification 4B. This performance specification is essentially the same as the specification for BIFs provided in Appendix IX of Part 266. This performance specification is the very similar to existing Appendix B Performance Specifications 3 (for O_2) and 4A (for CO). It references many of the provisions of the two other specifications. What the proposed specification does do is describe how the current BIF CEMS performance specifications differ from performance specifications 3 and 4A and prescribes the BIF specifications in instances when differences occur. EPA is proposing specification 4B because it believes it is important to ‘‘grandfather’’ in the current performance specifications for administrative and cost reasons. Performance specification 4B does not differ substantially from the current Part 60 specifications. Therefore, EPA invites comment on whether to not propose performance specification 4B and instead rely on the existing specifications 3 and 4A.

Also, performance specifications 3 and 4A (which performance specification 4B refers to) requires a Relative Accuracy Test Audit (RATA) be performed on the CEMS. It also allows for a waiver of the RATA requirement if an acceptable substitute is used. The Agency is currently moving away from requiring RATAs for CEMS for which cylinder gases are available. Cylinder gases are available for both CO and O^2, so we invite comment on whether the RATA requirements not be included in performance specification 4B. EPA would still require facilities to perform quarterly absolute calibration audits (ACAs) using calibration error (CE) test procedures for these CEMS. EPA invites comment on whether the RATA requirement should not be promulgated and whether just a quarterly ACA is adequate without a RATA.

HC CEMS performance specifications are proposed here as Performance Specification 8A. It is identical to the performance specification contained in section 2.2 of Appendix IX of Part 266, except the quality assurance section has been deleted and placed in the appendix to Subpart EEE, Part 63, to be consistent with the Agency's approach to Part 60 performance specifications.

There is an existing performance specification, number 8, for a volatile organic compound (VOC) CEMS. Performance specification 8 does not rely on heated sampling lines and detector. A cold VOC monitor does not measure less volatile hydrocarbons which, due to heating, are measured by a heated FID but not a cold VOC monitor. (Heavy hydrocarbons would condense out in the sampling line and in the analyzer in a VOC CEMS and not be measured as hydrocarbon emissions. Therefore, a VOC CEMS measures a subset of what a heated FID measures.) Using the VOC performance specification would be problematic because the emission standard was

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[151] See letter from Craig Campbell, CKRC, to James Berlow, EPA, undated but received on February 20, 1996.

[152] Note that PM emissions from CKs are comprised primarily of raw material entrained in the kiln off-gas. The material is known as cement kiln dust (CKD).

[153] Except that batch-fired HWCs would be required to comply with a minimum combustion chamber oxygen level prior to feeding a batch to maintain compliance with the D/F standard.

established using the results from heated FIDs, not cold VOC CEMS. EPA believes allowing compliance with a CEMS that measures only a subset of the pollutants represented by the standard is inappropriate. For this reason, we decided against proposing the use of performance specification 8. EPA believes it is appropriate to propose performance specification 8A to ‘‘grandfather’’ in the current specifications and keep compliance monitoring in agreement with how the standard was derived.

One issue that has arisen during the implementation of the BIF rule is that the stated span values for the CO CEMS may lead to high error in the facility’s calculated emission value. For instance, a CK may analyze for CO emissions in the bypass duct, and analyses in bypass ducts can have very high oxygen correction factors, on the order of 10. At the low range CO span of 200 ppm with an acceptable calibration drift of 3 percent, or 6 ppm, this means that error in the standard due to calibration drift would be 60 ppm if the oxygen correction factor is ten. An absolute calibration drift of 60 ppm is more than half the CO standard of 100 ppm and many believe this is unacceptable.

Therefore, EPA wishes to clarify the ranges for CEMS, stating that the spans for low and high ranges are expressed at an oxygen correction factor of 1. Facilities which normally operate at oxygen correction factors more than 2 would have to use CEMS with spans proportionately lower than the stated values, relative to the oxygen correction factor at the sampling point.

In the example above, where the oxygen correction factor is 10, the suggested value of the low range span for the CO CEMS would be 200 divided by 10, or 20 ppm. If the low CO range is 20, the oxygen correction factor is 10, and the calibration drift is 3 percent of the span of the range, then the absolute calibration drift would be 6 ppm.

Because the span value is a suggested value, the facility could use a 25 ppm span value to satisfy this requirement. This modification is contained in the CEMS Quality Assurance section of the proposed rules and would apply to the other CEMS except the oxygen CEMS, where the oxygen correction factor does not apply. It is proposed that corresponding changes be made to the BIF rule as well.

An issue which also relates to the oxygen correction factor is that it grows exponentially as oxygen levels increase, particularly at oxygen concentrations above 15 to 17 percent. Some facilities experience high oxygen correction factors at times of start-up or shut-down because combustion has just commenced or is just completing and, as a result, there is very high levels of excess oxygen in the combustor. For this reason, EPA invites comment on whether it would be appropriate to cap the oxygen correction factor at some multiplier above the facility’s normal operating correction factor for a specified period of time, on the order of minutes, after a start-up or prior to a shut-down.

6. Hydrochloric Acid (HCl) and Chlorine Gas (Cl_2)

Table V.2.5 summarizes the proposed HCl/Cl_2 compliance monitoring requirements and other options being considered. See also proposed § 63.1210(o).

TABLE V.2.5.—PROPOSED HCl/Cl_2 COMPLIANCE MONITORING REQUIREMENTS AND OTHER OPTIONS BEING CONSIDERED

		Compliance using	Limits from	Avg period	Operating limit avg pd basis
Proposed Option 1 (Facility Choice).	Max Flue Gas Flowrate or Production Rate.	Same	Comp Test	1 hour	Avg of Max 1 hour RAs.
	Max Chlorine Feedrate.	Feedstream Analysis	Comp Test	12 hour	Avg over all runs.
	Min Press Drop, Wet Scrubber.	Press drop across scrubber.	Comp Test	10 min	Avg of Min 10 min RAs.
				1 hour	Avg over all runs.
	Min Liq Feed Pressure, Wet Scrubber.	Pressure	Manuf Spec	10 min.	
	Min Liq pH, Wet Scrubber.	pH	Comp Test	10 min	Avg Min 10 min RAs.
				1 hour	Avg over all runs.
	Min Liq/Gas Ratio, Wet Scrubber.	Scrubber liquid and gas flowrates.	Comp Test	10 min	Avg Min 10 min RAs.
				1 hour	Avg over all runs.
	Min Sorbent Feedrate, Dry Scrubber.	Sorbent Feedrate	Comp Test	10 min	Avg of Min 10 min RAs.
				1 hour	Avg over all runs.
	Min Carrier Fluid Flowrate or Nozzle Pressure Drop, Dry Scrubber.	Carrier fluid flowrate or pressure drop.	Manuf Spec	10 min.	
	Sorbent Specs, Dry Scrubber.	Brand and Type	Comp Test	N/A	Same brand and type.
Proposed Option 2 (Facility Choice).	CEMS	HCl and Cl2 CEMS	CEMS Std.	2 hours.	
Additional Option	Surrogate CEMS	HCl CEMS	Comp Test	2 hours	Avg over all runs.
	Factors Affecting Cl_2 Formation.	TBD	Comp Test	TBD	TBD.

a. Evaluation of Monitoring Options. The rule would allow sources the option of using separate CEMS to monitor HCl and Cl^2 emissions or to comply with limits on operating parameters.

HCl CEMS are commercially available and have been used at permitted municipal waste combustor sources and some HWCs for many years. Cl_2 CEMS are currently being marketed by a European manufacturer. Although the Agency prefers the use of CEMS whenever they are available for compliance monitoring, we are concerned that the use of CEMS to monitor HCl and Cl_2 emissions may not be cost-effective. This is because facilities are likely to be required to monitor chlorine feed to demonstrate compliance with the SVM and LVM standards anyway, given that a multi-metal CEMS may not be commercially available for some time.[154] Accordingly, the rule would allow, but not require, the use of CEMS for HCl and Cl_2.

We note that we considered the feasibility of allowing the use of an HCl CEMS only, whereby the HCl CEMS would be used as a surrogate for the HCl/Cl^2 standard. As discussed below, we determined, however, that this approach would be more complicated, more costly, have technical problems, and/or provide less assurance of compliance. We nonetheless invite comment on whether the use of an HCl CEMS as a compliance parameter for the HCl and Cl_2 standard could be a workable approach.

b. Compliance Using Limits on Operating Parameters. If a source elects not to use separate HCl and Cl_2 CEMS to demonstrate compliance with the HCl/Cl_2 standard, the rule would require the source to establish limits on the following operating parameters based on operations during the comprehensive performance test to ensure it maintains compliance with the standard: maximum feedrate of total chlorine and chloride from all feedstreams, and limits on the acid gas APCD operating parameters discussed below.

i. Maximum Flue Gas Flowrate or Production Rate. If flue gas flowrates exceed those during the comprehensive performance test, the HCl/Cl_2 collection efficiency of the control device may not be maintained which may result in emissions that exceed the standard. Therefore, EPA proposes that maximum flue gas flowrate be controlled to levels that are no higher than those during the performance test. Alternatively, CKs and LWAKs may establish a 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. The limit would be based on a one-hour average and be established as the average of the maximum hourly rolling average for each run of the comprehensive performance test.

ii. Maximum Total Chlorine or Chloride Feedrate. The rule would limit the amount of total chlorine or chloride fed in all feedstreams to levels that were fed during the comprehensive performance test demonstrating compliance with the HCl/Cl_2 standard. Sources would be required to perform sampling and analysis of each feedstream for total chlorine and chloride content to document compliance with the feedrate limit for total feedstreams. See also the discussion in section II.F.2 for other requirements to document compliance with feedstream limits.

The total chlorine and chloride feedrate limit would be averaged over a twelve-hour period and would be established as twelve times the hourly feedrate during the comprehensive performance test.

We again note that there is an inconsistency between this twelve-hour feedrate average and the proposed one-hour averaging period for HCl and Cl_2 CEMS. EPA invites comment on whether the averaging period for chlorine feed should be promulgated at one, instead of twelve, hours.

Note that if a facility uses a CEMS for compliance with the HCl and Cl_2, Hg, SVM, and LVM standards, no chlorine feed monitoring would be required.

iii. Wet Scrubber Parameters. Wet scrubbers can be used to control HCl and Cl_2 emissions. To ensure that the control efficiency of a wet scrubber is maintained at levels achieved during the comprehensive performance test, the rule would require sources to establish limits on the following operating parameters: pressure drop across the scrubber; liquid feed pressure; liquid (blowdown) pH; and liquid to gas flow ratio.

Pressure drop across a wet scrubber is an important parameter because it is an indicator of good mixing of the two fluids, the scrubber liquid and the flue gas. A low pressure drop would indicate poor mixing and, hence, poor efficiency. A high pressure drop would indicate good removal efficiency. Therefore, EPA proposes that the pressure drop across the scrubber be limited to the minimum level during the comprehensive performance test. Limits would be based on both a ten-minute and a one-hour average. The ten-minute average limit would be established as the average of the lowest ten-minute rolling average for each run, and the hourly average limit would be established as the average over all runs.

Scrubber liquid feed pressure is important because it directly relates to the amount of scrubber liquid pumped into the scrubber and is easier to measure than scrubber liquid flow directly. The more scrubber liquid pumped into the scrubber, the better the removal efficiency. If liquid flow were to decrease, the removal efficiency would also decrease. EPA proposes that minimum liquid feed pressure be maintained on a ten-minute average and that the limit be the minimum value established by the scrubber manufacturer.

The pH of the scrubber liquid is also important because, at low pH, the scrubber solution is more acidic and removal efficiency of HCl decreases. We propose that the pH be determined from the blowdown liquid. This is because it is the best indicator of scrubber efficiency by measuring pH of scrubber liquid. EPA proposes that minimum pH of the scrubber water be controlled on both a ten-minute and a one-hour average. The ten-minute average limit would be established as the average of the lowest ten-minute rolling average for each run, and the hourly average limit would be the average over all runs.

EPA solicits comment on whether the alkaline reagent (such as lime) concentration in the scrubber should be a control parameter for alkaline wet-scrubbers. This parameter is closely related to the just mentioned pH since the concentration of alkaline reagent in the scrubber will keep the scrubber liquid pH high. EPA believes this parameter is important because the alkaline reagent is what removes Cl_2 and, to a lesser extent, HCl from the flue gas. pH is a secondary indicator of this parameter. EPA's concern is alkaline reagent concentrations can be low enough to lower the efficiency of wet scrubbers yet buffer the scrubber liquid enough to maintain pH. However, the concentration of alkaline reagent in the scrubber liquid can not be continuously monitored as easily as pH. We invite comment on whether the concentration of alkaline reagent in the scrubber liquid should be a control parameter for wet scrubbers, whether this parameter should be in addition to or in lieu of the pH parameter, and what averaging period(s) such a parameter should have.

In addition, EPA invites comment on whether a ten-minute average is appropriate for pH (and/or alkaline reagent concentration). Some facilities may not automate their wet scrubbers to add scrubbing solutions as needed to maintain scrubber efficiency. Such facilities make up batches of virgin scrubber solution and add it to the scrubber liquid. In this case, it might be

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[154] If we determine that multi-metal CEMS are commercially available at promulgation and require their use in the final rule, we may also require the use of CEMS to monitor HCl and Cl_2 emissions.

more appropriate to establish a parameter ensuring that batches of new scrubber solution is added to the wet scrubber prior to the scrubber liquid pH (and/or possibly alkaline reagent) reaching a certain level.

Liquid to gas flow ratio is another important wet scrubber parameter. A high liquid to gas flow ratio indicates good scrubber removal, while a low liquid to gas flow ratio indicates less efficient removal. EPA proposes that the minimum scrubber liquid to flue gas flow ratio be controlled on both a ten-minute and a one-hour average. The ten-minute average limit would be established as the average of the lowest ten-minute rolling average for each run, and the hourly average limit would be established as the average over all runs.

iv. Dry Scrubber Parameters. A dry scrubber removes HCl from the flue gas by adsorbing the HCl onto some sorbent, normally an alkaline substance like limestone. To ensure that the collection efficiency of the scrubber is maintained at comprehensive performance test levels, the rule would require sources to establish limits on the following operating parameters: sorbent feedrate; carrier fluid flowrate or nozzle pressure drop; and sorbent specifications.

Sorbent feedrate is important because, when more sorbent is fed into the dry scrubber, removal efficiency for HCl and Cl_2 will increase.[155] Conversely, lower sorbent feedrates tend to cause removal efficiency to decrease. Therefore, EPA proposes that the minimum sorbent feedrate into the dry scrubber be controlled on both a ten-minute and a one-hour rolling average. The ten-minute average limit would be established as the average of the lowest ten-minute rolling average for each run, and the hourly average limit would be established as the average over all runs.

Carrier fluid is some liquid or gas (normally air or water) which transports the sorbent into the dry scrubber. Without proper carrier flow to the dry scrubber the sorbent flow into the dry scrubber will decrease, and efficiency will also decrease. Nozzle pressure drop is also an indicator of carrier gas flow into the scrubber. At a relatively high pressure drop, more sorbent is carried to the dry scrubber. At lower pressure drop, less sorbent is carried to the scrubber. Therefore, the rule would require that carrier fluid flowrate or nozzle pressure drop be maintained to the minimum levels occurring during the comprehensive performance test. Limits would be established on both a ten-minute and a one-hour rolling average. The ten-minute average limit would be established as the average of the lowest ten-minute rolling average for each run, and the hourly average limit would be established as the average over all runs.

As was the case with maintaining the quality of carbon used in carbon injection and carbon bed systems for control of D/F and Hg, the rule would require that the quality of sorbent be maintained after the comprehensive performance test. Therefore, the rule would require sources to continue to use the same sorbent brand and type as they used during the comprehensive performance test. The rule would allow a source to obtain a waiver from this requirement from the Director, however, if the owner or operator: (1) documents by data or information key characteristics of the sorbent which controls HCl and Cl_2; (2) documents by data or information specification levels corresponding to those characteristics; and (3) complies with the specification.

As was the case for pH in wet scrubbers, EPA invites comment on whether a ten-minute average is appropriate for sorbent feedrate. Some facilities may not automate their dry scrubbers to add sorbent solutions as needed to maintain scrubber efficiency. Such facilities make up batches of virgin sorbent solution and add it to a dry scrubber feed tank containing the sorbent. In this case, it might be more appropriate to establish a parameter ensuring that batches of new scrubber sorbent is added to the dry scrubber prior to the sorbent concentration in the dry scrubber reaching a certain level.

c. Compliance Using Separate HCl and Cl_2 CEMS. The rule would allow sources to use separate HCl and Cl_2 CEMS to demonstrate compliance with the HCl/Cl_2 standard. This option would allow for the direct measurement of the standard, at the top of the monitoring hierarchy, but does so at a higher cost relative to the previous option of compliance with limits on operating parameters. EPA seeks comment on whether the use of separate HCl and Cl_2 CEMS is in fact cost-effective and should be required in the final rule in lieu of allowing compliance with operating limits.

Under this option, compliance would be demonstrated by measuring HCl emissions (in ppmv) with the HCl CEMS and measuring Cl_2 emissions (in ppmv) with a Cl_2 monitor. Since the HCl and Cl_2 standard is based on equivalents of HCl, the ppmv emissions of Cl_2 must be multiplied by two and added to the HCl emissions to determine the combined emission level. If this result is lower than the emission standard, then the facility is in compliance with the HCl/Cl_2 standard.

i. HCl CEMS. HCl CEMS are proven technologies, available worldwide, and are currently required in the permits of many MWCs. Several HWCs also use HCl CEMS. HCl CEMS are not expensive; the purchase cost are $12,000 to $55,000.[156]

Performance specifications for a HCl CEMS are proposed today as Performance Specification 13 of Appendix B, Part 60. The proposed appendix to Part 63, Subpart EEE, also proposes certain RATA and ACA requirements.

ii. Cl_2 CEMS. Cl_2-specific CEMS are currently being marketed by Opsis, a European CEMS manufacturer. These devices have been certified for use in Germany and can also be used to monitor for HCl, CO, NO_X, SO_X, and NH_3. This device would likely be a cost-effective option for new facilities or existing facilities purchasing a suite of new CEMS.

Performance specifications for Cl_2 analyzers are proposed here as Performance Specification 14 of Part 60, Appendix B. The proposed appendix to Part 63, Subpart EEE, also proposes certain RATA and ACA requirements.

d. Consideration of Using an HCl CEMS Only. EPA requests comment on whether the use solely of an HCl monitor for compliance with the HCl/Cl_2 standard could be workable. If so, this approach could be allowed as an option in the final rule.

This approach would provide direct monitoring of the HCl portion of the standard and act as a surrogate monitor for the Cl_2 portion. However, EPA is concerned that poor correlation between HCl and Cl_2 emissions may result in HCl being a poor surrogate for Cl_2. For an HCl CEMS alone to be a feasible surrogate monitor for the HCl/Cl_2 standard, this and other issues discussed below must be addressed.

Cl_2 and HCl form a post-combustion equilibrium. At temperatures above 1000°F the equilibrium is quite stable and correlation is good. At lower temperatures, though, formation of Cl_2 is favored over HCl and the equilibrium no longer holds. All HWCs experience temperatures lower than 1000°F, so the HCl/Cl_2 equilibrium does not hold. The formation of Cl_2 under these circumstances is dependent on a

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

[156] See Chapter 2.6 of USEPA, ''Draft Technical Support Document for HWC MACT Standards, Volume IV: Compliance with the Proposed MACT Standards'', February 1996.

number of site-specific conditions, such as the post-combustion temperature profile and hence the rate of conversion to Cl_2, and residence time from the point where Cl_2 formation is favored to the stack. In fact, these conditions may vary at any given facility depending on the circumstances at any time after combustion. Given that HCl appears to be a poor indicator of Cl_2 emissions, direct measurement of Cl_2 is desired.

If this issue can be adequately addressed, the use of only a HCl CEMS to demonstrate compliance with the standard would involve determining a site-specific HCl limit representative of the combined HCl/Cl_2 emissions. This would involve a comprehensive performance test at maximum chlorine feed and under conditions which are worst-case for Cl_2 formation and emissions and optimal for HCl removal. The resulting HCl level would become the site-specific limit to demonstrate compliance with the HCl/Cl_2 standard.

Limits on operating conditions would also be necessary to ensure that the ratio of Cl_2 to HCl emissions is not higher than experienced during the comprehensive performance test, and that HCl control equipment is *not operated more efficiently* (note emphasis) after the performance test. Otherwise, the HCl emissions during normal operations may under-predict combined HCl and Cl_2 emissions.

7. Particulate Matter (PM)

As discussed above in the sections on operating limits for compliance with the D/F, SVM, and LVM standards, a PM limit would be established as the lower of either the levels that occurred during the comprehensive performance test to demonstrate compliance with the D/F, SVM, and LVM emission standards (as a compliance parameter for those standards) or the national PM standard. Table V.2.6 below summarizes the proposed monitoring requirements and options being considered.

TABLE V.2.6.— PROPOSED PM MONITORING REQUIREMENTS AND OTHER OPTIONS BEING CONSIDERED

		Compliance using	Limits from	Avg. period	Operating limit avg. pd basis
Proposed Requirement	CEMS	PM CEMS	CEMS Std	2 hours.	
			D/F or SVM/LVM Comp Test.	10 Min	Lowest Avg Min 10 min RAs.
				1 hour	Lowest Avg over all runs.
Option: Feedstream and Operating Parameter Limits.	Max Flue Gas Flowrate or Production Rate.	Same	Comp Test	1 hour	Avg of Max 1 hour RAs.
	Max Ash Feedrate	Feedstream Analysis	Comp Test	12 hour	Avg over all runs.
	Min Press Drop, Wet Scrubber including Ionizing Wet Scrubber.	Press drop across scrubber.	Comp Test	10 min	Avg of Min 10 min RAs.
				1 hour	Avg over all runs.
	Min Scrubber Feed Press, Wet Scrubber including Ionizing Wet Scrubber.	Pressure	Manuf Specs	10 min	N/A.
	Min Blowdown or Max Solid Content in Liq, Wet Scrubber including Ionizing Wet Scrubber.	Liquid Flowrate or Solid Content.	Comp Test	10 min	Avg of Min/Max 10 min RAs.
				1 hour	Avg over all runs.
	Min Liq/Gas Ratio, Wet Scrubber including Ionizing Wet Scrubber.	Scrubber Liquid and Gas Flowrates.	Comp Test	10 min	Avg Min 10 min RAs.
				1 hour	Avg over all runs.
	Min Pressure Drop, Fabric Filter.	Pressure Drop Across Fabric Filter.	Comp Test	10 min	Avg Min 10 min RAs.
				1 hour	Avg over all runs.
	Min Power Input	Voltage	Comp	10 min	Avg Min 10.
				1 hour	Avg over all runs.

a. Evaluation of Monitoring Options. Continuous PM CEMS are commercially available and installed on stacks worldwide. EPA proposes that facilities maintain continuous compliance with the PM standard through the use of a PM CEMS. PM CEMS are installed for compliance purposes in the European Union (EU) with the EU hazardous waste combustor PM standard of 13 mg/dscm. Germany has been in the forefront in the development, certification, and application of PM CEMS.

i. Evaluation of PM CEMS feasibility and use. EPA in the past has relied on opacity monitors to indicate compliance with a PM standard. Opacity CEMS used in accordance with performance specification 1 have been a valid tool to indicate PM APCD failures and the necessity for corrective action as a result. However, opacity monitors are not, relatively speaking, very sensitive. They are typically useful down to about 45 mg/dscm. Today's proposed regulation will limit PM emissions to 69 mg/dscm. Opacity monitors would not be sufficient because to maintain compliance with 69 mg/dscm, facilities would generally need to operate around 35 mg/dscm. Thus, emissions will typically be below the detection limit of opacity monitors most of the time. While normal emission levels below the detection limits of CEMS are acceptable, facilities often desire the detection limit to be below one-tenth of the emission limit, or 7 mg/dscm for the proposed standard. This gives one sufficient warning of how emissions are changing before the emission limit is approached, and allows the facility, based on CEMS readings, to change operations as necessary to be in compliance with the applicable standard. EPA has relied on opacity CEMS because there has not been available an acceptable quantitative monitor for continuous mass PM emissions. Opacity CEMS standards are established at a given percent opacity limit (generally 5–10 percent) over a 6-minute averaging period and, as stated, cannot distinguish particulate concentrations below 45 mg/dscm. In other words, opacity CEMS as they are currently used can be used to ensure PM APCD efficiency but not to determine mass emissions in real time.

If possible, EPA desires a quantitative, continuous measure of PM mass concentration rather than opacity. EPA has recently determined that CEMS do exist that do this: beta gauges and light scattering based CEMS. These CEMS rely on calibration of the device to manual gravimetric measurements. Therefore, EPA is proposing use of CEMS based on the availability of these newer technology PM CEMS and a related PM CEMS Performance Specification for monitoring PM mass concentration. This PS does not specify the type of CEMS used and allows the use of opacity monitors, which can also be calibrated to relate opacity to mass concentration. However, opacity is more sensitive to PM size distribution and physical properties, and has high detection limitations relative to the newer PM CEMS. As a result the calibration will be less stable for an opacity CEMS calibrated according to the proposed performance specification than one of the newer technology instruments.

EPA believes that mass emission monitoring is feasible, and opacity monitoring has borderline sensitivity relative to today's proposed PM emission limit. The newer technology PM CEMS can give a real-time quantitative measure of PM mass emissions while opacity CEMS cannot. From a cost standpoint opacity monitoring is no less expensive than the alternative proposed here. As a result, EPA proposes to require mass emission monitoring rather than opacity monitoring.

The German approach to using CEMS for PM compliance monitoring is based on the application of a practical engineering philosophy. PM CEMS are used despite the known sensitivities to various factors such as particle composition and size distribution since these devices are designed to minimize the impacts of these changes on the accurate measure of PM mass concentrations. The German experience on PM CEMS is that at controlled sources, i.e., those with low loading or equipped with PM control devices such as baghouses or ESPs, these sensitivities are not as important as they are at facilities with no control or high and/or highly varying grain loadings. The Germans have found that PM CEMS can be calibrated to manual methods to achieve a statistically reliable and enforceable calibration curve at controlled sources.[157]

At periods when the particle composition and size changes dramatically, the PM CEMS calibration is not valid. However, this occurs when fuel is changed or the PM control device fails and causes very high grain loadings to occur. To account for the PM CEMS' sensitivity to fuel type, the Germans mandate a new calibration be made whenever the fuel is changed. During times of high grain loading the PM CEMS cannot accurately determine how high the PM emissions were. But at controlled devices, this only occurs when the PM control device fails and/or otherwise exceeds the PM standard. Therefore, PM CEMS remain a reliable indicator of compliance with a PM standard.

In Germany, calibration of the PM CEMS defines a statistically derived site-specific calibration of the PM CEMS' response to various PM loadings. This is done by installing a plate in lieu of a bag in the baghouse or by varying the ESP voltage to allow various grain loadings to flow through the control device to the stack. The PM CEMS and manual methods are run simultaneously at various PM loadings to determine emissions. These PM CEMS outputs and manual methods results are used to statistically define the calibration curve for the PM CEMS.

EPA has tested several of these devices at a hazardous waste incinerator and a cement kiln and has found that PM CEMS maintain calibration, even in a water saturated flue gas.

ii. Types of PM CEMS available. The many types of PM CEMS fall into three broad categories: accumulated mass, impaction, and light scattering.

For accumulated mass PM CEMS, stack gas is extracted isokinetically and particles are deposited on a sensing surface for mass measurement. Two types of accumulated mass devices are β-radiation attenuators, commonly referred to as ''β-gauge'' devices, and loaded oscillators. EPA has tested a stack-type β-gauge but testing was inconclusive.[158] EPA knows of no available stack-type loaded oscillator device.

For impaction devices, particles impact upon a sensor surface due to the inertia imparted by the approaching gas stream. Two types of impaction PM CEMS are contact electrification, commonly referred to as ''triboelectric'', and acoustic energy. Stack-type triboelectric devices are commercially available and in widespread use in France. However, EPA has concern about triboelectric PM CEMS since the physical property of PM which they work on, contact electrification, can vary the most from particle to particle even at controlled sources. For this reason, facilities should be aware that triboelectric PM CEMS may not be quantitative enough to be used for compliance with the PM standard. Acoustic energy PM CEMS are not in widespread use.

Light scattering CEMS are preferred in Germany and are believed to be the PM CEMS most suitable for making measurements at low particulate levels typical of a well controlled source. Light scattering PM CEMS operate by sending a light beam across a path and measuring the light reflected back to a sensor at some angle from the source light. Several hundred of these devices have been certified for stack-use in the EU. EPA has also tested a time-dependant optical transmission device. Under certain circumstances, it can give results comparable to those of the light scattering device.

To be in compliance with the PM limit, facilities would comply with the performance specifications and operating practices for the CEMS proposed here. If a PM CEMS is used at a facility, no feedstream or operating parameter limits will be necessary to document compliance with the PM limit. If a PM CEMS is not used, compliance with limits on feedstream and operating parameters will be necessary.

iii. Control of PM Emissions. We are proposing to use a PM CEMS as a compliance parameter to ensure: (1) compliance with the national MACT PM standard; and (2) that the collection efficiency of the PM control device is maintained at performance test levels achieved when documenting compliance with the SVM, LVM, and D/F standards. Thus, it is necessary to

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[157] See Chapter 2.1 of USEPA, ''Draft Technical Support Document for HWC MACT Standards, Volume IV: Compliance with the Proposed MACT Standards'', February 1996.

[158] See Chapter 2.1 of USEPA, ''Draft Technical Support Document for HWC MACT Standards, Volume IV: Compliance with the Proposed MACT Standards'', February 1996.

establish the PM limit as the lower of the level that occurs during the SVM, LVM, and D/F performance tests or the MACT standard. This is because a source could be operating well below the national PM standard during the performance test and, after the test, operate the PM control device at lower collection efficiency (e.g., to reduce operating costs, or because of reduced efficiency from ''wear and tear''). In this case, the source could continue to be in compliance with the national PM standard, yet exceed the D/F, LVM, and SVM emission limits because of increased emissions of adsorbed D/F, LVM, and SVM.

To ensure that the collection efficiency is maintained while meeting the site-specific PM limit, the rule would require that feedstocks with normal levels of ash, i.e., those levels which the facility routinely experiences during normal operations, be fed during the performance test. This would preclude a source from artificially increasing the PM loading during the performance test using high ash feedstocks to obtain a high site-specific PM limit. If this were the case, the source could meet the PM limit during normal operations when feeding feedstocks with normal ash content while operating the PM control device under less efficient conditions. This could result in an increase in emissions of metals and D/F adsorbed onto PM. We invite comments on how to ensure that feedstocks with normal ash content are fed during the comprehensive performance test.

The comprehensive performance tests would be conducted as follows. During the D/F, SVM, and LVM comprehensive performance tests, the facility would make manual measurements of D/F and metals and CEMS measurements of PM. Emissions of PM would be limited to the national standard of 69 mg/dscm during the tests. Following the tests the facility would establish two site-specific limits for PM: a ten-minute limit to control perturbations and a one-hour limit to control average emissions. The ten-minute average would be based on the highest ten-minute rolling averages occurring during each comprehensive test. The hourly average would be the average of all one-minute averages occurring during each comprehensive test. (Note that, if the facility were to perform separate D/F and metals tests, the lowest of the two PM averages would be the applicable PM limit.)

The facility need not determine or record two-hour averages to document compliance with the MACT PM standard during normal operation, only during the comprehensive test. Since the one-hour average is the average of all one-minute averages during the comprehensive performance test and the time duration of the test is longer than two hours, the one-hour average would have a numerical value lower than the two hour national standard. Demonstration of compliance with a lower numerical limit over a shorter averaging period proves compliance with a higher number over a longer averaging period.

In lieu of a site-specific PM limit, EPA could limit key operating parameters for the PM control device to ensure that the device's collection efficiency is maintained at performance test level. We are concerned, however, that limiting key operating parameters (e.g., pressure drop across a fabric filter) may not be adequate because there are many complex operating and maintenance factors that affect collection efficiency of a PM control device. We believe that continuous monitoring of a surrogate emission (i.e., PM) is far preferable to continuous monitoring of operating parameters that less effectively relate to collection efficiency. (We note, however, that if the use of a PM CEMS is not required in the final rule, the rule would establish limits on the PM control device operating parameters as the next preferable approach.)

Also, EPA invites comment on allowing small on-site sources (defined in § 63.1208(b)(1)(ii) in the proposed regulations) to obtain a waiver from the requirement of installing a PM CEMS. If the waiver is promulgated and allowed by the permitting authority, the facility would demonstrate compliance with PM by establishing operating parameter limits described in subsection b, ''Operating Parameter Limits,'' below.

iv. Proposed PM CEMS Performance and Calibration Specifications. There are existing performance specifications (PS) developed by the International Standards Organization (ISO) for PM CEMS. The ISO specifications have been modified slightly to account for the US regulatory environment. This PM CEMS PS is proposed here as Part 60, Appendix B, Performance Specification 11. EPA invites comment on this specification.

It is proposed that HWCs follow the German approach to using PM CEMS. This approach involves deriving a site-specific statistically derived calibration curve of PM CEMS response to manual methods results for each fuel type. When the facility changes fuel type or supplier, a new PM CEMS calibration would be performed.

It is proposed that PM CEMS be calibrated to the reference method, 40 CFR 60, Appendix A, Method 5. Performance specification 11 requires that at least 15 measurements be made at least three grain loadings. During calibration, Method 5 and the CEMS will be run simultaneously during each of the 15 measurements. The average output response from the CEMS is then compared to the results of each of the 15 measurements. Two calibration procedures are possible for PM CEMS: linear and quadratic. The performance specification proposes that facilities first calculate the calibration using the linear relationship, then the quadratic. If the quadratic relationship proves to be a better fit to the data, it is used. Otherwise the linear relationship is used.

The quality assurance (QA) requirements for HWC CEMS propose that an absolute calibrations audit (ACA) be performed quarterly (every three months) and a relative calibration audit (RCA) be performed every 18 months (30 months for small on-site facilities). If the calibration has drifted, a new calibration shall be performed. An absolute calibration audit would not be required during quarters when a response calibration audit is conducted.

Also, there is a concern that the suitability of a calibration curve for a PM CEMS is dependant on the type of fuel used. For the purposes of this source category it is proposed that fuel type be defined by the physical state of the fuel: gas, liquid, or solid. Therefore, a facility that burns only gas, liquid, or solid fuel would need to generate only one calibration curve. Facilities which wish to burn a combination of fuel types would need to establish a single or multiple calibration curves which encompasses all combinations of fuel mix. Facilities which use multiple curves must describe in their quality assurance plan their methodology for deriving the curves and how the proper curves will be used during normal operation. See the TBD for more information on calibration due to fuel changes.

b. Operating Parameter Limits. If the final rule does not require the use of a PM CEMS, we would rely on limits on ash feedrate and key PM APCD operating parameters to ensure continued compliance with the PM emission standard. In addition, if the provision allowing small on-site facilities (defined in § 63.1208(b)(1)(ii) of the proposed regulations) to waiver the PM CEMS requirement is promulgated and the facility elects not to use a PM CEMS, the facility would have to establish these operating parameter limits to document compliance with the PM emission limit.

i. Maximum Flue Gas Flowrate or Production Rate. EPA is concerned that flue gas flowrates exceeding those of the performance test could decrease the collection efficiency of the PM control device. For that reason, EPA proposes limiting flue gas flowrate. Alternately, CKs and LWAKs could limit production rate (e.g., production rate of clinker or aggregate, or raw material feedrate) since production rate is proportional to flue gas flowrate. Either flue gas flowrate or production rate would be established as a one hour average. The one-hour average would be the average of the maximum hourly rolling averages occurring during the comprehensive performance tests.

ii. Maximum Ash Feedrate. A portion of the ash fed into a HWC is emitted as PM. To limit the amount of PM emitted at the stack, maximum ash feedrate would be used as a compliance parameter. As set out in the BIF rule, however, EPA does not believe that an ash feedrate limit is necessary for CKs or LWAKs because entrained raw materials comprise virtually all of their PM emissions. See 266.103(c)(1)(iv) and 56 FR at 7146. Thus, for a cement or lightweight aggregate kiln, variation in ash content of the hazardous waste is not likely to have a significant effect on PM loading at the inlet to the PM control device or PM emissions. Conceptually, however, the feedrate of ash in liquid feeds and the rate at which air pollution control dust (e.g., cement kiln dust) is returned to the kiln may have significant effect on the loading of *small* particles. Absent a CEMS, EPA seeks comment on addressing this issue.

It is proposed that the limit on ash feedrate be established on a one-hour average to coincide with the other control parameters for PM. This one-hour average for ash feed is also consistent with and conservative relative to the two-hour (national) averaging period for a PM CEMS.

iii. Wet Scrubber Parameters, including Venturi and Ionizing Wet Scrubbers. Venturi and other wet scrubbers remove PM by capturing particles in liquid droplets and separating the droplets from the gas stream. The wet scrubber parameters pertinent to PM control are minimum pressure drop across the wet scrubber, minimum liquid feed pressure to the wet scrubber, minimum blowdown or solids content of the scrubber liquid, and minimum liquid to gas ratio. Ionizing wet scrubbers have the additional parameter of minimum power input. Parameters for pressure drop, liquid feed pressure, and liquid to gas ratio are described, below, in the section dealing with HCl and Cl_2 standard. Parameters for blowdown or solids content and power input to an IWS are described in the next paragraphs.

Blowdown is the amount of scrubber liquid removed from the process and not recycled back into the wet scrubber. Blowdown is an important wet scrubber parameter because, as scrubber liquid is removed and not recycled, solids are removed as well and not recycled. Alternately, solids content can be used as a direct indicator of solids content in the scrubber liquid. When the scrubber liquid contains high solids, there is a lack of a driving force for more solids to go into solution. Conversely, when little or no solids are in the scrubber liquid, there is a strong driving force for liquids to go into solution. Therefore, establishing a maximum solids content for a wet scrubber is desirable.

If a PM CEMS is not required in the final rule, we propose that either a minimum blowdown or a maximum solids content limit be established. Both would be established on both a ten-minute and a one-hour average. The ten-minute average would be the average of the minimum, for blowdown, or maximum, for solids content, ten-minute averages occurring during each run of the comprehensive performance test. The one-hour average would be the average over all runs.

Power input to an IWS is important because IWSs 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 of the packing by the scrubber liquid. Therefore, power input to an IWS is a key parameter to the proper operation of an IWS and EPA proposes that facilities establish a limit on minimum power input to an IWS. This limit would be established on both a ten-minute and one-hour average. The ten-minute average would be the average of the minimum 10 minute averages occurring during each run of the comprehensive performance test and the one-hour average would be the average across all runs.

Facilities may obtain a waiver from these requirements for wet scrubbers from the Director if they can identify other key parameters which affect good control of PM through their use and use these parameter limits during normal operation.

iv. Fabric Filters. Fabric filters (FFs), also known as baghouses, are used to filter PM from stack flue gas prior to the stack. Performance of a fabric filter directly affects PM emissions. 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. Since low pressure drop is an indicator of one of these types of failure, pressure drop across the fabric filter is the best indicator that the fabric filter has not failed.

If the final rule does not require the use of a PM CEMS, EPA proposes that a limit on minimum pressure drop across the fabric filter be established to ensure that collection efficiency is maintained. EPA proposes that this limit be established on both a ten-minute and a one-hour average. The ten-minute average would be the average of the single lowest 10-minute rolling averages occurring during each run of the comprehensive performance test. The one-hour average would be the average over all runs.

EPA believes it would also be useful to establish other, potentially better parameters as measures of collection efficiency for the fabric filter. Collection efficiency from fabric filters is a function of filter type, face velocity (which in turn is a function of flue gas flowrate and filter material area), cake build-up on the filter, and particulate matter characteristics (primarily particulate size distribution). Unfortunately, the Agency is not aware of a way to establish parameters for these indicators of collection efficiency. Therefore, EPA invites comment on what type of parameters could be used as better indicators of collection efficiency and on what averaging period they should be established.

Facilities may obtain a waiver from these requirements for PM APCDs from the Director if they can identify key parameters which affect good control of PM through their use and use these parameter limits during normal operation.

v. Electrostatic Precipitators. Electrostatic precipitators (ESPs) capture PM by charging particulate in an electric field and collecting the charged particulate on an inversely charged collection plate. Electrical power is the product of the electrical voltage and the current. High voltage leads to high magnetic field strength which results in an increase in the saturation charge level the particle can obtain, which in turn causes an increase 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 due to a phenomena called ‘‘ionic space charge’’ and, thus, increased collection at the plate. High voltage is also important on the collection plates, since this will increase collection of the inversely charged particles on the plates. Therefore, maximizing both voltage and current is desirable for good collection. Therefore, power input to the ESP is a direct function of ESP efficiency since, the lower the power input, the lower the collection efficiency.

For these reasons, EPA proposes that facilities establish a limit on minimum power input to the ESP to ensure that collection efficiency is maintained at performance test levels if the final rule does not require the use of a PM CEMS. This limit would be established on both a ten-minute and one-hour average. The ten-minute average would be the average of the minimum 10-minute averages for power input which occurs during each run of the comprehensive performance test. The one-hour average would be the average over all runs.

Since very high power can be supplied to either the charging or collection parts of an ESP, EPA also invites comment on whether power input to each part of the ESP should be controlled.

Facilities may obtain a waiver from these requirements for ESPs from the Director if they can identify more appropriate parameters that would ensure that collection efficiency is maintained at performance test levels.

8. Waiver of Operating Limits

We believe that a provision to waive any or all of the operating limits discussed in this section is appropriate given that many sources will employ unique and innovative combinations of emission control devices. Fixed, national monitoring and compliance requirements may not be applicable or reasonable in some situations. Accordingly, the proposed rule would allow the Director to grant a waiver from any or all of the operating limits discussed in this section if a source documents in writing that other, more appropriate operating limits would ensure compliance with the pertinent emission standard. See proposed § 63.1210(s). The documentation must include recommended averaging periods for the alternative operating limits, and the basis for establishing the limits based on operations during the comprehensive performance test.

9. Request for Comment on Waiver of CEMS Requirements for Small, On-Site Sources

We specifically invite comment on whether the final rule should allow small, on-site sources the option of not having to use a mercury and PM CEMS. Under a waiver, the source would be required to comply with the operating limits discussed above in lieu of using a CEMS. As a separate issue, EPA is proposing less stringent RATA and RCA frequencies for the mercury and PM CEMS (and testing in general, see section III of this part) for these sources.

Sources with a gas flowrate less than 23,127 acfm would be considered small. See discussion in Part Four, Section I, for the rationale for that demarcation between small and large units. See also § 63.1208(b)(1)(ii) of the proposed rule. We believe that this waiver could be warranted because small, on-site sources may be better able to effectively sample and analyze feedstreams to ensure compliance with feedrate limits, and because their emission rates (i.e., environmental loading) would be less than from large sources.

We also invite comment on basing the definition of what is small on a gas flowrate and the value proposed for defining what is a small source.

D. Combustion Fugitive Emissions

Operating parameters on combustion fugitive emissions are necessary to ensure that these emissions do not leak from the combustion device, APCDs, or any ducting connecting them. The current BIF and incinerator rules establish provisions for controlling combustion fugitive emissions (see §§ 266.102(e)(7)(I) and 264.345(d)). Today's proposed rule would require sources to comply with those requirements, with minor clarifications. See proposed § 63.1207(b). Specifically, it is proposed that sources shall:

—keep the combustion chamber and all ducting and devices from the combustion chamber to the stack totally sealed against fugitive emissions; or
—maintain the maximum pressure on an instantaneous basis in the combustion chamber and in all ducting and devices from the combustion chamber to the stack at lower than ambient pressure at all times;[159] or
—use some other means of control demonstrated to provide equivalent control. Support for such demonstration shall be included in the operating record with prior written approval obtained from the Director.

In addition, the rule would require the owner or operator to specify in the operating record the method used for fugitive emission control.

EPA continues to believe this approach (already in effect for incinerators and BIFs) is appropriate and is proposing to retain it here. There are cases, however, particularly at munitions incinerators, where combustion fugitive emissions are a problem even when less than ambient pressure is apparently being maintained. In these cases, the Director may require in the RCRA operating permit continual video surveillance of the equipment to ensure there are no leaks. If leaks occur, each occurrence is a violation, and would require an automatic waste feed cut-off (AWFCO). In addition, as with all AWFCOs, the owner or operator must identify the cause of the leak and identify remedial action taken to minimize future occurrences.

We are also proposing to make conforming changes to the existing BIF and incinerator requirements for combustion fugitive emissions. See proposed §§ 264.347(e), 265.347(c), and 266.102(e). The effective date of these conforming requirements would be 6 months after publication of the final rule in the Federal Register, and so would take effect before the MACT standard compliance date.

E. Automatic Waste Feed Cutoff (AWFCO) Requirements and Emergency Safety Vent (ESV) Openings

We explain in this section that the source must be in compliance with the CEMS-monitored emission standards and the operating limits at all times. This would be ensured by requiring that all operating parameters for which limits would be established (as discussed above) must be interactive with an automatic waste feed cutoff (AWFCO) system. Further, we also describe the periodic reporting requirements that would apply if 10 AWFCOs that result in an exceedance of a CEMS-monitored emission standard or operating limit occur during any 60-day period. Finally we explain the consequences of, and reporting requirements for, emergency safety vent openings.

1. Automatic Waste Feed Cutoff System

Sources must be in compliance with the CEMS-monitored emission standards and operating limits at all times. See proposed § 63.1207 (a)(1) and (a)(2). If a facility exceeds a standard or operating limit, today's rule proposes that the hazardous waste feed be instantaneously and automatically cut off. This requirement now exists under current incinerator permits and the Agency's BIF rules (see § 266.102(e)(7)(ii)). After an AWFCO, the source must continue to monitor all AWFCO operating parameters (and

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[159] That is, on an instantaneous basis, without an averaging period. The recording system must record the instantaneous values continuously.

CEMS-monitored emissions) and cannot begin feeding hazardous waste again until all parameters come within allowable levels. Further, to minimize emissions of regulated pollutants, including products of incomplete combustion that could result from the perturbation caused by the waste feed cutoff, combustion gases must continue to be routed through the air pollution control system after a cutoff, and minimum combustion temperature must be maintained for as long as hazardous waste remains in the combustion chamber.

As currently required under the BIF rule, all AWFCO parameters must continue to be monitored after an AWFCO, and hazardous waste firing cannot resume until all parameters are within allowable levels. Thus, all rolling averages must continue to be calculated even when hazardous waste is not being burned.[160]

Today's proposed rule would require the following parameters to be AWFCO parameters:[161]

—CEMS-monitored emission standards
—All applicable feedrate limits (e.g., hazardous waste, pumpable LVM metals, total SVM and LVM metals)
—Minimum combustion chamber temperature (each chamber)
—Maximum combustion chamber temperature
—Maximum temperature at the inlet to the initial dry PM control device
—Maximum combustion chamber pressure (if used to control combustion fugitive emissions)
—Maximum flue gas flowrate (or production rate)
—Minimum flue gas flowrate (where required (e.g., under § 63.1208(h)(1)) (or production rate)
—Limits on operating parameters of the emission control equipment (e.g., carbon injection rate)
—Failure of the Automatic Waste Feed Cut-off system.
—Whenever continuous monitoring systems (CMS) or the measurement component of the CMS registers a value beyond its rated scale.

We note that the current requirements for BIFs and incinerators do not require a AWFCO whenever a measurement component of the CMS registers a value beyond its rated scale or when the AWFCO system fails. To ensure that those standards conform with today's proposal, we are proposing to add this requirement to those rules. The effective date of these conforming requirements would be six months after publication of the final rule in the Federal Register, and thus would precede the MACT standard compliance date.

If an operating limit or CEMS-monitored emission standard is exceeded after the hazardous waste feed has ceased but while hazardous waste remains in the combustion chamber, it is a violation of the relevant emission standard.[162]

As currently required for BIFs, the AWFCO system and associated alarms must be tested at least once every seven days when hazardous waste is burned to verify operability, unless the owner or operator documents in the operating record that weekly inspections will unduly restrict or upset operations and that less frequent inspections will be adequate. At a minimum, operational testing must be conducted at least once every 30 days.

Under today's proposed rule, owners and operators would be required to document in the operating log the cause of each AWFCO that is associated with an exceedance of an operating limit or CEMS-monitored emission standard[163] and document the preventive measures taken to minimize future AWFCOs. Also, we are proposing a reporting requirement for excessive AWFCOs caused by violations to alert regulatory officials that a source is having operational problems. Thus, regulatory officials can increase frequency of inspections and review the sources operating plan. In addition, the Director may specify requirements through the RCRA permit beyond recordkeeping and reporting for addressing AWFCOs (i.e., approval to restart hazardous waste feed, etc.)

Owners or operators would be required to submit an ''Excessive AWFCO Report'' to the Administrator if more than 10 AWFCOs associated with an exceedance of an operating limit or CEMS-monitored emission standard occur during any 60 calendar-day period. After 10 such cutoffs occur, the 60 calendar-day clock would begin anew. The report would have to be postmarked within five calendar days of the tenth AWFCO associated with an exceedance, and would have to document the cause of each such cutoff and preventive measures taken to minimize future cutoffs.

We invite comments on alternative exceedance frequencies that would trigger the need to submit an Excessive AWFCO Report, such as incurring 5 cutoffs in any 30 calendar-day period. A shorter accounting period would enable enforcement officials to better identify problem facilities.

2. Emergency Safety Vent (ESV) Openings

Today's rule would require that combustion gases always pass through the emission control system in place during the comprehensive performance test. Thus, opening an emergency safety vent (ESV) (including emergency vent stacks, bypass stacks, thermal relief valves, and pressure relief valves) to bypass any part of the emission control system would be a violation of that requirement and the emission standard the by-passed control device is designed to control. See proposed § 63.1207(a)(3). We are also proposing to make conforming changes to the RCRA incinerator standards of Part 264, Subpart O, to provide consistency. While this section specifically addresses ESVs, the requirements apply to any type of air pollution control bypass stack while hazardous waste remains in the combustion chamber.

ESVs are safety devices which are designed to allow combustion gases to bypass the air pollution control equipment in order to: (1) Prevent ground-level releases which could endanger workers, in the event of an overpressure, or (2) prevent damage to the air pollution control equipment in the event of excessively high temperatures. An ESV opening allows uncontrolled emissions to directly enter the atmosphere. Some ESVs are situated prior to the secondary combustion chamber. This chamber is important for organics destruction in an incinerator. Further, since incinerators normally demonstrate compliance with the regulatory performance standards while

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[160] This requirement that all parameters must continue to be monitored after a AWFCO assumes that the operator intends to begin burning hazardous waste as soon as the operating parameters return to allowable levels. If not, however, it may not be practicable to require monitoring of AWFCO parameters when hazardous waste is not burned. We specifically request comment on a reasonable interval of time after a AWFCO and before hazardous waste firing could be resumed during which the operator would not be required to monitor the AWFCO parameters. For example, if the operator did not intend to begin burning hazardous waste for 8 hours after the AWFCO, it may not be appropriate to require monitoring of AWFCO parameters during that period.

[161] We note that during the RCRA permitting process, permit writers may identify additional operating parameters they determine to be necessary on a case-specific basis in order for the source to comply with the standards. See subsection C.1. of this part, ''Continued Applicability of RCRA Omnibus Authority,'' for more information on this.

[162] If an operating limit is exceeded (when hazardous waste is in the combustion chamber), the source has violated the emission standard for which the operating limit is used to ensure compliance.

[163] Not all AWFCOs are the result of an exceedance of an emission standard or operating limit. AWFCOs which are not associated with a violation must be recorded in the operating log but need not be reported.

using their secondary combustion chambers and air pollution control devices, emissions from ESVs are expected to be in excess of levels set by the performance standards for the respective devices.

There are situations where the alternative to opening an ESV (e.g., fugitive emissions at ground level, or even an explosion) are worse from a health and environmental standpoint. Thus, EPA would like to emphasize that simply eliminating an ESV itself is one solution, but not appropriate in some cases. Rather, EPA believes that emergency (or other) situations which would cause either an ESV opening or fugitive emissions from the combustor can, and should be, prevented to the greatest extent possible.

EPA believes that most facilities can readily make changes in their operations which can reduce ESV openings. To minimize ESV openings, facilities may need to repair or replace unreliable equipment, better control the feeding of waste, or add redundant systems where necessary.

In the preamble to the proposed amendments for hazardous waste incinerators (55 FR 17890, April 27, 1990), EPA proposed to clarify the regulatory status of ESV openings. The Agency proposed that no ESV openings be allowed while hazardous waste is in the unit. In this case any ESV opening while hazardous waste remains in the unit would be a permit violation and subject to enforcement action. This is being reproposed today.

Also in the proposed rule for hazardous waste incinerators (55 FR at 17891), EPA proposed to amend § 264.345(a) to clarify that an incinerator must operate in accordance with the operating requirements specified in their permit whenever there is hazardous waste in the incinerator. Today's rule is again proposing to amend § 264.345(a) to clarify that an incinerator must be operated in accordance with the conditions specified in the permit and meet the applicable emission standards at all times that hazardous waste or hazardous waste residues remain in the chamber. (This is a conforming change.)

For BIFs, the regulations state that they must be operated in accordance with the operating limits and the applicable emission standards at all times when there is waste in the unit. § 266.103(c)(1). Further, § 266.102(e)(7)(ii)(B) requires that combustion gases must be routed through the air pollution control system as long as waste remains in the unit. The BIF final rule discusses that a BIF must be in compliance at all times that there is hazardous waste in the unit, regardless of whether an automatic waste feed cutoff has occurred. See 56 FR at 7160. The activation of the automatic waste feed cutoff system does not relieve the facility from its obligation to comply with the permit conditions while waste remains in the unit. Today's rule does not propose any changes to this regime.

Finally, today's proposed rule would require the owner or operator to record in the operating log the ESV opening, the reason for the opening, and corrective measures taken to minimize the frequency of openings. Further, the owner or operator would have to submit a written report to the Administrator within 5 calendar days of each ESV opening documenting the information provided in the operating log.

While it is understood that there can be mitigating circumstances which require the use of ESVs, these instances should be minimized. Therefore, it is proposed that the owner or operator prepare an ESV Operating Plan in which the owner or operator shall address what they will do to prevent the use of the ESV and release uncontrolled emissions into the air and what they will do to minimize the hazard from such releases (such as back-up systems, maintaining flame temperature, and combustion air to combustion organics.) This plan is analogous to the ''Preparedness and Prevention and Contingency Plan'' discussed in the 1990 proposed revisions to the hazardous waste incinerator rule (55 FR at 17890). A corresponding change to the current hazardous waste incinerator rules are proposed as well.

F. Quality Assurance for Continuous Monitoring Systems

EPA proposes specific quality assurance (QA) requirements for continuous monitoring systems (CMS). These systems can be classified as: continuous emissions monitoring systems (CEMS); analysis of feedstreams; and continuous monitoring systems to comply with limits on other operating parameters.

1. Continuous Emissions Monitoring Systems (CEMS)

The rule would require HWCs to comply with the general monitoring requirements under § 63.8 for all MACT sources except as discussed below. In addition, the rule would establish in the appendix to Part 63, Subpart EEE, specific quality assurance (QA) and quality control (QC) requirements for CEMS used by HWCs. These requirements would supersede the requirements in Appendix F of Part 60 for these sources. We are proposing an appendix to Subpart EEE in lieu of the requirements of Appendix F because the proposed appendix to Subpart EEE would incorporate various issues particularly relating to HWCs (e.g., requirements for specific CEMS not addressed by Appendix F; out-of-control periods and data reporting are not relevant to HWCs because HWCs cannot burn hazardous waste if the CEMS is not meeting performance specifications).

a. Applicability of § 63.8 Requirements. Most of the § 63.8 monitoring requirements for MACT sources would apply to HWCs including requirements for the owner and operator to develop and implement a quality control program (§ 63.8(d)(2)) and conduct a performance evaluation test in conjunction with the performance test to demonstration compliance with the emission standards (§ 63.8(d)(2) and (e)(4)). Section 63.8(f) also provides for approval of an alternative monitoring method.

Several provisions of § 63.8, however, would not apply to HWCs. They are as follows:

i. § 63.8 (c)(1)(I)–(iii), (c)(4), (c)(7), (c)(8), and (g)(5) would not apply because these paragraphs address requirements relating to operations when the CEMS is out of compliance with the relevant performance specifications. Hazardous waste cannot be fed (or remain in the combustion chamber) if the CEMS is not in compliance with performance specifications.

ii. § 63.8 (c)(4)(ii) and (g)(2) would not apply because these paragraphs define continuous operation and data reduction inconsistently with today's proposed rule. Under today's rule, the performance specifications in Appendix B to Part 60 and the data quality objectives in the appendix to Part 63, Subpart EEE, define continuous operation specific to the CEMS.

b. Quality Assurance Procedures. The proposed appendix to Part 63, Subpart EEE, defines quality assurance procedures for CEMS at HWCs. If a CEMS component is not in compliance with applicable quality assurance procedures or performance specifications (provided in Appendix B, Part 60), hazardous waste burning must cease immediately and cannot be resumed until the owner or operator documents that the CEMS meets the performance specifications.

The appendix would require owners and operators to develop and implement a quality assurance and quality control (QA/QC) program. It would define requirements for determining compliance with calibration and zero drift specifications provided in Appendix B. It would also define requirements for performance evaluations, that is, performance audits including relative accuracy tests and absolute calibration audits.

The appendix also deals with issues specific to these source categories. It establishes specific testing intervals for CEMS for HWCs. It defines the one minute and rolling averages, the oxygen correction factor, CEMS span values, and provides a provision to allow the use of alternative span values. It provides procedures for reestablishing a rolling average after short term interruptions such as calibration and maintenance and long-term interruptions such as periodic downtime for kiln maintenance or for weekends and holidays when the facility is not being operated. It also allows up to 20 minutes of CEMS downtime for calibration purposes.

c. Conforming changes to the BIF and incinerator rules. Conforming changes are also proposed to the BIF and incinerator rules: deleting the current Part 266, Appendix IX, CEMS requirements; and, instead, requiring the use of the Part 60, Appendix B, performance specifications and the data quality specifications in the appendix to Subpart EEE.

d. Zero Drift and Zero Gas Requirements. The Agency specifically invites comment on two other issues which affect all CEMS: whether the zero drift requirements contained in the appendix to Subpart EEE (and the various performance specifications) should be promulgated, or whether the zero gas requirements should be changed from the current 0–20 percent levels to a 0–0.1 ppm level.

Many of the performance specifications require that zero gas, or zero level gas, contain between 0 to 20 per cent of the measured constituent. However, facilities often use just one zero grade gas for all their CEMS, one of ‘‘zero-grade nitrogen.’’ Therefore, EPA invites comment on whether this requirement should be changed from 0 to 20 percent to 0 to 0.1 ppm of the measured constituent.

e. EPA certification of CEMS. EPA invites comment on whether a process should be established whereby CEMS manufacturers could certify that their CEMS meet the established performance specifications. If this were promulgated, a CEMS would not be allowed for use on a hazardous waste combustor unless it has been certified by EPA. The CEMS certification would be similar to the certifications used for TUV approval in Germany and for CEMS used for compliance with EPA’s acid rain program.

Issues EPA needs to address in order to promulgate such a process include: what benefits the regulated community and industry would incur as a result of such a certification; how the program would work; and whether a nongovernment agency could do this task.

vi. Correcting CEMS Readings for Moisture Content. One quality assurance issue that must be considered is how often facilities need to measure the moisture content of their flue gas. All the standards proposed today are on a dry basis, so knowing the flue gas moisture content to correct CEMS outputs to a dry basis is necessary. EPA is considering two alternative approaches to obtain the moisture content of the flue gas. One involves making periodic measurements of the moisture content of the flue gas using Method 4, found in Part 60, Appendix A. Under this scheme, a facility would take flue gas moisture measurements quarterly, while conducting the ACA. This moisture level would then be used to correct CEMS outputs for moisture throughout the next quarter.

Another alternative is that facilities make instantaneous measurements of the flue gas temperature at the CEMS sampling point. The temperature would then be used to determine the saturation water concentration of the flue gas. The saturation water concentration would then be used to correct the CEMS output for moisture.

EPA favors using the saturation water concentration as a surrogate for flue gas moisture because it is continuous, frequently conservative, and cost-effective compared to running a manual method. One issue with this approach is that facilities with wet APCS may have a water concentration higher than the saturated water concentration due to entrained water droplets in the flue gas. However, we do not have data on the amount of entrained water droplets in the flue gas and, thus, cannot determine at this point how important this issue is.

The Agency requests data and information from facilities with a wet APCS regarding the total water concentration (including water droplets) in the flue gas compared with the saturated water concentration. The Agency will evaluate data and recommendations of commenters on these or other approaches in making a determination on the best approach for the final rule.

2. Analysis of Feedstreams

In this section, we discuss the following proposed requirements for analysis of feedstreams: (1) required analysis plan; (2) requirement to submit the plan for review and approval the Director’s request; (3) frequency of analysis; and (4) information that must be determined and recorded to document compliance. (We note that HWCs are already subject to these requirements under 40 CFR Parts 261, 264, 265, 266, and 270.) We also request comment on analysis of gaseous feedstreams, including natural gas. We also propose making a conforming change to the BIF and incinerator rules to clarify that constituent monitoring is required for all feedstreams.

a. Feedstream Analysis Plan. The rule would require (in § 63.1210(c)) an owner or operator to obtain an analysis of each feedstream that is sufficient to document compliance with the applicable feedrate limits. The owner or operator must obtain the analyses for each feedstream prior to feeding into the combustor. This is done in order to document compliance with the applicable feedrate limits at all times.

To ensure that the owner or operator will obtain an adequate analysis, the owner or operator would be required to develop and implement a feedstream analysis plan and record it in the operating record. The operating plan must specify at a minimum: (1) the parameters for which each feedstream will be analyzed to ensure compliance with proposed § 63.1210; (2) whether the owner or operator will obtain the analysis by performing sampling and analysis, or by other methods such as using analytical information obtained from others [164] or using other published or documented data or information; (3) how the analysis will be used to document compliance with applicable feedrate limits (e.g., if hazardous wastes are blended and analyses are obtained of the wastes prior to blending but not of the blended, as-fired, waste, the plan must describe how the owner and operator will determine the pertinent parameters of the blended waste); (4) the test methods which will be used to obtain the analyses; [165] (5) the sampling method which will be used to obtain a representative sample of each feedstream to be analyzed using sampling methods described in Appendix I, Part 261, or an equivalent method; and (6) the frequency with which the initial analysis of the feedstream will be reviewed or repeated

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[164] When analytical information is provided by others, the analysis plan must document how the owner or operator will ensure it is complete and accurate.

[165] The information must be provided whether the owner or operator conducts the analyses or the analyses are obtained from others.

to ensure that the analysis is accurate and up to date.[166]

We note that guidance on developing a feedstream analysis plan is provided in *Waste Analysis At Facilities That Generate, Treat, and Dispose of Hazardous Waste*, (OSWER [Office of Solid Waste and Emergency Response] #9938.4–03, April 1994). The document is available from the National Technical Information Services (NTIS), publication # PB94–963–603. In addition, in April 1995, EPA published a Notice of Availability for public comment on *Waste Analysis Guidance for Facilities That Burn Hazardous Wastes-Draft* (Office of Enforcement and Compliance Assurance # EPA 530–R–94–019) (see 60 FR 18402). This guidance document provides assistance in developing waste analysis plans specifically for HWCs. The comment period for this document closed on June 2, 1995, and EPA is currently reviewing and evaluating the comments received.

b. Review and Approval of Analysis Plan. Under today's proposed rule, the Director could require the owner or operator to submit the analysis plan for review and approval at any time. Given that feedstream analysis is a primary compliance approach for the SVM, LVM, and HCl/Cl_2 emission standards, it is imperative that the source develop and implement an adequate analysis plan. Consequently, the Agency would like to review and approve analysis plans for each existing source at the time of initial compliance (i.e., initial notification of compliance).[167]

Because of resource constraints, however, the Agency will review analysis plans on a priority basis, considering factors such as whether the source accepts off-site waste, volume of waste burned, and compliance history.[168] Therefore, the Agency wishes to preserve flexibility on whether to require a source to submit its analysis plan for review and approval.

c. How to Comply with Feedrate Limits. To comply with the feedrate limits, the source must: (1) know the concentration of the limited parameter (e.g., SVM) in the feedstream at all times; (2) know the feedrate of the feedstream at all times; and (3) record the feedrate (the product of the concentration times the feedstream rate) in the operating record. The source would know the concentration of the parameter in the feedstream by implementing the analysis plan discussed above.

The source would know the feedrate of the feedstream by using a continuous monitor of the volumetric or mass flowrate.[169] If a volumetric flowrate monitor is used, the source must know the density of the feedstream at all times if it is necessary to know the mass per unit time feedrate.

In order for a facility to know the concentration of the parameters at all times, the source must record the feedrate in the operating record. It would be preferable to reduce the burden on regulatory inspectors to continuously record all of the parameters used to calculate the feedrate (e.g., concentration of metal, volumetric flowrate, density) as well as the feedrate itself. Other approaches may be acceptable, however, such as continuously recording only volumetric flowrate, but clearly noting in the record the concentration and density associated with that volumetric flowrate so that the inspector could readily confirm that the feedrate was not exceeded at the recorded flowrates. If a source prefers the second approach, we recommend that it informally notify the Director for concurrence.

d. Request for Comment on Monitoring Gaseous Feedstreams. We request comment here on how to address the difficulty of continuously sampling gaseous feedstreams—both natural gas and process gas—for nonvapor constituents (metals, chloride salts).

Natural gas is a primary fuel for several HWCs. Under today's rule (as well as the BIF regulations), this feedstream, like all other feedstreams, would be subject to the continuous monitoring and recording provisions, including feedstream sampling and analysis for metal and chlorine constituents.

Facilities have questioned whether it is necessary to sample and analyze natural gas for constituents they feel are not reasonably expected to be present. Therefore, the Agency is soliciting data and information on whether (and at what concentrations) the seven metals that would be regulated in today's rule are likely to be present in natural gas. Based on the information submitted by commenters, the final rule could incorporate a number of options including: (1) determine that natural gas feedstreams need not be considered in feedrate determinations because levels of metals and chlorine and chloride are not likely to be significant; (2) allow sources to make a one-time, site-specific determination of metals and chlorine levels that could be used for feedrate determinations provided that the natural gas supplier does not change; or (3) establish generic concentration levels for metals and chlorine and chloride that could be assumed to be present. We also invite comment on these or other approaches to address this issue.

Process gas feedstreams pose a similar problem. One approach for these feedstreams would be to allow sources to make a one-time determination of metals and chlorine levels (by sampling and analysis, process knowledge, or other information) that could be used for feedrate determinations until process changes or other factors occurred that could change the composition of the gas. We invite comments on this or alternative approaches to address this issue.

3. Quality Assurance for Continuous Monitoring Systems Other Than CEMS

Continuous monitoring systems (CMS) other than CEMS include the systems associated with monitors such as thermocouples, pressure transducers, stress/strain gages, flow meters, and pH meters. In addition to the requirements discussed below, we are proposing to require compliance with the general quality assurance procedures for continuous monitoring systems (CMS) provided by existing § 63.8(c)(4). See proposed § 63.1210(d). That paragraph requires owners and operators to verify the operational status of CMS by, at a minimum, complying with the manufacturer's written specifications or recommendations for installation, operation, and calibration of the system. To make current rules consistent with the ones which will be promulgated here, EPA proposes making conforming changes to the BIF and incinerator rules to incorporate quality assurance requirements for CMS.

a. Sampling and Detection Frequency. We are proposing to require that CMS (other than CEMS)[170] 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.

b. Exceeding CMS Span Would Trigger a AWFCO. The rule would also

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[166] The analysis must be repeated as necessary to ensure that it is accurate and up to date. At a minimum, the analysis must be repeated when the owner or operator is notified or has reason to believe that the process or operation generating or producing the feedstream has changed.

[167] Analysis plans would be reviewed and approved for new sources during the RCRA permitting process (i.e., prior to commencement of construction).

[168] Note that the analysis plan will be reviewed during facility inspections as well.

[169] Quality assurance for the flowrate monitor is discussed below in the text.

[170] The proposed CEM performance specifications and data quality objectives define acceptable sampling and detection frequency.

require that the automatic waste feed cutoff (AWFCO) system be engaged if the span of any CMS (other than a CEMS) is exceeded. This is because it is not practicable to establish span values for each CMS as we have proposed for each CEMS.

The issue arises because facilities have the discretion of purchasing equipment with any span. For CMS, the span is defined as the range between the highest certifiable reading a CMS can make (the ''upper span'') and its corresponding minimum (the ''lower span.'') If a CMS were to have an upper span which is too low, say a thermocouple with a upper span of 630°C, there would be no way to document accurately a temperature higher than 630°C. This is a problem if the facility routinely operates at a temperature of, say, 750°C. For this reason, it is important to ensure that CMS are operated within their certified span.

III. MACT Performance Testing and Related Issues

Today's rule would require performance testing to demonstrate compliance with the proposed MACT emission standards. The requirements and procedures for MACT performance testing are discussed here. In addition, HWCs would continue to be subject to the existing trial burn requirements during the RCRA permitting process. The interaction between the RCRA trial burn and the MACT performance test is also discussed here. In addition, we discuss in this section the waiver for performance testing for Hg, SVM, LVM, and HCl/Cl_2 that would be provided for sources that feed de minimis levels of these metals or chlorine. Finally, we discuss in this section requirements for relative accuracy tests for CEMS.

A. MACT Performance Testing

Two types of performance testing would be required to demonstrate compliance with the proposed MACT emission standards: comprehensive performance testing and confirmatory performance testing. See proposed § 63.1208.

1. Comprehensive Performance Testing

The purpose of the comprehensive performance test is to initially and periodically thereafter: (1) demonstrate that the source is in compliance with the CEMS-monitored emission standards (e.g., PM, Hg, CO, HC); (2) conduct manual stack sampling to demonstrate compliance with the emission standards for pollutants that are not monitored with a CEMS (e.g., D/F, SVM, LVM, HCl/Cl_2); (3) establish limits on the applicable operating parameters provided by proposed § 63.1210 (Monitoring Requirements) to ensure that compliance is maintained with those emission standards for which a CEMS is not used for compliance monitoring; and (4) demonstrate performance of CMS is consistent with the requirements and quality assurance plan. Thus, the comprehensive performance test has purposes similar to the RCRA trial burn and BIF interim status compliance test. It would be more like a BIF interim status compliance test, however, because of the low level of Agency oversight and high degree of facility self-implementation, as discussed below.

a. Operations During Comprehensive Performance Testing. Given that limits will be established on operating parameters during the comprehensive performance test, sources will likely want to operate during the test at the edge of the operating envelope that they believe is both necessary to operate efficiently and comply with the emission standards. Accordingly, sources may elect to spike feedstreams with metals or chlorine, for example, to ensure that the feedrate limits are high enough to accommodate normal operations while allowing some flexibility to feed higher rates at times.

In addition, sources may identify two or more modes of operation for which separate performance tests would be conducted and for which separate limits on operating conditions would be established. In this situation, the source would be required to note in the operating record under which mode of operation it was operating at all times. An example of when two modes of operation must be identified would be a cement kiln that routes its kiln off-gas through the raw meal mill to help dry the raw meal. When the raw meal mill is not operating (perhaps one third of the time), the kiln gas bypasses the raw meal mill. Emissions of PM and other HAPs or HAP surrogates may vary substantially depending on whether the kiln gas bypasses the raw meal mill.

When conducting the comprehensive performance test, sources must also operate under representative conditions for the following parameters to ensure that emissions are representative of normal operating conditions: (1) 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 D/F emission standard; and (2) cleaning cycle of the PM control device (e.g., ESP rapping cycle) when demonstrating compliance with the SVM and LVM emission standard when using manual stack sampling and the D/F emission standard.

b. Frequency of Testing. The rule would require that the comprehensive performance test be performed periodically because the Agency is concerned that long-term wear-and-tear on critical components (e.g., firing systems, emission control equipment) could adversely affect emissions. Large sources (i.e., those with a stack gas flow rate greater than 23,127 acfm) and sources that accept waste from off-site would be required to perform comprehensive performance testing every three years.

Small, on-site sources would be required to perform testing every five years, unless the Director determines otherwise on a case-specific basis. The proposed testing frequency would be less for small, on-site sources because of cost-effectiveness concerns. In addition, we note that, from the RCRA perspective, small, on-site sources are more familiar with the wastes they burn, the waste may be more homogeneous and less complex, and they burn smaller volumes of waste. Thus, their emissions may not pose the same hazard as emissions from large or commercial facilities. We invite comment on this approach.

The Director may determine, however, that a small, on-site source may pose the same potential hazard as a large or off-site source because of the factors listed above, compliance history, or other reasons. Accordingly, the rule would allow discretion for the Director to require a three-year testing frequency for such small, on-site sources as warranted.

c. Agency Oversight. The proposed rule would require the owner or operator to submit a ''notification of performance test'' to the Administrator 60 days prior to the planned test date. The notification must be accompanied by a site-specific test plan for review and approval by the Administrator. This is consistent with the general provisions for MACT sources provided by § 63.7 (b) and (c). See those paragraphs for provisions regarding: (1) Agency approval of the test plan; (2) 30-day period for the Agency to approve or disapprove the test plan;[171] and (3) notwithstanding Agency approval or disapproval, or failure to approve or disapprove, the test plan, the owner or operator must comply with the applicable requirements, including the

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[171] Generally, § 63.7(c)(3) provides that the source can assume the test plan is approved if the Agency does not take action within 30 days of receiving the original plan or any supplementary information.

deadline for submitting the initial and subsequent notifications of compliance.

In addition, the Agency has the option of observing the performance test.

d. Operating Conditions During Subsequent Tests. Although the rule would 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 CEMS), two types of waivers from this requirement would be 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 Director may grant if warranted to allow the source to exceed the current operating limits without restriction. The rationale and implementation of these waivers is discussed below.

The rule would provide 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.

Accordingly, EPA is proposing to allow sources to operate under the ''same'' operating conditions as the previous comprehensive performance test in order to duplicate the current operating limits. It is not practicable to require a source to operate under the exact same operating conditions as the previous comprehensive performance test, however. Therefore, the rule would allow sources to deviate during comprehensive performance testing by up to 5 percent from the current operating limits provided that the source accept operating limits based on the new performance test levels that are the more stringent of the current operating limits or levels achieved during the new performance test. We invite comment on whether this provision would meet our objective of ensuring that the operating envelope does not shrink over time as subsequent comprehensive performance tests are conducted. For example, an additional approach would be to provide for a site-specific waiver of the 5 percent deviation limit to allow deviations from current operating limits as warranted to ensure that the operating envelope does not shrink.

The rule also proposes a waiver that the Administrator may grant if warranted to allow the source to exceed the current operating limits without restriction. This is because the source may want to operate under less restrictive limits and believes that it can still comply with the emission standards under the less restrictive limits. For example, a source may want to burn a waste with higher metal or chlorine content, and/or the source may want to install an improved emission control device.

To accommodate such situations, the rule would allow the Administrator to grant a site-specific waiver of the operating limits if the source provides supporting documentation that it is likely to be able to meet the emission standards under less restrictive operating limits. The documentation must be submitted prior to or at the time of submittal of the notification of performance test, and must include empirical data or other data and information to support the request. If the waiver request is submitted with the notification of performance test (which must be accompanied by the test plan), the Director will approve or disapprove the waiver request under the procedures for approving or disapproving the test plan.

e. Testing Schedule and Notification of Compliance. The owner or operator must submit to the Administrator a notification of compliance under proposed § 63.1211(c) documenting compliance with the emission standards and CMS requirements, and identifying applicable operating limits. (This provision is similar to § 63.7(g).) The notification must be postmarked by the 90th day following the completion of performance testing and CMS performance evaluation.

The initial notification of compliance must be postmarked within 36 months after the date of publication of the final rule. Subsequent notifications must be submitted within 90 days after the completion of subsequent performance testing. Subsequent comprehensive performance testing must be initiated 36 months for large and off-site sources or 60 months for small, on-site sources, respectively, after initiation of the initial performance test.

Given the complexity of comprehensive performance testing and to allow for unforeseen events, however, the rule would allow the subsequent test to be initiated within a range of 30 days before or after the 36 or 60-month anniversary. The rule would require that the anniversary date remain based on the initial comprehensive performance test. This would simplify recordkeeping and preclude a source from intentionally scheduling the test toward the end of the 30-day grace period and thus effectively obtaining a 37 or 61-month testing frequency.

The rule would give a source the option of performing a comprehensive performance test at any time before the 36 or 60-month anniversary. A source may want to retrofit or add a new emission control device prior to a test anniversary date. To do so, the source would be required to conduct a new comprehensive performance test to document compliance with emission standards and to establish new operating limits. The rule would require the source to follow the same procedures for this comprehensive performance test as discussed above (e.g., submittal of notification of performance testing and test plan; review and approval of test plan). Note that conducting a comprehensive performance test prior to the normal anniversary date would establish a new anniversary date.

f. Time Extensions for Subsequent Performance Tests. The rule would allow the Administrator to grant up to a 1 year time extension for any performance test subsequent to the initial comprehensive performance test.[172] This would enable the source to consolidate, into one test, both the MACT-related performance testing and the RCRA trial burn testing, which are both required for issuance and reissuance of RCRA operating permits.[173] (Trial burn testing requirements are discussed below.)

For example, if the comprehensive performance test anniversary were a date proximate to the date scheduled for the trial burn, we believe it is reasonable to allow the source to conduct only one test to satisfy both requirements (i.e., the MACT-related performance test and the RCRA trial burn). To address this situation, the rule would allow up to a one-year time extension for the performance test.[174]

When the trial burn and performance tests are consolidated, the anniversary dates for subsequent performance tests would be correspondingly adjusted. For example, if the anniversary date for a

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[172] Note that we discuss in Part Five, Section I (Selection of Compliance Dates) of the preamble that the rule would provide up to a 1-year time extension to submit the initial notification of compliance.

[173] In addition, the source may experience a major outage whereby the performance test could not be conducted within the 2-month window around the anniversary date. This time extension provision could address this situation as well.

[174] Note that, if the trial burn were scheduled before, rather than after, the performance test anniversary date, there would not be a problem because the source can conduct a comprehensive performance test at any time prior to the anniversary date. If so, the anniversary date is simply moved up.

confirmatory performance test for a large or off-site source is January 1 and the trial burn is scheduled for September 1 of that year, the source may adjust the anniversary date of the confirmatory performance test to September 1. This would also delay the anniversary date for subsequent comprehensive performance tests by 9 months. As noted above, under the proposal a maximum of 12 months delay could be granted.

The procedure for granting or denying a time extension would be the same as those for existing § 63.6(i) which allows the Administrator to grant MACT sources up to 1 additional year (in addition to the 3 years beginning with publication of applicable standards (e.g., MACT standards for HWCs) in the Federal Register) to comply with the standard.[175] (These are also the same procedures that would apply to a request for a time extension for the initial notification of compliance.)

We invite comment on alternative maximum time periods for the extension to allow sources to reasonably consolidate performance and trial burn testing, and whether the time extension should be automatic or require prior approval by the Administrator.

vi. Failure to Submit a Timely Notification of Compliance. If the owner or operator does not submit a notification of compliance by the required date, the rule would require the source to immediately stop burning hazardous waste (the same manner as applied to BIFs certifying compliance under RCRA § 266.103 in 1991). If the source wanted to burn hazardous waste in the future, it would be required to comply with the standards and permit requirements for new MACT and RCRA sources. For example, if the source were operating under RCRA interim status, it would need to obtain a RCRA operating permit and meet MACT standards for new facilities before hazardous waste burning could resume. Moreover, the rule would require the source to obtain written approval from the Administrator before hazardous waste burning could resume. (For RCRA interim status sources, issuance of a RCRA operating permit would constitute such written approval.)

g. Failure of a Comprehensive Performance Test. When a source determines (e.g., based on CEMS recordings, results of analysis of samples taken during manual stack sampling, or results of the CMS performance evaluation) that it has failed any emission standard during the performance test, it would be required to immediately stop burning hazardous waste. If, however, a source conducts the comprehensive performance test under two or more modes of operation and meets the emission standards when operating under one or more modes of operation, it would be allowed to continue burning under the modes of operation for which it has met the standards.

For sources that fail one or more emission standards during all modes of operation tested, the rule would enable the source to burn hazardous waste only for a total of 720 hours and only for the purposes of pretesting (i.e., informal testing to determine if it could meet the standards operating under modified conditions) or comprehensive performance testing under modified conditions.

Finally, failure to comply with an emission standard after initial notification of compliance would be a violation of the rule.

We note that HWCs are currently subject to virtually these same requirements under RCRA rules.

h. Applicability of Existing Part 63 General Requirements for MACT Sources. Part 63 establishes requirements for performance testing in § 63.7 and requirements for extension of compliance dates in § 63.6(i). Some of these provisions would be directly applicable to HWCs, some would be applicable in modified form, some would be superseded by today’s rule, and others are not applicable.

The following § 63.7 requirements would be applicable to HWCs:

(1) Paragraph (a)(1) (Applicability) and (a)(3)

(2) Paragraphs (b) (Notification of performance test) and (c) (Quality Assurance Program), except that all sources would be required to submit the test plan for review and approval

(3) Paragraph (d) (Performance testing facilities)

(4) Paragraph (e) (Conduct of performance tests), except that operating conditions during comprehensive performance testing would be as discussed above (i.e., not normal operating conditions), and operating conditions during confirmatory performance testing discussed below would be under normal conditions as defined in that discussion. Also, emissions during startup and shutdown would be included in the performance tests, if the sources wishes to have the authority to burn hazardous waste during those periods.

(5) Paragraph (f) (Use of an alternative test method)

(6) Paragraph (g) (Data analysis, recordkeeping, and reporting), except that the test results would have to be reported 90 days after completion of the test, rather than 60 days.

The following § 63.7 requirements would not be applicable to HWCs:

(1) Paragraph (a)(2) (establishing deadlines for performance testing) because new HWCs would be required to obtain a RCRA operating permit before commencing construction. The RCRA operating permit would specify allowable periods of operation and operating conditions prior to (and following) performance testing. Existing HWCs would be required to submit a notification of compliance within 3-years of the date of publication of the final rule in the Federal Register.

(2) Paragraph (h) (Waiver of performance tests), because the bases for the waiver are not relevant to HWCs as follows: (1) the rule would allow the Administrator to grant a time extension to submit a notification of compliance; and (2) the purpose of periodic testing is to determine whether sources are meeting the standards on a continuous basis.

2. Confirmatory Performance Testing

Confirmatory performance testing for D/F would be required mid-way between the cycle required for comprehensive performance testing to determine if the source is continuing to meet the emission standard. The Agency is proposing such testing only for D/F given: (1) the health risk posed by D/F; (2) there is no CEMS for D/F; (3) there is no feedrate limit of a material that directly and unambiguously relates to D/F emissions (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 D/F emissions even though the source stays in compliance with applicable operating limits.

Confirmatory testing differs from comprehensive testing, however, in that the source would be required to operate under normal, representative conditions during confirmatory testing. This would reduce the cost of the test while providing the essential information because the source would not have to establish new operating limits based on the confirmatory test.

a. Definition of Normal Operating Conditions. Normal operating conditions would be defined as operations during which: (1) the CEMS

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[175] Note, however, that § 63.6(i) applies to an entirely different situation: extension of time for initial compliance with the standard whereby performance testing is conducted after the date of compliance.

that measure parameters that could relate to D/F emissions—PM, CO, HC—are recording emission levels within the range of the average value for each CEMS (the sum of all one-minute averages, divided by the number of one minute averages) over the previous 12 months to the maximum allowed; and (2) each operating limit established to maintain compliance with the D/F emission standard (see discussion in Part Five, section II.C.1) is held within the range of the average values over the previous 12 months and the maximum or minimums, as appropriate, that are allowed. The Agency believes it is necessary to define normal operating conditions in this manner because, otherwise, sources could elect to limit levels of the regulated D/F operating parameters (e.g., hazardous waste feedrate, combustion chamber temperature, temperature at the inlet to the dry PM control device) to ensure minimum emissions. Thus, without specifying what constitutes normal conditions, EPA believes the confirmatory test could be meaningless. On the other hand, the proposed definition of normal conditions is broad enough to allow the source flexibility in operations during the test.

When conducting the confirmatory performance test for D/F, sources must also operate under representative conditions for the following parameters to ensure that emissions are representative of normal operating conditions: (1) 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 D/F emission standard; and (2) cleaning cycle of the PM control device (e.g., ESP rapping cycle).

Finally, when conducting the confirmatory test for D/F, the source would also be required to conduct a performance evaluation of the CMS that are required to maintain compliance with the D/F emission standard.

b. Frequency of Testing. Large and off-site sources would be required to conduct confirmatory performance testing 18 months after the previous comprehensive performance test. Small, on-site sources would be required to conduct the testing 30 months after the previous comprehensive performance test. The same 2-month testing window applicable for comprehensive tests would also apply to confirmatory tests.

c. Agency Oversight, Notification of Performance Test, Notification of Compliance, Time Extensions, and Failure to Submit a Timely Notice of Compliance. The requirements that would apply to comprehensive tests would also apply to confirmatory tests.

d. Failure of a Confirmatory Performance Test. When a source determines (e.g., based results of analysis of samples taken during manual stack sampling) that it has failed the D/F emission standard, it would have violated the rule. The source would be required to immediately stop burning hazardous waste. If, however, a source had conducted the comprehensive performance test under two or more modes of operation and met the D/F emission standards during confirmatory testing when operating under one or more modes of operation, it would be allowed to continue burning under the modes of operation for which it has met the standards.

For sources that fail one or more emission standard during all modes of operation tested, the rule would require the source to modify design or operation of the unit and conduct a new comprehensive performance test to demonstrate compliance with the D/F emission standard and establish new operating limits. Further, prior to submitting a notification of compliance based on the new comprehensive performance test, the source could burn hazardous waste only for a total of 720 hours, and only for purposes of informal pretesting or comprehensive performance testing.

B. RCRA Trial Burns

HWCs are also subject to the existing permit requirements under RCRA that are established at 40 CFR Parts 264, 266, and 270. Those rules require HWCs (among other things) to conduct a trial burn to demonstrate compliance with applicable emission standards. Operating conditions are included in the permit to ensure that compliance is maintained.

We are proposing to amend those rules today to refer to the proposed MACT requirements. Thus, the existing RCRA emission standards and ancillary requirements would be superseded by the proposed MACT standards, with one exception: destruction and removal efficiency (DRE).

1. The RCRA DRE Requirement Would Be Implemented Under RCRA Authority

The destruction and removal efficiency (DRE) requirement under the RCRA standards would continue to apply to all HWCs. Although the DRE requirement, which is statutory for incinerators, RCRA § 3004(o)(1)(B), could be proposed as a MACT surrogate parameter to minimize organic HAPs by ensuring good combustion, we are not doing so. This is because the DRE standard is complex and impracticable to self-implement.[176] Consequently, the Agency would continue to apply the DRE standard under RCRA authority alone.

2. Coordinating Trial Burns and MACT Performance Tests

As discussed above, the rule would allow a source to consolidate a trial burn test with a comprehensive or confirmatory test if the trial burn test were conducted within a year after the anniversary date for the MACT performance test.[177] If the tests are consolidated, however, the unified test must of course satisfy the objectives of both tests.

We note that the level of Agency oversight for trial burns is substantially greater than the oversight that might be provided for MACT performance tests. Accordingly, as current practice, the Agency's implementation procedures for trial burns will deviate from those proposed for the MACT performance tests. As examples, the Agency will require that the test plan be submitted more than 60 days in advance of the planned trial burn test, and extensive public participation will be provided for review of the test plan, test results, and determination of operating limits.

C. Waiver of MACT Performance Testing for HWCs Feeding De Minimis Levels of Metals or Chlorine

Today's rule would provide a waiver of performance testing requirements for Hg, SVM, LVM, or HCl/Cl_2 for HWCs that feed *de minimis* levels of these metals or chlorine.[178]. Under the waiver, a source would be required to assume that all Hg, SVM, LVM, or chlorine fed in each feedstream is emitted from the stack and to document that resulting emission concentrations do not exceed the emission standards, considering stack gas flow rate. Thus, the source would be required to: (1) establish and comply with maximum feedrate limits for total feedstreams for Hg, SVM, LVM, or chlorine; and (2) establish and comply with, as a minimum stack gas flow rate, the flow rate used to document compliance (by calculation

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[176] We note that, for this reason, the Agency chose not to require BIFs operating under interim status to comply with the DRE standard even though they were subject to all other emission standards that would be applicable under a operating permit.

[177] If the trial burn were scheduled prior to the performance test, the source could elect to consolidate the tests and, thus, move up the anniversary date for the performance test.

[178] Note that the term *de minimis* means simply low concentration of metals or chlorine. It does not denote or imply low risk.

rather than emissions testing) with the emission standard.

To accommodate sources that may operate under a wide range of gas flow rates, the rule would allow a source to establish different modes of operation with corresponding minimum stack gas flow rate limits and maximum feedrates for metals or chlorine. If a source uses this approach, the operating record must clearly identify which operating mode is in effect at all times.

Sources claiming the waiver would be required to do so in the initial notification of performance test and would not be required to establish or comply with operating limits for the performance test (i.e., Hg, SVM, LVM, or HCl/Cl_2) for which the waiver is claimed. Sources eligible for a waiver from the Hg standard would not be required to install a Hg CEMS.

D. Relative Accuracy Tests for CEMS

This section describes the testing requirements for CEMS proposed today. Note that CEMS for multi-metals, HCl, and Cl_2 are proposed to be optional. Facilities need not perform tests described below for CEMS they elect not to use.

A relative accuracy test audit (RATA) for Hg and multi-metal CEMS would be required every three years (or five years for small on-site facilities). RATAs for CO and O_2 CEMS would be required annually.[179] RATAs for Hg and multi-metals involve comparing the output of the CEM to the results of manual method tests in order to determine the overall accuracy of the CEM and would be conducted in conjunction with a comprehensive test. RATAs for CO and O_2 would be conducted during a comprehensive test or on the anniversary date of the previous comprehensive test.

A relative calibration audit (RCA) for PM CEMS would be required every 18 months (30 months for small on-site facilities). These are similar to a RATA in that they involve comparing the output of the CEM to the results of manual method tests in order to verify the validity of the CEM and its calibration, and would be conducted whenever a comprehensive or confirmatory test is performed.

An absolute calibration audit (ACA) is a test which determines the calibration error (CE) associated with a CEM. These audits do so by challenging the analyzer using gas bottles or solutions of metals or particulate with known concentrations of the compound being analyzed. ACA's are conducted quarterly for all CEMS except for multi-metals, which are conducted annually.

Calibration drift (CD) and zero drift (ZD)[180] tests are conducted daily using cylinder gas bottles, filters, or internal (to the CEMS) calibration standards.

IV. Selection of Manual Stack Sampling Methods

This section discusses the manual emission test methods that would be required for emission tests and calibration of CEMS and relies heavily on the BIF methods currently in Part 266, Appendix IX. EPA previously proposed incorporating many of these methods in SW–846, *Test Methods for Evaluating Solid Wastes* (60 FR 37974, July 25, 1995). Accordingly, both the BIF and proposed SW–846 numbers are given.

The emission test method for D/F would be the proposed SW–846 Method 0023A (60 FR 37974, July 25, 1995). It is identical to the BIF Method 23 in Appendix IX of Part 266 except Method 0023A requires that collection efficiencies be determined for both the particulate and sorbent. BIF Method 23 is the same as the Air Method 23 in Part 60, Appendix A. Method 23 determines the efficiency off the sorbent only and assumes the same recovery off the particulate as from the sorbent. We are also proposing today to make a conforming change to the BIF rule to require use of Method 0023A rather than Method 23.

It is proposed that BIF Method 0012 (SW–846 method 0060) be used as the manual method test for Hg. The proposed manual emission test method for the SVM and LVM standards is BIF Method 0012 contained in section 3.1 of Appendix IX, Part 266 (SW–846 method 0060). This method is also commonly known as Air Method 29.

For compliance with the HCl/Cl_2 standard, the rule would use BIF Methods 0050, 0051, and 9057 contained in section 3.3 of Appendix IX, Part 266, as the manual test method (SW–846 would retain the same numbering). These methods are commonly known as Air Method 26A, found in Appendix A of Part 60.

Existing § 63.7 describes procedures for allowing the use of alternative test methods for MACT sources. This procedure involves using Method 301 of Part 60, Appendix A, to validate the proposed method. The data from the Method 301 validation is submitted to EPA. EPA then decides if the proposed method is acceptable. Absent this approval under § 63.7 procedures, alternate methods cannot be used.

V. Notification, Recordkeeping, Reporting, and Operator Certification Requirements

Today's proposed rule would establish several notification, recordkeeping, and reporting requirements for HWCs. This section discusses the applicability to HWCs of existing requirements in §§ 63.9 and 63.10 and Parts 264, 265, 266, and 270. In addition, we discuss in this section new requirements that would apply specifically to HWCs. Finally, we discuss whether operator certification requirements should be promulgated.

A. Notification Requirements

HWCs would be required to submit the following notifications:

- Initial notification. The initial notification requirements of existing § 63.9(b) would apply. These notifications are intended to alert regulatory officials that a source is subject to the regulations. Even though all existing HWCs have already notified the Administrator of their hazardous waste activities under RCRA requirements, and new HWCs must notify the Administrator and obtain an operating permit before commencing construction, these RCRA-required notifications will not always be received by the same regulatory officials implementing the MACT standards. For example, when a state is authorized for Title V permitting, various state regulatory authorities, including local air boards, could be the implementing authority. In contrast, RCRA regulations are implemented by Agency and state officials. Accordingly, to ensure that all appropriate regulatory officials are apprised that a HWC is subject to the MACT and RCRA regulations, we are proposing to retain the initial notification requirement under § 63.9(b).
- Notification of performance test and CMS performance evaluation. This notification includes the planned test date, performance test plan (to demonstrate compliance with emissions), CMS performance evaluation plan, and quality assurance plan. It is required by existing § 63.9(c), except that all sources must submit their test plan and CMS performance evaluation plan for review and approval.
- Notification of compliance. This notification includes results of performance test and CMS performance evaluation and certification by the owner and operator that the source is in compliance with the applicable

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[179] Note that EPA invites comment on waiving the RATA requirements for CO and O_2, instead relying on quarterly calibration error tests using cylinder gasses.

[180] Note that EPA invites comment on whether the ZD requirements should be deleted.

standards. It is similar to that required by existing § 63.9(h) with several important differences. Under today's rule, a source must notify that it is actually in compliance with all applicable standards, not merely identify its status with respect to compliance as allowed by § 63.9(h). In addition, paragraphs (h)(2) (D) and (E) requiring the source to identify the type and quantity of pollutants emitted and an analysis of whether the source is a major or area source are not applicable to HWCs. This is because today's proposed rule would apply to all HWCs irrespective of whether it meets the definition of a major source. Finally, today's rule would require the notification to be submitted 90 days after completion of testing, rather than 60 days as now required by paragraph (h)(2)(ii).

- Request for extension of time to submit a notification of compliance. A notification for a time extension for initial compliance is provided by § 63.9(c). Today's rule would require sources to submit a notification of compliance after each performance test (both comprehensive and confirmatory) and allow requests for time extensions to submit those notifications.
- Request for a time extension to consolidate a performance test with a trial burn. Today's rule would allow a source to request to consolidate a trial burn with a performance test if the trial burn test date is no later than 12 months after the performance test anniversary date.

To summarize applicability of existing § 63.9 notification requirements and to assist the regulated community in understanding the applicable requirements, the following list is provided as guidance:

- Paragraph (a) (Applicability and general information) applies.
- Paragraph (b) (Initial notifications) applies as discussed above.
- Paragraph (c) (Request for extension of compliance) applies for the purposes discussed above.
- Paragraph (d) (Notification that source is subject to special compliance requirements) applies.
- Paragraph (e) (Notification of performance test) applies as discussed above.
- Paragraph (f) (Notification of opacity and visible emission observations) is not applicable because the rule would establish a PM emission standard and other compliance/monitoring requirements in lieu of opacity and visible emission standards.
- Paragraph (g) (Additional notification requirements for sources with CMS) applies.
- Paragraph (h) (Notification of compliance status) applies with the caveats discussed above.
- Paragraph (i) (Adjustments to time periods or postmark deadlines for submittal and review of required communications) applies.
- Paragraph (j) (Change in information already provided) applies.

The rule would require the following additional notification requirements:

- Small quantity on-site burner exemption. See discussion in Part Six, Section II.A.1.
- Pre-trial burn period (shakedown). See discussion in Part Six, Section II.F.1.

B. Reporting Requirements

HWCs would be required to submit the following reports:

- Excessive AWFCO report. See discussion in Part Five, Section II.E.1.
- ESV opening report. See discussion in Part Five, Section II.E.1.

For guidance to the regulated community, the applicability of the existing reporting requirements under §§ 63.10(d) (General reporting requirements), 63.10(e) (Additional reporting requirements for sources with CMS), and 63.10(f) (Waiver of recordkeeping or reporting requirements) would be as follows:

- Paragraph (d)(1) applies. This paragraph references the reporting requirements in the specific standards for a source category, in this case proposed Subpart EEE.
- Paragraph (d)(2) (Reporting results of performance tests) applies, except that the report may be submitted up to 90 days after completion of the test.
- Paragraph (d)(3) (Reporting results of opacity or visible emission observations) does not apply because the rule would not regulate opacity or visible emissions.
- Paragraph (d)(4) (Progress reports) applies.
- Paragraph (d)(5) (Periodic startup, shutdown, and malfunction reports; and immediate startup, shutdown, and malfunction reports) does not apply. Given that HWCs could not burn hazardous waste under the proposed rule except in compliance with all applicable emission standards, operating limits, and CMS performance specifications, the rule would not require a startup, shutdown, and malfunction plan as required by § 63.6(e)(3) for other MACT sources. There will be no excess hazardous waste emissions during these periods (unless the HWC violates the standards) and the Agency does not need information about how quickly a HWC is able to correct a malfunction or come back into compliance again so that it may resume hazardous waste burning.[181]
- Paragraph (e)(1) (General) applies.
- Paragraph (e)(2) (Reporting results of CMS performance evaluations) applies.
- Paragraph (e)(3) (Excess emissions and CMS performance report and summary report) does not apply because HWCs cannot burn hazardous waste except in compliance with all applicable standards.
- Paragraph (e)(4) (Reporting continuous opacity monitoring system data produced during a performance test) does not apply because COMs are not required in this proposal.
- Paragraph (f) (Waiver of recordkeeping or reporting requirements) would not apply because the bases for considering the waiver are not relevant to HWCs as follows: (1) Recordkeeping and reporting should not be waived because ''the source is achieving the relevant standards'' because recordkeeping and reporting would be the primary means of compliance assurance for the HWC rules; (2) recordkeeping and reporting should not be waived during a time extension because the requirements would not apply until a HWC submitted the initial notification of compliance irrespective of whether a time extension were granted; and (3) recordkeeping and reporting should not be waived if a time extension is granted for a subsequent notification of compliance (because the source will be burning hazardous waste under the standards).

C. Recordkeeping Requirements

Existing § 63.10(b)(1) requires MACT sources to keep the records discussed below for at least five years from the date of each occurrence, measurement, maintenance, corrective action, report, or record. At a minimum, the most recent two years of data must be retained off-site. The remaining three years of data may be retained on site. Such files may be maintained on: microfilm, a computer, computer floppy disks, optical disk, magnetic tape, or microfiche.

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[181] One exception to this is the operation of cement kilns when the hazardous waste feed has been cut off and there is no hazardous waste remaining in the combustion chamber. In this situation, the HWC emission standards, operating limits, and CMS performance specifications would not apply. Given that the Agency plans to propose MACT standards for cement kilns that do not burn hazardous waste, however, a cement kiln that is temporarily not subject to today's proposed standards because the waste feed has been cutoff (and there is no hazardous waste remaining in the combustion chamber) would nonetheless remain (or become) subject to any MACT standards the Agency may promulgate.

1. Information Required in the Operating Record

The rule would require HWCs to record the following in the operating record:

- Comprehensive test results used to determine operating limits. See discussion in Part Five, Section II.B.
- All operating parameter limits established. See discussion in Part Five, Section II.C.
- Operating data which substantiates compliance, including minute-by-minute operating parameter data, including feedstream; and minute-by-minute CEM data. See discussion in Part Five, Section II.B.
- Documentation for performance test waiver. See discussion in Part Five, Section III.C.
- Description of and operating data substantiating compliance with provisions to limit combustion fugitive emissions. See discussion in Part Five, Section II.D.
- For each occurrence of an exceedance of a CEM or operating parameter limit, including what operating parameter of CEM limit was violated: the cause of the violation, and what corrective action was taken to ensure the violation will be prevented in the future. See discussion in Part Five, Section II.E.1.
- For each ESV opening: documentation that the ESV opened, the reason for the opening, and corrective measures taken to minimize the frequency of openings. See discussion Part Five, Section II.E.2.
- ESV operating plan. See discussion Part Five, Section II.E.2.
- CEM quality assurance document, including: definition of compliance with the calibration and zero drift specifications, and how relative accuracy and absolute calibration audits will be performed. See discussion Part Five, Section II.F.1.
- Feedstream Analysis Plan, including: the parameters for which each feedstream will be analyzed to ensure compliance; whether the owner or operator will obtain the analyses by performing sampling and analysis or by other methods; how the analysis will be used to document compliance; the test methods used; the sampling method used; and the frequency of testing. See discussion in Part Five, Section II.F.2.
- Other Continuous Monitoring Systems (CMS), including: manufacturer's written specifications for installation, operation, and calibration of a CMS; and technical specifications of CMS, such as spans and percent error. See discussion in Part Five, Section II.F.3.

In addition, HWCs would be required to develop and keep in the operating record a feedstream management plan that enables the source to maintain compliance with CEM-monitored emission standards. Although a facility using a CEM for compliance would not be required to comply with feedrate limits, the owner and operator would be required to develop a feedstream management plan (and include it in the operating record) that will enable the source to know the feedrate in all feedstreams of Hg (as well as other metals and chlorine if the source elects to use a CEM for compliance monitoring) at all times to minimize automatic waste feed cutoffs and exceedances of the emission standard. Knowledge of Hg (and other metals and chlorine) concentration of feedstreams can come from the waste generator, supplier, or other information, and need not be obtained by sampling and analysis by the burner. If the source experiences frequent AWFCOs or exceedances, enforcement officials will determine if a feedstream management plan is in place. If the plan is determined to be inadequate, the Director may require that it be upgraded, taking into account whether a good faith effort has been made to develop a plan, even if the plan is determined to be inadequate.

Note that RCRA/HSWA already requires the facility owner to certify no less than annually, that the facility has a waste minimization program in place, and the certification must be maintained in the facility's operating record. The facility owner is encouraged to coordinate the development of the feedstream analysis plan and the feedstream management plan with the facility's waste minimization program. EPA published Interim Final ''Guidance to Hazardous Waste Generators on the Elements of a Waste Minimization Program in Place,'' (1993) and the ''Pollution Prevention Facility Planning Guide'' (1993), which provide information to facility owners on how to prepare analyses of waste streams and options for reducing wastestreams using alternative pollution prevention/waste minimization measures. Information on these documents can be requested by calling the RCRA hotline at 1–800–424–9346.

Many states provide free pollution prevention/waste minimization technical assistance that may aid facilities in the development of pollution prevention/waste minimization plans. At least 20 states have requirements for certain facilities to prepare pollution prevention/waste minimization plans. As noted elsewhere in today's rule, facilities can get further information on available technical assistance by contacting the National Pollution Prevention Roundtable in Washington, D.C. at (202) 466–7272, or from Enviro$ense, an electronic library of information on pollution prevention, technical assistance, and environmental compliance, that can be accessed by contacting a system operator at (703) 908–2007, via modem at (703) 908–2092, or on the Internet at http://wastenot.inel.gov/enviro-sense.

2. Applicability of § 63.10 Recordkeeping Requirements

The applicability of the existing recordkeeping requirements of § 63.10 would be as follows:

- Paragraph (a) (Applicability and general information) applies, except for (a)(2) that exempts sources that are operating under a compliance extension. This is because sources that receive a time extension to submit the initial notification of compliance would not be subject to any of the proposed standards. Further, sources that receive an extension for a subsequent notification of compliance need to comply with recordkeeping and reporting requirements to provide compliance assurance given that they are burning hazardous waste during the extension.
- Paragraph (b) (General recordkeeping requirements) applies, except for (b)(2) (iv)–(vi) that pertain to actions during malfunctions, and (b)(3) regarding recordkeeping for applicability determinations.
- Paragraph (c) (Additional recordkeeping requirements for sources with CMS) would apply, except for (c)(6)–(8), (c)(13), and (c)(15) that pertain to malfunctions.

3. New Recordkeeping Requirements

The rule will also require recordkeeping requirements for the following:

- Comparable fuels. Sampling and analysis plan, including revisions; and certifications from burners. Under § 261.4 records will be kept for as long as the generator manages a comparable fuel, plus five years. See discussion in Part 6, Section I.E.6.
- Comparable fuels. Results of sampling and analysis; and records of off-site shipments for five years. See discussion in Part 6, Section II.E.6.
- Small quantity on-site burner exemption. Under § 266.108, records will be kept for 3 years. See discussion in Part Six, Section II.D.
- Regulation of residues. Under § 266.112, records will be kept until

closure. See discussion in Part Six, Section II.D.

D. Operator Certification

The Agency notes that section 129 of the Clean Air Act requires EPA to develop and promulgate a model program for the training and certification of municipal waste combustor (MWC) and medical waste combustor (MWI) operators. Accordingly, the Agency has promulgated operator certification and training requirements for MWCs and has proposed requirements for MWIs. The Agency is today requesting comment on whether similar requirements are necessary and appropriate for operators of HWCs.

The MWC and MWI requirements call for (in part) full operator certification of all shift supervisors and chief facility operators by the American Society of Mechanical Engineers (ASME) or a State certification program. In addition, a least one of the following persons is required to be on duty at all times during which the unit is combusting waste: a fully certified chief facility operator; a fully certified shift supervisor; or a provisionally certified control room operator.

We note that the ASME has recently established a Standard for the Qualification and Certification of Hazardous Waste Incinerator Operators (ASME QHO–1–1994, January 31, 1995). We request comment on whether: (1) operator certification requirements are necessary for HWCs; and (2) the ASME standard, or an equivalent State certification program) is appropriate and sufficient

The ASME standard has been developed specifically for hazardous waste incinerators. We are not aware of an equivalent standard for operators of cement kilns and lightweight aggregate kilns that burn hazardous waste. We note, however, that the Cement Kiln Recycling Coalition has stated that it is committed to the development of an operating training and certification program for its member facilities.[182] We invite comment and information from owners and operators of waste-burning kilns regarding the need for a certification standard and the status of development of a standard for such combustors.

VI. Permit Requirements

The rulemaking approach in today's proposal, to promulgate final standards under joint RCRA/CAA authority, raises some challenging implementation questions. In this section, permitting strategies are discussed. EPA requests comment on how these strategies can be further simplified while retaining basic environmental protection goals.

A. Coordination of RCRA and CAA Permitting Processes

The rulemaking approach chosen for today's proposal is to promulgate the final standards for hazardous waste combustors under joint RCRA/CAA authority. However, the standards will only appear under 40 CFR Part 63 (Clean Air Act section). The RCRA regulations in 40 CFR Parts 264 and 266 will make reference to these Part 63 standards, thereby incorporating them as RCRA standards as well. Thus, legally, the new standards will be part of both the RCRA and CAA regulations and both regulatory programs (RCRA & CAA) will have an obligation to address these standards in permits issued under their authority.

Although the Agency believes that a single permit would be ideal to implement these two programs, today's proposed approach does not always eliminate the need for two separate permits. However, it does provide a variety of options for State implementation. By using both the CAA and RCRA authorities, today's approach provides maximum flexibility for permitting authorities at the Regional, State, and/or local levels to coordinate the issuance of permits and enforcement activities in the way which most effectively addresses their particular situation.

Currently, combustion facilities are required to obtain two permits; a RCRA permit and a CAA permit. Although it is EPA's long term goal is to have one permit that would address both RCRA and CAA requirements, it is difficult because (1) different pieces of the rule rely on different authorities, and (2) significant coordination is needed between Regional, State, and local authorities. After careful consideration, EPA's goal in today's proposal is to coordinate as much as possible between the two permitting programs to avoid duplication of effort, inconsistent requirements, and redundant procedures.

EPA explored the possibility of requiring combustion facilities to have only one EPA permit issued under either RCRA authority or CAA authority. Promulgating these standards in the CAA regulations and requiring only a CAA permit looked promising because RCRA allows EPA to defer RCRA regulation to other authorities administered by EPA, if RCRA core values are covered by the other federal requirements (RCRA Section 1006(b)(1)), in this case, the CAA. However, EPA believes that several RCRA core requirements (e.g., corrective action, omnibus conditions, DRE, etc.) cannot be addressed in a CAA permit, since the CAA does not provide the legal authority to address them.

Promulgating these requirements under RCRA authority and issuing only a RCRA permit is not possible because the CAA does not allow permits for major sources to be waived. As previously discussed, all facilities covered by this rulemaking will be considered major sources. Also, CAA specific concerns (e.g., acid rain, criteria pollutants, etc.) would not be addressed in a RCRA permit.

EPA considered placing the revised air emission standards in the CAA regulations and including a RCRA permit-by-rule provision that would defer to the CAA permit. Under this option, the CAA regulations would contain the air emission requirements and the CAA permit would contain the emission standards. In addition, a separate RCRA permit would address RCRA-specific concerns (e.g., corrective action, omnibus conditions, DRE, storage, etc.). This approach would avoid duplicating air emission requirements in both permits. EPA is not proposing regulatory language that would require this approach because there is concern that it might limit the permitting flexibility of the implementing agencies by specifying which program would be required to address air emissions. Some states have expressed concerns about this approach. Many states—for example, those that regulate air emission standards under their hazardous waste program—may find it difficult to implement this option; also, some states were concerned about the ability of local permitting programs being solely responsible for the air emissions permitting for these facilities. On the other hand, the flexibility EPA is suggesting in today's proposal would not preclude states from using this permitting approach.

More broadly, EPA has not specified any one permitting approach in today's proposal. The flexibility the Agency is proposing would allow states to decide which permitting approach to take. The important things are that all substantive requirements are met and that a timely and full opportunity for public involvement is provided during the permitting process.

EPA has identified a range of possible permitting scenarios under today's proposed approach. Some examples of

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[182] Letter from Craig Campbell, CKRC, to Ronald Bastian, Chairman, ASME QHO, dated January 5, 1994.

coordinated efforts between the RCRA and CAA programs include: (1) issuing a single permit using both (or either) RCRA and CAA authority, and (2) issuing two separate permits with close coordination between the two programs.

In the first example, the two permitting programs would work together to issue one permit that meets all the requirements of both programs. This joint permit would include CAA-specific items (e.g., acid rain, criteria pollutants, etc.), RCRA-specific items (e.g., corrective action, omnibus conditions, DRE, etc.), and items common to both programs (e.g., air emission standards, etc.). The permit would be issued under joint authority and signed by the Director(s) of both programs. This scenario is likely to be most appropriate where a State has authority for both programs and the two programs have experience working together. This approach could also be implemented by using the CAA in combination with the RCRA permit-by-rule provision as discussed above.

In the second example, the two permitting programs (one responsible for RCRA, and one responsible for CAA) would coordinate their permitting efforts. Each program would issue a permit. The requirements common to both programs (e.g., stack emission standards, etc.) would be included in one permit and the other permit would incorporate the common requirements by reference. This approach would avoid duplicative and conflicting requirements. In this example, each permit would go through the applicable procedures for issuance. To coordinate permit issuance, all public participation requirements (notices, comments, hearings, etc.) could be combined. Under this approach permits would be subject to applicable appeal procedures and enforcement provisions under each program; however, EPA would not expect to enforce under both permits. The appropriate enforcement response will be determined on a case-by-case basis. We invite comment on this point in particular.

EPA will work with the States to identify issues relating to streamlining the permitting programs and to develop any needed guidance materials or model processes. Additionally, EPA will continue to pursue a mechanism to issue one permit that would address both RCRA and CAA requirements.

An Agency-wide initiative led by the Permits Improvement Team (PIT) has recommended ways to improve permitting activities for all environmental programs. Under this initiative EPA continues to seek the best ways to permit facilities throughout its various media programs. The approach in today's proposal is consistent with the current direction of the PIT, which suggests avoiding duplication of effort by incorporating the air emission standards into one permitting program. EPA is committed to harmonizing these two permitting processes as much as possible for the implementation of today's proposal.

B. Permit Application Requirements

EPA reviewed information required for permit applications under both the CAA (§ 70.5) and RCRA (Part 270) to identify any duplication that could be eliminated and to determine whether any CAA or RCRA permit application requirements for hazardous waste combustors could be combined. Historically, determinations for permit approval for facilities regulated under the CAA generally focused solely on the efficiency of the air pollution control device (APCD). Conversely, the basis for permit approval under RCRA has traditionally been more specific and related to details of the combustion unit and process (for example, design characteristics of the unit, variability of the waste burned, information on the type of waste to determine the effect it may have on the quality of the operation of the unit over time, etc.). Specific information requirements are listed in §§ 270.15–270.26 (see specific technical information requirements in § 270.19 for incinerators and § 270.22 for BIFs). For these reasons, EPA has concluded that the current Part B information requirements and the information requirements in the CAA regulations are not duplicative and is proposing that both be retained under the existing regulations to assure that all RCRA and CAA concerns are addressed.

Although some of the general information required under § 270.13, Contents of Part A of the RCRA permit application, is also requested in § 70.5 of the CAA permit application requirements, EPA believes that because this information is so minimal, it would not be a burden for the applicant to duplicate it on two separate applications. Section 270.13 requires further information under the Part A, such as a scale drawing of the facility showing the location of all past, present, and future TSD areas, specifications of the hazardous waste listed or designated under 40 CFR Part 261 to be handled at the facility and a list of all permits or construction approvals received or applied for under other programs, to list a few. In addition, standards relating to the overall operation of the facility are listed under Part B (§ 270.14). These standards include, but are not limited to, chemical and physical analyses of the hazardous waste and hazardous debris to be handled at the facility, description of the security procedures, contingency plans, closure and post-closure plans (including cost estimates) and a description of the continuing training programs. Such standards are not required in the application for a CAA permit. EPA has therefore concluded that it would be reasonable to keep the application requirements where they now exist and cross-reference them where appropriate.

C. Clarifications on Definitions and Permit Process Issues

Because of the incorporation of the technical standards into both the RCRA and CAA regulations, as described previously, both RCRA and CAA permitting procedures are applicable. For issues such as the meaning of the term ''construction'', there could be confusion since the definitions and interpretations under one Act differ from those under the other. Our intent is not to reconcile these issues on a national basis but to continue to let both apply. As in the past, sources regulated under both Acts will need to coordinate with both RCRA and CAA permitting authorities to see how these procedures apply to them. We note in passing that this approach means that the most restrictive limitations or processes will generally govern.

The Agency requests comment on whether these issues should be addressed at the national level. EPA's current preference is not to do so, but to leave flexibility for the states and EPA Regions to address these issues.

1. Prior Approval

RCRA and CAA are similar in that both require EPA approval before construction or reconstruction of a facility (generally) (Sections 61.07, 63.5, 270.10(f)). Both programs use hypothetical emissions data to make the construction approval decision. If a facility is existing before the effective date of the final regulation, both RCRA and CAA require notification of operation but do not require approval of the construction that has already occurred (Sections 60.7, 266.103(a)(1)(ii)). (Modification of a permitted facility also requires prior approval.)

2. 50 Percent Benchmark

RCRA and CAA both classify a modification of a facility that costs more than 50 percent of the replacement cost of the facility as ''reconstruction''. However, the significance of this term is different under the two statutes. Under

RCRA, the issue of reconstruction is relevant to interim status facilities. An interim status facility planning modifications which constitute reconstruction must receive a RCRA permit prior to construction of the modifications and operation (§ 270.72(b)). Under the CAA, reconstruction subjects the facility to standards applicable to new facilities (§§ 60.15, 60.488, and 63.5).

3. Facility Definition

RCRA and CAA define ''facility'' differently. This definition has bearing in determining the value of the facility with respect to the 50 percent rule on modifications just discussed. CAA defines facility as the entire industrial process at the site (profit making productive process and pollution control devices), while RCRA for purposes of reconstruction refers to a ''comparable entirely new hazardous waste facility'' (Section 270.72) excluding other industrial processes at the site from consideration in the cost of the existing facility. For a site where the only activities are RCRA hazardous waste activities, the two definitions are identical. However, sites with non-RCRA industrial activities will have differing cost figures for each rule. Therefore, the two programs have differing determinations of how much reconstruction can occur before the 50 percent benchmark is exceeded. However, EPA believes this difference should not constitute a problem, since the reconstruction determination has different applications under each Act. 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 new versus existing MACT standards.

4. No New Eligibility for Interim Status

This joint CAA/RCRA proposed rulemaking revises emission standards for incinerators and BIFs and hence amends the original incinerator and industrial furnace rules that were finalized in 1981 and 1991, respectively. Because these rules established the date on which incinerators and BIFs were first subject to a permit requirement, the effective dates of those rules created the only opportunity for interim status eligibility. § 270.10(e)(1)(A)(ii). The interim status windows that occurred in 1981 and 1991 thus will not and legally cannot be modified by this rule. Of course, facilities currently burning wastes that become newly listed under other, future rules would still be able under existing law to qualify for interim status (§ 270.42(g)).

To avoid the possibility that readers of Part 63 might be unaware of their obligations under RCRA, EPA has inserted a note into Section written Section 63.1206 to alert them to this point. This note states: ''an owner or operator wishing to commence construction of a HWI 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. Please see 40 CFR Part 270.''

5. What Constitutes Construction Requiring Approval

RCRA and CAA both have restrictions requiring approval prior to construction. The definition of construction under the RCRA regulations and associated interpretations differ from the CAA approach to defining construction (case-specific call, see Sections 60.5, 61.06) Facilities need to comply with both and should be consulting with applicable permitting authorities to assure appropriate site-specific interpretations. We believe the RCRA construction definition is generally broader (more restrictive) and thus will govern in most cases. The Agency believes retaining the two differing definitions will not cause problems since they are already being applied concurrently. Also, the Agency feels that creating a third construction definition for this small subset of the RCRA and CAA facilities would create more confusion than it would eliminate.

D. Pollution Prevention/Waste Minimization Options

EPA believes pollution prevention/waste minimization measures may provide facilities additional flexibility in meeting MACT standards. Pollution prevention/waste minimization measures have been used by many companies to modify processes and install new or improved technologies which reduce or eliminate the volume and/or toxicity of hazardous wastes generation that would otherwise enter combustion unit feedstreams, or be treated or disposed of in some other fashion. EPA is soliciting comment on two pollution prevention/waste minimization options for reducing or eliminating hazardous constituents that enter on-site as well as commercial combustor feedstreams, and that can be considered in the definitions of changes in facility operating parameters and/or new or improved control technologies for meeting MACT standards.

The first option would require all facilities to provide adequate information on alternative pollution prevention/waste minimization measures that reduce hazardous constituents entering the feedstream, particularly the most persistent, bioaccumulative, and toxic constituents, in all permit applications. EPA believes this approach is consistent with the national policies of the Pollution Prevention Act of 1990, CAA, RCRA, and over 20 states who encourage or require pollution prevention plans. Facilities are encouraged to reference existing EPA documents, such as the Interim Final ''Guidance to Hazardous Waste Generators on the Elements of a Waste Minimization Program in Place,'' (May 1993), which provides a guide for developing pollution prevention/waste minimization programs. Facilities are also encouraged to reference EPA's ''Pollution Prevention Facility Planning Guide'' (May 1992), ''An Introduction to Environmental Accounting As A Business Management Tool'' (June 1995), and ''Setting Priorities for Minimization of Combusted Hazardous Waste'' (November 1995), and to contact the National Pollution Prevention Roundtable, and state pollution prevention technical assistance programs for additional pollution prevention resources. These documents were published as aides to facility owners in preparing analyses of pollution prevention/waste minimization measures. EPA believes this approach provides maximum flexibility to facilities for identifying controls through the application of processes, or systems (including pollution prevention/waste minimization measures) for reducing emissions.[183]

EPA believes in many cases, facilities may already be required or encouraged to prepare this information in the more than 20 States which have pollution prevention facility planning requirements already in place. EPA believes this approach will promote consistency in States which are requiring facilities to develop pollution prevention/waste minimization plans as a basis for developing multi-media permits. This approach will enhance, without duplicating, the requirements in this proposal for facilities to prepare a feedstream analysis plan and a feedstream management plan. In cases where this information has been already developed by the facility in accord with State requirements within 18 months prior to the date of application, no

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[183] Under the Clean Air Act Section 112(d)(2), MACT standards include, among other things, process changes, substitution of materials or other modifications.

additional pollution prevention/waste minimization information will be required as part of the permit application.

In the second option, EPA proposes to give EPA Regions and States discretion to make case by case determinations regarding whether a facility must provide adequate information for reducing measures, including pollution prevention/waste minimization measures, that will minimize hazardous constituents entering the feedstream. EPA believes this determination should be made based on the facility's ability to verify that they have a waste minimization program in place as required under RCRA, the extent to which the facility has reported pollution prevention information in annual Toxic Release Inventory reports (for facilities subject to TRI reporting requirements), and the extent to which information has already been prepared under existing state pollution prevention planning requirements, or in conjunction with State or local pollution prevention technical assistance programs.

EPA believes this option provides the regulated community and States broad flexibility to integrate existing pollution prevention/waste minimization programs into the objectives of this rulemaking. States, universities and local governments operate over 200 technical assistance programs that work cooperatively with companies to identify waste minimization options to reduce waste generation and management. Some states combine this approach with compliance assistance, and a few have in place enforceable waste minimization requirements ranging from mandatory waste minimization plans to incorporating waste minimization opportunities into permitting, inspection and/or enforcement activities. As noted elsewhere, facilities can contact the National Pollution Prevention Roundtable in Washington, D.C. at (202) 466–7272 for further information on technical assistance opportunities, or Enviro$ense, an electronic library of information on pollution prevention, technical assistance, and environmental compliance. Enviro$ense can be accessed by contacting a system operator at (703) 908–2007, via modem at (703) 908–2092, or on the Internet at http://wastenot.inel.gov/enviro-sense.

E. Permit Modifications Necessary To Come Into Compliance With MACT Standards

This Notice of Proposed Rulemaking would require facilities to come into compliance with a number of new MACT emission standards within three years following final promulgation of this rule. Some facilities would need to perform facility modifications to come into compliance with the MACT standards through changing operating parameters or adding new or improved control technology(ies) to reduce emissions. For example, incinerators that currently operate above the MACT PM emissions standards would potentially need to add or modify electrostatic precipitators (ESP) or baghouses to reduce emissions. Incinerators with a need to reduce dioxin emissions may need to look into establishing better controls on temperature or the use of carbon injection. LWAKs with potential exceedances in acid gas emissions may need to add control technology such as wet scrubbers. These facility changes may need to be added to a facility's existing RCRA permit through a permit modification. The facility, in this case, would need to apply for and receive approval for a permit modification (unless it is a class 1 modification) before commencing with its proposed change(s).

This rule is being proposed under both RCRA and the Clean Air Act Amendments. With regard to coming into compliance with these proposed standards, the Clean Air Act creates a mandatory compliance deadline of three years for facilities subject to these regulations (with a one year allowance for an extension granted on a case-by-case basis). The MACT standards are self-implementing in that they take effect in the absence of a CAA permit. As mentioned earlier in this notice, the Agency is also taking comment on whether it would be appropriate to move up the compliance date of this rulemaking from the proposed three year timeframe following promulgation to a timeframe closer to many RCRA-based regulations, that of six months to a year. The Agency is taking comment, as well, on any other timeframes which can be considered both technically and legally feasible.

However, these sources also hold RCRA permits (or operate under interim status) which likely would have to be modified as a result of efforts to comply with the MACT emission standards. With respect to facilities with RCRA permits, EPA is concerned that these facilities could submit a high number of Class 2 or Class 3 permit modification requests within the three year window before MACT compliance begins. This large influx could potentially lead to difficulties in timely processing of modification requests by EPA or State agencies. As a result, facilities potentially would not have conformed their RCRA permits to reflect the changes needed to meet the MACT standards. The Agency anticipates that many of the permit modification requests will contain either identical or similar proposed changes, given the similarities in incinerator, cement kiln, and LWAK design and operation. Given the large number and the potential for duplication of modification requests, and the desire to achieve timely emissions reductions, the Agency is considering options that will streamline the RCRA permit modification process to ensure that necessary modifications are made expeditiously, particularly in light of the fact that these standards could potentially become effective in a shorter period of time, depending on comments received from the public on this proposed rulemaking.

In today's proposal, we are seeking comment on five main options (referred to as modification options 1–5) which propose various mechanisms to expeditiously authorize changes made to comply with this rule. Also, the Agency is seeking comment on three approaches to address whether EPA or a state would process necessary permit modifications (referred to as implementation approaches 1–3) where a state is authorized to issue RCRA incineration and BIF permits but is not authorized to implement the new combustion rule. This situation should arise only where a state does not adopt the necessary provisions of the new rule within the time required by 40 CFR Part 271.21. EPA strongly urges states to adopt this rule, once finalized, expeditiously in order to streamline the processing of necessary modifications.

This notice seeks comment on which modification option or combination of modification options would be the most viable. The Agency is also taking comment on any combination of the above implementation approaches and options if an intermediate option and implementation approach combination seems more appropriate. Under the current RCRA permit modification scheme, a permitted facility would refer to Appendix I of 40 CFR 270.42 to determine if its proposed modification is classified in the modifications table. A modification may rank as Class 1, 2, or 3 (see 53 FR 37912 (Sept. 28, 1988)). A higher modification class signifies an increased significance of the facility change which is accompanied with a commensurate increase in the level of public participation. Facilities can proceed with most Class 1 changes without notifying the Agency, though some Class 1 modifications require prior Agency approval. Owners and operators must, in all cases, notify the public and the authorized Agency once they have made a Class 1 modification. For cause, the Agency may reject any Class 1 modification.

Class 2 modifications provide for considerably more participation by both the facility and the public including an informational meeting between the owner and the public regarding the owner's request prior to the Agency decision. Class 3 modifications substantially alter the facility or its operations. As a result, they require the most Agency review and are subject to more public participation requirements than a Class 1 or 2 modification, including the full part 124 procedures for processing draft permit decisions.

1. Proposed Options Regarding Modifications

To provide a procedural framework that allows these facilities to make the necessary changes in RCRA permits, the Agency proposes to amend the interim status and permit modification requirements.

a. Modifications During Interim Status. Interim status facilities can make certain facility alterations with fewer procedural hurdles than apply to permitted facilities. However, many changes do require Agency approval. In addition, interim status facilities must adhere to all reconstruction requirements found in 40 CFR Part 270.72 and must revise their Part A permit applications. To ensure that facilities making changes to come into compliance with today's proposed MACT standards are not constrained by the reconstruction limits under § 270.72, the Agency is proposing to add a new sub-section as (b)(8) that would exempt those facilities from the reconstruction limitation. The Agency does not expect that the costs to come into compliance would exceed the 50 percent limit for reconstruction—defined as 50 percent of the cost of a new, comparable hazardous waste management facility. However, since the limit is cumulative for all changes at the interim status facility, there could be cases where this provision could pose problems (e.g., where the facility had invested in a number of prior changes).

b. Permit Modifications. For permitted facilities, EPA's goal is to implement a procedural system which is as streamlined as possible, but still allows for a satisfactory level of public input. The Agency believes that a streamlined process can result in earlier achievement of the more stringent MACT requirements by facilities, leading to more environmentally protective operations. The approach is consistent with general efforts within the Agency to improve environmental permits by focusing on performance standards, rather than on a detailed review of the technology requirements.

The Agency's first, most streamlined option is that the facility would be given overall self-implementing authority (as it has under the CAA) to perform all necessary facility modifications to comply with the new standards without having to obtain a permit modification from either the state or the Agency. This option provides the facility with the greatest latitude and authority since it would allow the facility the opportunity to make changes to its waste management process and to operate under conditions which are different than those which are specified in either the HSWA or base portion of its existing RCRA permit. Under this option, there would be no immediate need for the facility to request a permit modification to incorporate these operating changes into the existing permit. These changes, provided they enable the facility to meet the new CAA standards, would be incorporated into the permit at some later date (e.g. during the permit renewal process). It should be noted that this option does not provide for public participation at the time the facility is altering its process to comply with the new standards. Public involvement would instead occur as part of a later permit action, such as permit reissuance. It would also not provide for State or Federal agency oversight prior to design or operating changes. This option is based on the theory that, so long as the facility is meeting the applicable performance standards, there may be no need to review how it comes into compliance.

The Agency's second modification option would consider all modification requests due to the MACT standards to be Class 1 modifications requiring no prior approval. The basis for this option would be to ensure that facilities are capable of meeting the new standards within the three year compliance window because like Option 1, it relieves the facility of possible delays associated with obtaining prior approval for modifications needed to come into compliance. It also puts substantial compliance responsibility on the facility to make the correct changes within the allotted time.

The Agency's third option, for which rule language has been proposed, would revise Appendix I of 40 CFR 270.42 to designate as Class 1 modifications with prior Agency approval all initial requests for permit modifications made by facilities in order to comply with today's MACT standards. Appendix I of 40 CFR 270.42 would be revised to reflect this classification by adding item L(9) entitled "Initial Technology Changes Needed to Meet MACT Standards under 40 CFR Part 63 (National Emission Standards for Hazardous Air Pollutants From Hazardous Waste Combustors)". The prior approval under this option would provide for an Agency review of the proposed physical and operational changes to the facility before they are implemented in order to ensure that these changes do not lead to other undesirable consequences.

Experience suggests that steps intended to reduce emissions may not, in all cases, lead to enhanced environmental protection. On the other hand, it could be argued that it should be the responsibility of the facility, not the permitting Agency, to assure that the regulated unit meets the required performance standards. EPA requests comment on the need for Agency oversight.

The abbreviated procedures in options 1 through 3 would be limited to facilities making initial changes to existing permits in order to come into compliance with § 112 standards. The procedures would not apply to general retrofitting changes outside the framework of meeting MACT related technology changes or to subsequent changes relating to maintaining compliance with § 112 standards. The Agency is aware that the criteria for deciding on the classification of a modification request deviate from past decision making criteria used to differentiate among modification classifications in Appendix I of Part 270. Many of the changes facilities might make to conform to the new standards would likely be Class 2 or 3 modifications under the current scheme. However, the Agency believes that a streamlined approach may be justified because EPA did not consider newer, more stringent standards becoming effective under shorter timeframes when it developed the current permit modification table. Also, these changes are mandated under a different regulatory scheme for which the modification tables were not designed to account. This streamlining of the modifications process has been addressed in the past by the Agency to ensure that changes made at facilities needed to meet LDR levels for newly listed or newly identified hazardous waste could be met (see 54 FR 9596, March 7, 1989). These previous modifications needed to meet the LDR levels for newly identified wastes were redesignated as Class 1 modifications. These MACT standards impose more stringent operating standards than current requirements; the Agency anticipates that the public will be receptive to these improvements and upgrades. Also, the Agency would still have control over the modification process under option 3 since it would still be reviewing the details of proposed new equipment or fixes to existing equipment.

The Agency's fourth modification option, like modification option 3, would consider all initial modification requests to existing permits to be Class 1 modifications requiring prior approval by the Director, but would give the Director the authority to elevate this modification to a Class 2 modification if the Director believes that additional public participation is warranted. This option to elevate a Class 1 modification requiring prior approval to a Class 2 modification would apply only to facilities requesting modifications to comply with today's proposed MACT standards. It would not apply to other class 1 modifications.

The fifth modification option represents a ''no change'' option. Most modifications requested would likely be handled as Class 2 or 3 modifications given the types of facility changes we expect in response to the MACT standards. Under this option, facilities would be urged to submit their permit modification requests as soon as possible in order to maximize the chances of completing the modification procedures, including administrative appeals, prior to the compliance deadline. EPA believes this alternative could thwart the Agency's chief objective of minimizing RCRA/CAA interface problems, and would be difficult to implement within the CAA compliance deadlines. Therefore, EPA does not favor this alternative.

Finally, the Agency realizes that many states have not yet adopted the modification table in Appendix I of 40 CFR 270.42. It hopes that states will, at a minimum, adopt the modification scheme that is promulgated in the final rule to ensure expeditious implementation of the new MACT standards. Alternatively, if option 2 or 3 is selected in the final rule, States that rely on a two-tiered system of major and minor modifications could classify these changes as ''minor modifications''.

In light of these proposed options for facilities attempting to comply with the MACT standards proposed in this notice, the Agency is, under a separate process, investigating ways to streamline the entire RCRA permit modification and renewal process for all industry categories to further reduce redundancies and inefficiencies in the process, while making sure that the public has adequate notice and involvement in the process. The Agency is in the early stages of this effort and wishes to solicit comment from the public on ways to achieve a more effective and efficient overall RCRA permit modification and renewal system.

2. Proposed Approaches To Address Potential Implementation Conflict

As mentioned earlier, the Agency is also taking comment on three companion approaches to deal with possible permit implementation conflicts which may occur in the event that a state does not become authorized to carry out the provisions of this rulemaking in time to handle necessary modifications. These approaches are relevant to modification options 2 through 5; if option 1 is chosen, no permit modification will be necessary, so the issues discussed in this section would not arise. It is important to remember that the standards in this rule would take effect automatically under the CAA. Therefore, the facility would be obligated under that statute to make the necessary changes to achieve compliance. The issue discussed herein relates to the respective roles of EPA and authorized states in processing RCRA permit modification requests.

The Agency's first approach provides a narrow interpretation of the scope of this rulemaking. Under this approach, only the numerical standards imposed by this rulemaking would be viewed as within the scope of this rule, and so, within the scope of HSWA. The manner in which facility changes are performed would be interpreted to be beyond the scope of the rule. Therefore, for those facilities needing a RCRA permit modification to reflect changes in permit conditions, the facility would be required to request the modification through the agency(ies) that implement the portion(s) of the permit to be modified.

Under the Agency's second approach, both the proposed MACT standards as well as the modification(s) needed to come into compliance with these standards would be interpreted to fall within the scope of today's HSWA rulemaking. Accordingly, the Agency would make the modifications under HSWA for facilities in states that have not yet become authorized for this rule. Although this approach would facilitate changes, the Agency does recognize that it could potentially create a possibility for conflict between state and federal permit portions. In areas where these modifications would be inconsistent with currently existing state-issued portions of the facility's permit, the State would need to perform parallel modification procedures to correct the inconsistencies. In the event that a State could not do this (e.g. there is no ''cause for modification'' under the State regulations to cover the type of change that would be necessary), EPA would attempt to secure agreement from the state that the new HSWA conditions are more stringent than any inconsistent state permit conditions and take precedence over such conditions. The state might memorialize this agreement through memorandum or letter to the facility or to the rulemaking record. This approach might require an extensive amount of communication between the State and the Agency, e.g. to come to agreement that the HSWA change is an improvement over any conflicting conditions in the state portion of the permit.

Under the Agency's third approach, in states that have not yet become authorized under RCRA for this rule, the Agency would not only modify the permit by adding conditions necessary for facilities to come into compliance with these MACT standards, but would also delete or modify conditions of the state portion of a permit if conflicts exist between the state- administered base program portion of a permit and the federally-administered HSWA portion. This approach is similar to the second approach, except that all modifications to any portion of a RCRA permit would be viewed as an integral part of EPA's role in carrying out the new HSWA requirements.

VII. State Authorization

A. Authority for Today's Rule

Today's rule is being proposed under the joint authority of the Clean Air Act (42 U.S.C. 7401 et seq.) and RCRA (42 U.S.C. 6924(o) and 6924(q)). The proposed approach would apply the new standards to both regulatory programs. Although the proposed standards would be located in 40 CFR Part 63, which addresses Clean Air Act requirements, the RCRA regulations in 40 CFR Parts 264 and 266 would incorporate these standards by reference. States may also promulgate these standards under their CAA program, and then incorporate them by reference into their RCRA regulations. Alternatively, States may promulgate these standards in both the RCRA and CAA sections of their State code for several reasons. Also, States without an approved CAA Title V permit program may promulgate these standards under their RCRA program only. Note however, that EPA strongly encourages States to adopt and apply for authorization or delegation under both regulatory programs for today's proposed standards when finalized. (In the implementation of RCRA and the CAA by States, there is no functional distinction between the authorization of a State to implement RCRA in lieu of EPA, and the delegation to a State to administer the CAA. See the discussion below.) EPA believes that State implementation of this rule will facilitate the coordination between the RCRA and CAA regulatory programs.

B. Program Delegation Under the Clean Air Act

Section 112(l) of the Clean Air Act allows EPA to approve State rules or programs for the implementation and enforcement of emission standards and other requirements for air pollutants subject to section 112. Under this authority, EPA has developed delegation procedures and requirements located at 40 CFR Part 63, Subpart E, for NESHAPS under Title III of the CAA (See 57 FR 32250, July 21, 1992). Related requirements for permit programs under Title V are located at 40 CFR Part 70 (See 58 FR 62262, November 26, 1993).

Under 40 CFR 70.4(a) and § 502(d) of the CAA, States were required to submit to EPA a proposed Part 70 (Title V) permitting program by November 15, 1993. If a State CAA Title V program does not receive EPA approval by November 15, 1995, the Title V program must be implemented by EPA for that State.

Submission of rules or programs by States under 40 CFR Part 63 is voluntary. Once a State receives approval from EPA for a standard under section 112(l) of the CAA, the State is delegated the authority to implement and enforce the approved State rules or programs in lieu of the otherwise applicable federal rules (the approved State standard would be federally enforceable). States may also apply for a partial Title III program, such that the State is not required to adopt all rules promulgated in 40 CFR Part 63. EPA will administer any rules federally promulgated under section 112 of the CAA that have not been delegated to the State.

The section 112(l) rule for delegation under Title III (see 58 FR 62262, November 26, 1993), is currently the subject of litigation. (See *Louisiana Environmental Network* v. *Environmental Protection Agency,* No. 94–1042 (D.C. Cir., filed January 21, 1994).) The outcome of this case could severely limit the ability of States to receive delegation for air toxics standards that differ from the comparable federal standards. A decision is expected in early 1996.

C. RCRA State Authorization

1. Applicability of Rules in Authorized States

Under section 3006 of RCRA, EPA may authorize qualified States to administer and enforce the RCRA program within the State. Following authorization, EPA retains enforcement authority under sections 3008, 3013, and 7003 of RCRA, although authorized States have primary enforcement responsibility. The standards and requirements for authorization are found in 40 CFR Part 271.

Prior to HSWA, a State with final authorization administered its hazardous waste program in lieu of EPA administering the Federal program in that State. The Federal requirements no longer applied in the authorized State, and EPA could not issue permits for any facilities that the State was authorized to permit. When new, more stringent Federal requirements were promulgated or enacted, the State was obliged to enact equivalent authority within specified time frames. New Federal requirements did not take effect in an authorized State until the State adopted the requirements as State law.

In contrast, under RCRA section 3006(g) (42 U.S.C. 6926(g)), new requirements and prohibitions imposed by HSWA take effect in authorized States at the same time that they take effect in unauthorized States. EPA is directed to carry out these requirements and prohibitions in authorized States, including the issuance of permits, until the State is granted authorization to do so.

Today's rule is being proposed pursuant to sections 3004(o) and 3004(q), of RCRA (42 U.S.C. 6924(o) and 6924(q)), which are HSWA provisions. The rule would be added to Table 1 in 40 CFR 271.1(j), which identifies the Federal program requirements that are promulgated pursuant to HSWA. States may apply for final authorization for the HSWA provisions in Table 1, as discussed in the following section of this preamble.

2. Effect on State Authorization

Today's proposed rule is considered to be more stringent than the existing standards in 40 CFR Parts 264 and 266. Thus, because today's revised technical standards for hazardous waste combustors are being proposed under HSWA authority, when finalized, this rule would be implemented by EPA in authorized States until their programs are modified to adopt this rule and the modification is approved by EPA. Note that these standards would also apply to all covered facilities under CAA authority, regardless of whether a State has been delegated the provisions of the final rule because these standards would be largely self-implementing.

Because today's rule is proposed pursuant to HSWA, a State submitting a program modification may apply to receive interim or final authorization under RCRA section 3006(g)(2) or 3006(b), respectively, on the basis of requirements that are substantially equivalent or equivalent to EPA's. The procedures and schedule for State program modifications for final authorization are described in 40 CFR 271.21. It should be noted that all HSWA interim authorizations will expire January 1, 2003. (See § 271.24(c) and 57 FR 60132, December 18, 1992.) In addition, note that 40 CFR Part 63, Subpart E provides for interim approvals under the CAA only in limited circumstances.

Section 271.21(e)(2) requires that States with final authorization must modify their programs to reflect Federal program changes and to subsequently submit the modification to EPA for approval. The deadline by which the State would have to modify its program to adopt these regulations is specified in section 271.21(e). This deadline can be extended in certain cases (see section 271.21(e)(3)). Once EPA approves the modification, the State requirements become Subtitle C RCRA requirements.

States with authorized RCRA programs may already have requirements similar to those in today's proposed rule. These State regulations have not been assessed against the Federal regulations being proposed today to determine whether they meet the tests for authorization. Thus, a State is not authorized to implement these requirements in lieu of EPA until the State program modifications are approved. Of course, states with existing standards could continue to administer and enforce their standards as a matter of State law pending authorization for revised standards. In implementing the Federal program, EPA will work with States under agreements to minimize duplication of efforts. In most cases, EPA expects that it will be able to defer to the States in their efforts to implement their programs rather than take separate actions under Federal authority.

States that submit official applications for final RCRA authorization less than 12 months after the effective date of these regulations are not required to include standards equivalent to these regulations in their application.

However, the State must modify its RCRA program by the deadline set forth in § 271.21(e). States that submit official applications for final authorization 12 months after the effective date of these regulations must include standards equivalent to these regulations in their application. The requirements a State must meet when submitting its final authorization application are set forth in 40 CFR 271.5.

3. Streamlined Authorization Under RCRA

Recently, EPA has initiated a series of rulemakings intended to streamline and speed the State authorization of RCRA rules. On August 22, 1995, EPA proposed abbreviated authorization procedures for certain routine Land Disposal Restrictions (LDR) provisions as part of the Phase IV LDR rule (see 60 FR 43654 and 43686). This proposal would implement streamlined authorization procedures for certain minor and routine rulemakings for those States which certify that they have authority equivalent to and no less stringent than the federal rule. EPA believes that the abbreviated authorization procedures proposed in the August 22, 1995, proposal would be appropriate for RCRA Subtitle C authorization for those States that are approved to implement this rule pursuant to 40 CFR Part 63, Subpart E, and are simply incorporating this rule into their RCRA regulations. EPA requests comment regarding the use of this proposed procedure for this authorization scenario. Note however, that EPA is not proposing to use RCRA authorization as a substitute for CAA section 112(l) approvals.

The primary reason that EPA is proposing to use an abbreviated authorization procedure when States are approved to implement this rule under the CAA, is that the delegation process and requirements in Part 63 are similar to authorization under 40 CFR 271.21. For example, section 112(l)(1) of the CAA requires that a program submitted by a State ‘‘shall not include authority to set standards less stringent than those promulgated by the Administrator.’’ Further, section 116 of the CAA precludes a State from adopting or enforcing less stringent standards than those under section 112. See 40 CFR §§ 63.12(a)(1), 271.1(h), and section 3009 of RCRA. States may also establish more stringent requirements as long as they are not inconsistent with the CAA. Further, section 112(l)(5)(A) of the CAA requires States to have adequate authorities to ensure compliance, similar to the requirement in section 3006(b) of RCRA. Thus, for EPA to approve a State rule or program, the procedures and criteria in 40 CFR 63.91(b) must be met, as well as any applicable requirements of §§ 63.92 through 63.94. These requirements are equivalent to those under RCRA. Therefore, using an abbreviated RCRA authorization procedure would prevent States from going through substantial authorization procedures under both the CAA program and the RCRA program.

EPA is also committed to streamlining the authorization process for States that would not be incorporating delegated CAA standards stemming from the final rule. EPA believes that authorized States have experience implementing sophisticated combustion regulatory programs and would have the ability to effectively implement today’s proposed standards. Thus, EPA requests comment on whether all States that are authorized for the incinerator regulations under 40 CFR Part 264 and the Boiler and Industrial Furnace (BIF) regulations should use the authorization procedure proposed on August 22, 1995. EPA is also developing a second authorization procedure for those RCRA rules which have more significant impacts on State hazardous waste programs that is slightly more extensive than the procedure proposed on August 22, 1995. This second procedure is also intended to significantly streamline the authorization process, and will be described in detail in the upcoming Hazardous Waste Identification Rule (HWIR) proposal for contaminated media. EPA believes that this second procedure may be more appropriate for today’s proposal, given its significance and complexity. In the upcoming HWIR-Media proposal, EPA will request comment whether this procedure should be used for RCRA authorization in this case.

VIII. Definitions

Many of the terms used in today’s proposal have been defined either in the Clean Air Act or in existing § 63.2. For terms that are not already defined, we are proposing definitions in § 63.1201. In addition, we are proposing conforming definitions to the existing RCRA regulations in §§ 260.10 and 270.2.

A. Definitions Proposed in § 63.1201

We are proposing definitions for the following terms in § 63.1201: Air Pollution Control System, Automatic Waste Feed Cutoff System, Cement Kiln, Combustion Chamber, Compliance Date, Comprehensive Performance Test, Confirmatory Performance Test, Continuous Monitor, Dioxins and Furans, Feedstream, Flowrate, Fugitive Combustion Emissions, Hazardous Waste, Hazardous Waste Combustor, Hazardous Waste Incinerator, Initial Comprehensive Performance Test, Instantaneous Monitoring, Lightweight Aggregate Kiln, Low Volatility Metals, New Source, Notification of Compliance, One-Minute Average, Operating Record, Reconstruction, Rolling Average, Run, Semivolatile Metals, and TEQ.

We believe that the definitions of these terms is self-explanatory as proposed.

B. Conforming Definitions Proposed in §§ 260.10 and 270.2

To avoid confusion and ambiguity, we are proposing conforming definitions in §§ 260.10 and 270.2 for the following terms that pertain to implementation of the current RCRA requirements and RCRA requirements that would not be superseded by the proposed MACT standards: RCRA operating permit, DRE performance standard, closure and financial responsibility requirements, addition of permit conditions as warranted on a site-specific basis to protect human health and the environment.

Because these definitions pertain to existing RCRA requirements, the effective date for the definitions would be six months after the date of publication in the Federal Register.

C. Clarification of RCRA Definition of Industrial Furnace

Today’s proposed rule applies to combustion units that are already subject to regulation under RCRA. These devices are presently classified as hazardous waste incinerators or hazardous waste-burning industrial furnaces, depending on their mode of operation. As discussed below, the distinctions between these classifications (i.e., incinerator and industrial furnace) are important in determining the level for Clean Air Act technology-based standards and also in applying a variety of RCRA regulatory provisions.

From the RCRA perspective, the distinction between incinerators and industrial furnaces (and boilers, for that matter) is important, among other things, for determining facility eligibility for interim status, the regulatory regime for classification of combustion residue (i.e., for example, product or non-product), and eligibility for Bevill status for combustion residue. EPA defines industrial furnaces as those designated devices that are an integral part of a manufacturing process and that use thermal treatment to recover materials or energy. 40 CFR 260.10.

Other criteria in the rule indicate what it means to be an ''integral part of a manufacturing process.'' The RCRA rules thus set out ''aspects of industrial furnaces that distinguish them from hazardous waste incinerators'', 48 FR 14472, 14483 (April 4, 1983); 50 FR 614, 626–27 (January 4, 1985). These include whether the device is designed and used ''primarily to accomplish recovery of material products'', the ''use of the device to burn or reduce raw materials to make a material product'', ''the use of the device to burn or reduce secondary materials as effective substitutes for raw materials, in processes using raw materials as principal feedstocks'', ''the use of the device to burn or reduce secondary materials as ingredients in an industrial process to make a material product'', and ''the use of the device in common industrial practice to produce a material product. 40 CFR 260.10.

EPA interprets the regulatory definition of industrial furnace as applying only to devices that are enumerated in the rule and that also satisfy the narrative portion of the definition, that is, functions as an integral part of a manufacturing process, taking into account the narrative criteria in the rule. Thus, for example, if a device which is otherwise a cement kiln is not used as an integral component of a manufacturing process, it is not an industrial furnace. See 56 FR at 7140, 7141 (February 21, 1991) (Device-by-device application of industrial furnace regulatory definition); 48 FR at 14485 (April 4, 1983) (same). A cement kiln used primarily to burn contaminated soil from Times Beach so as to destroy dioxins thus is not an industrial furnace because it would not be an integral component of a manufacturing process but essentially a waste treatment unit. Among other things, it would not be used ''primarily for recovery of material products.'' 40 CFR 260.10(13)(I); See also Background Document for the Regulatory Definition of Boiler, Incinerator, and Industrial Furnace (October 1984), at page 6. Conversely, a cement kiln making cement from raw materials but burning some hazardous waste for destruction as an adjunct to its normal activities could be classified as an industrial furnace.

Industrial furnaces burning hazardous wastes for any purpose—energy recovery, material recovery, or destruction—are currently subject to the rules for BIFs in Part 266 subpart H. 56 FR at 7138; 40 CFR 266.100. In this regard, the BIF rule changed the previous regulatory regime whereby if a combustion device burned hazardous waste for destruction, it was regulated as an incinerator no matter what the proportion of burning for destruction to other activities. 40 CFR 264.340(a) and 265.340(a) as promulgated at 50 FR at 665–66 (January 4, 1985); 48 FR at 14484 and n. 15 (April 4, 1983). However, a device must still satisfy the regulatory definition of industrial furnace, and thus must in the first instance be an integral component of a manufacturing process. This means, among other things, that enclosed combustion devices that burn hazardous wastes for destruction may not be industrial furnaces. See 1984 Background Document for Definition of Boiler, Incinerator, and Industrial Furnace (cited above), page 6. This is because hazardous waste destruction devices may not be designing and using the device primarily to accomplish recovery of material products, may not be using the device to combust secondary materials as effective substitutes for raw materials, etc.[184]

PART SIX: MISCELLANEOUS PROVISIONS AND ISSUES

I. Comparable Fuel Exclusion

EPA is proposing to exclude from the definition of solid and hazardous waste materials that meet specification levels for concentrations of toxic constituents and physical properties that affect burning. Generators that comply with sampling and analysis, notification and certification, and recordkeeping requirements would be eligible for the exclusion.[185] See proposed § 261.4(a)(13).

Hazardous waste is burned for energy recovery in boilers and industrial furnaces in lieu of fossil fuels. There are benefits to this energy recovery in the form of diminished use of petroleum-based fossil fuels. Industry sources contend that in some cases, hazardous waste fuels can be ''as clean or cleaner'' (meaning they present less risk) than the fossil fuels they displace. This claim has not been documented with full emissions and risk analysis. Industry further contends that currently regulating these materials under normal hazardous waste regulations acts as a disincentive to using them as fuels.

EPA's goal is to develop a comparable fuel specification which is of use to the regulated community but assures that an excluded waste is similar in composition to commercially available fuel and poses no greater risk than burning fossil fuel. Accordingly, EPA is using a ''benchmark approach'' to identify a specification that would ensure that constituent concentrations and physical properties of excluded waste are comparable to those of fossil fuels. We note that this is consistent with the main approach discussed in the Dow Chemical Company petition of August 10, 1995, which also points out a number of benefits that would result from promulgating this type of exemption: (1) support for the Agency's goal of promoting beneficial energy recovery and resource conservation; (2) reduction of unnecessary regulatory burden and allowing all parties to focus resources on higher permitting and regulatory priorities; and (3) demonstration of a common-sense approach to regulation.[186]

The rationale for the Agency's approach is that if a secondary material-based fuel is comparable to a fossil fuel in terms of hazardous and other key constituents and has a heating value indicative of a fuel, EPA has ample authority to classify such material as a fuel product, not a waste. Indeed, existing rules already embody this approach to some degree. Under § 261.33, commercial chemical products such as benzene, toluene, and xylene are not considered to be wastes when burned as fuels because normal fossil fuels can contain significant fractions of these chemicals and these chemicals have a fuel value. Given that a comparable fuel would have legitimate energy value and the same hazardous constituents in comparable concentrations to those in fossil fuel, classifying such material a non-waste would promote RCRA's resource recover goals without creating any risk greater than those posed by the commonly used commercial fuels. Under these circumstances, EPA can permissibly classify a comparable fuel as a non-waste. See also 46 FR at 44971 (August 8, 1981) exempting from Subtitle C regulation spent pickle liquor used as a wastewater treatment agent in part because of its similarity in composition to the commercial acids that would be used in its place.

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[184] The Administrator specifically rejects the contrary suggestion of the Agency's Environmental Appeals Board that ''the purpose for which hazardous waste is burned at the facility has little or no bearing on whether the facility meets the industrial furnace definition.'' *In re Marine Shale Processors, Inc.*, RCRA Appeal No. 94–12 (March 17, 1995) p. 25 n. 32.

[185] We note that DOW Chemical Company (Dow) in a petition to the Administrator, dated August 10, 1995, specifically requested that the Agency develop a generic exclusion for ''materials that are burned for energy recovery in on-site boilers which do not exceed the levels of fossil fuel constituents. . . .'' (Petition, at p. 3). This proposal also responds to that petition.

[186] We also note there are other details in the DOW petition that are congruent with aspects of today's proposal. The Agency specifically invites comment on the DOW petition as part of this rulemaking.

As discussed below, EPA seeks comment on a number of options including what fossil fuel or fuels should be used as a benchmark, and how to select appropriate specification limits given the range of values both within and across fuel types. EPA also requests additional data on hazardous constituents naturally occurring in commercially available fuels. (The Agency's current data on fossil fuel composition are provided in the docket to this rulemaking.)

Also, the exclusion would operate from the point of fuel generation to the point of burning. Thus, the fuel's generator would be eligible for the exclusion and could either burn the excluded comparable fuel on site or ship it off-site directly to a burner. Thus, the Agency must ensure that storage and transportation of excluded comparable fuel poses no greater hazard than fossil fuel. The Agency invites comment on whether the applicable Department of Transportation (DOT) and Office of Occupational Safety and Health (OSHA) requirements are adequate to address this concern so that separate, potentially duplicative RCRA regulation would not be needed.

Note also that, because EPA is proposing to eliminate or amend other combustion-related exemptions in this rulemaking (i.e., the exemption for incinerators for wastes that are hazardous solely because they are ignitable, corrosive, or reactive and contain no or insignificant levels of Appendix VIII, Part 261, toxic constituents; and the low-risk waste exemption under BIF), the inclusion of a comparable fuels exemption may offset the effects of these changes at a number of affected facilities.

EPA also invites comment on whether acutely hazardous wastes should be ineligible for the exemption. See the section called ''CMA Clean Fuel Proposal'', below, for what is considered an acutely hazardous waste.

A. EPA's Approach to Establishing Benchmark Constituent Levels

1. The Benchmark Approach

EPA considered using risk to human health and the environment as the way to determine the scope and levels of a ''clean fuels'' specification. However, the Agency encountered several technical and implementation problems using a purely risk-based approach. Specifically, we have insufficient data relating to the types of waste burned and the risks they pose. To pursue a risk-based ''clean fuels'' approach, EPA needs to examine emissions from a number of example facilities at which ''clean fuel'' would be burned. The Agency could then analyze risks while the facility is burning the ''clean fuel''. EPA also does not have sufficient data to determine the relationship between the amount of ''clean fuel'' burned and emissions, especially dioxins and other non-dioxin PICs. EPA also does not know how emissions relate to real individual facilities as compared to example facilities used to derive the ''clean fuel'' specification. (Emissions and/or risks at a given facility could be higher than those of the example facilities given site-specific considerations.) Without this, it is not clear how the Agency can use risk to establish a ''clean fuel'' specification. The Agency requests data and invites comment on deriving a risk based specification.

The Agency is instead proposing to develop a comparable fuel specification, based on the level of hazardous and other constituents normally found in fossil fuels. EPA calls this the ''benchmark approach''. For this approach, EPA would set a comparable fuel specification such that concentrations of hazardous constituents in the comparable fuel could be no greater than the concentration of hazardous constituents naturally occurring in commercial fossil fuels. Thus, EPA would expect that the comparable fuel would pose no greater risk when burned than a fossil fuel and would at the same time be physically comparable to a fossil fuel.

2. The Comparable Fuel Specification

EPA is proposing to use this benchmark approach to develop a series of technical specifications addressing:

(1) physical specifications:

—Kinematic viscosity (cST at 100° F),
—Flash point (°F or °C), and
—Heating value (BTU/lb);

(2) general constituent specifications for:

—Nitrogen, total (ppmw), and
—Total Halogens (ppmw, expressed as Cl^{1-}), including chlorine, bromine, and iodine;[187] and

(3) individual hazardous constituent specifications, for:

—Individual Metals (ppmw), including antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, selenium, silver, and thallium, and
—Individual Appendix VIII, Part 261, Toxic Organics and Fluorine (ppmw).

(Note that ppmw is an alternate way of expressing the units mg/kg.) The constituent specifications and heating value would apply to both gases and liquids. The flash point and kinematic viscosity would not apply to gases. EPA invites comment on whether this list of specifications should be expanded to include other parameters, specifically ash and solids content, to ensure that excluded comparable fuels have the same handling and combustion properties as fossil fuels.

There are existing specifications for fossil fuels that are developed and routinely updated by the American Society for Testing and Materials (ASTM). (See ASTM Designation D 396 for fuel oils and D 4814 for gasoline.) These requirements specify limits for physical properties of fossil fuels, such as flash point, water and sediment, distillation temperatures,[188] viscosity, ash, sulfur, corrosion, density, and pour point. The ASTM requirements do not limit specific constituents in fuel. As a result, fossil fuels are quite diverse in their hydrocarbon constituent make-up. Specific levels of hydrocarbon constituents are a function of the crude oil, the processes used to generate the fuels, and the blending that occurs. This makes ASTM requirements for fuels of no use for deriving individual hazardous constituent specifications, but useful for deriving physical specifications. EPA invites comment on whether ASTM's physical specifications for flash point and viscosity should be used instead of the results of EPA's analysis.[189] [190]

a. Standards for CAA Metal HAPs. EPA is proposing limits for two metals that are not found on Part 261, Appendix VIII: cobalt and manganese. EPA included these metals in the analysis because they are listed in the Clean Air Act (CAA) as hazardous air pollutants (HAPs). See CAA, section 112(b). These metals are included because burning does not destroy metals, and will cause the release of metals into the air. Therefore, if a comparable fuel contained more of a metal than a fossil fuel, the result would be more air emissions of that metal than would be the case if the facility burned only fossil fuels. From a CAA perspective, it would not be acceptable to increase emissions of CAA HAP metals, relative to what would be emitted if fossil fuels were burned.

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[187] See discussion below concerning another halogen, fluorine.

[188] The temperature at which a certain volumetric fraction of the fuel has distilled.

[189] The issue is that all analytical results should meet ASTM's specifications. Thus, basing a specification limit on analysis of samples will result in limits more restrictive than the ASTM specification defining an acceptable fuel.

[190] ASTM does not specify a heating value requirement.

Therefore, constituent levels (or detection limits) for the two CAA HAPs are proposed as well.

b. Heating Value. With respect to heating value, the Agency is concerned with the issues of overall environmental loading and acceptability of the waste as a fuel. Comparable fuels may have a lower heating value than the fossil fuels they would displace. In these situations, more comparable fuels would be burned to achieve the same net heating loads, with the result that more of the hazardous constituents in the comparable fuel would be emitted (e.g., halogenated organic compounds and metals) than if fossil fuel were to be burned. This would lead to greater environmental loading of potentially toxic substances, which is not in keeping with the intent of the comparable fuels exclusion.

To address environmental loading, the Agency could establish a minimum heating value specification comparable to the BTU content of the benchmark fossil fuel(s). Fossil fuels have a higher heating value than most hazardous waste fuels, however; so this approach might exclude many otherwise suitable fuels. Therefore the Agency chose to establish the specification(s) for comparable fuels at a heating value of 10,000 BTU/lb.[191] EPA chose 10,000 BTU/lb because it is typical of current hazardous waste burned for energy recovery.[192] However, hazardous waste fuels have a wide range of heating values. Therefore, EPA is proposing that, when determining whether a waste meets the comparable fuel constituent specifications, a generator must first correct the constituent levels in the candidate waste to a 10,000 BTU/lb heating value basis prior to comparing them to the comparable fuel specification tables. In this way, a facility that burns a comparable fuel would not be feeding more total mass of hazardous constituents than if it burned fossil fuels.[193]

Also, EPA wants to ensure that currently defined wastes which meet the comparable fuels exclusion have a legitimate use as a fuel. Historically, the Agency has relied on a heating value of 11,500 J/g (5,000 BTU/lbm) as a minimum heating value specification for determining if a waste is being burned for energy recovery. (See § 266.103(c)(2)(ii).) EPA proposes this limit today as a minimum heating value for a comparable fuel to ensure that comparable fuels are legitimate fuels.

c. Applicability of the specifications. A separate issue is the applicability of these specifications. EPA is proposing that these specifications apply to all gases and liquids currently defined as hazardous wastes. (However as noted elsewhere, used oil, and used crude oil that is also a hazardous waste, would remain subject to regulation as used oil under 40 CFR Part 279, even if it meets the comparable fuel specifications.) The specifications for viscosity and flash point would only pertain to liquid fuels. This is because gases are inherently less viscous than liquids and flash point does not apply to gases. Therefore, EPA proposes that the specifications for viscosity and flash point not apply to gaseous comparable fuels.

d. Organic Constituent Specifications. With respect to Appendix VIII organic toxic constituents and other toxic synthetic chemicals, such as pesticides and pharmaceuticals, the Agency needs to ensure that only waste fuels comparable to fossil fuels are excluded. Therefore, the Agency proposes to limit the Appendix VIII constituents in comparable fuels to those found in the benchmark fossil fuel. These limits were calculated using a statistical analysis of individual samples EPA obtained.

If the benchmark fossil fuel has no detectable level of a particular Appendix VIII constituent, then the comparable fuel specification would be ‘‘non-detect’’ with an associated, specified maximum allowable detection limit for each compound. (Note exception in the following section.) The detection limit is a statistically derived level based on the quantification limit determined for each sample.

There are also compounds found on Appendix VIII which were not analyzed for, either because an analytical method is not available or could not be identified in time for this analysis. These compounds are not listed in today’s specifications. If EPA is able to identify methods for analyzing these compounds and is able to analyze for these compounds prior to promulgation, an appropriate specification level or detection limit will be promulgated for Appendix VIII compounds missing from today’s specification. If EPA is not able to analyze for compounds on Appendix VIII, we propose that the standard for these remaining Appendix VIII constituents be ‘‘nondetect’’ without a maximum detection limit proposed.

e. Specification Levels for Undetected Pure Hydrocarbons. A corollary issue is that, since fossil fuels are comprised almost entirely of pure hydrocarbons[194] in varying concentrations, it is possible that many pure hydrocarbons on Appendix VIII, Part 261, could be present in fossil fuel but below detection limits. Therefore, EPA proposes allowing pure hydrocarbons on Appendix VIII to be present up to the detection limits in EPA’s analysis. Compounds on Appendix VIII which contain atoms other than hydrogen and carbon would be limited to ‘‘non-detect’’ levels as described in the previous paragraph.

f. Specification Levels for Other Fuel-like Compounds. In addition there are classes of fuel-like compounds that are not found in fossil fuels. These include oxygenates, an organic compound comprised solely of hydrogen, carbon, and oxygen above a minimum oxygen-to-carbon ratio. Examples of oxygenates which are used as fuels or fuel additives include alcohols such as methanol and ethanol, and ethers such as Methyl tert-butyl ether (MTBE).[195] However, Appendix VIII oxygenates are not routinely found in fossil fuels and were not detected in EPA’s sampling and analysis program.[196] Since oxygenates can serve as fuels and are believed to burn well (i.e., may not produce significant PICs), EPA invites comment on: (1) whether these compounds should also be allowed up to the detection limits in EPA’s analysis; and (2) an appropriate minimum oxygen-to-carbon ratio to identify an oxygenate.

g. Total Halogen Specification and Fluorine. Another issue is that the methods for determining total halogens do not measure fluorine, the lightest of the halogen compounds. Fluorine is, however, listed as an Appendix VIII constituent and methods are available for measuring fluorine directly. Therefore, EPA proposes that the total halogen limit pertain only to halogens other than fluorine, i.e., chlorine, bromine, and iodine. EPA also proposes that a fluorine limit be established separately from the total halogen limit. Specification values for fluorine are included in the specifications described below.

h. Specification Levels for Halogenated Compounds. EPA invites comment on whether it is necessary to

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[191] Constituent levels presented in today’s proposed rule have been corrected from the fuel’s heating value (approximately 20,000 BTU/lb) to 10,000 BTU/lb.

[192] Consult USEPA, ‘‘Draft Technical Support Document for HWC MACT Standards, Volume II: HWC Emissions Database’’, February 1996.

[193] Note that the heating value correction would apply only to allowable constituent levels in fuels, not to detection limits. Detection limits would not be corrected for heating value.

[194] Excluding sulfur, carbon and hydrogen comprise 99.6 to 100 percent of liquid fossil fuels.

[195] A compound such as 2,3,7,8–TCDD is not an oxygenate since it contains atoms other than hydrogen, carbon, and oxygen. Compounds such as Dibenzo-p-dioxin and Dibenzofuran are not oxygenates even though they are comprised solely of hydrogen, carbon, and oxygen because the oxygen-to-carbon ratio is too low.

[196] See the appendix for this notice for the results of EPA’s analysis.

specify limits for halogenated compounds found on Appendix VIII. Nondetect levels of halogens were found in EPA's fossil fuel analysis and the nondetect levels for total halogens were much less than those of the individual halogenated compounds. Therefore, a waste that meets the total halogen limit should, by default, meet the non-detect levels specified for halogenated compounds. EPA prefers this approach since it will simplify the comparable fuels specification and mean fewer and less costly sampling and analysis of comparable fuel streams for generators. We invite comment on this approach.

EPA also invites comment on whether this approach could be expanded to other Appendix VIII constituents as well (e.g., whether the total nitrogen specification level would ensure compliance with specification levels for individual compounds containing nitrogen).

3. Selection of the Benchmark Fuel

Another issue is selecting the appropriate fossil fuel(s) for the benchmark, and therefore the basis of the comparable fuel specification. Commercially available fossil fuels are diverse. They range from gases, such as natural gas and propane, to liquids, such as gasoline and fuel oils, to solids, such as coal, coke, and peat.

EPA does not believe, from an environmental standpoint, that the comparable fuel specification, which would exclude a hazardous waste fuel from RCRA subtitle C regulation, should be based on fossil fuels that have high levels of toxic constituents that may (or will) not be destroyed or detoxified by burning (e.g., metals and halogens). One would expect that solid fuels, such as coal, would have relatively high metal and possibly halogen levels. Metals and halogens are not destroyed in the combustion process and as a result can lead to increases in HAP emissions, unlike organic Appendix VIII constituents which (ideally) are destroyed or detoxified through combustion. Therefore, EPA is not inclined to include a solid fuel as a benchmark fuel. Also, we believe that basing the comparable fuel specification on a gas fuel would be overly conservative and have no utility to the regulated industry. Liquid fuels, on the other hand, are widely used by industry and do not have disadvantages of solid or gaseous fuels. Liquid fuels seem a good compromise among the fuel types. The Agency is therefore proposing to base the comparable fuel specification on benchmark liquid fuels.

However, even liquid fossil fuels are diverse and add to the complexity of selecting a benchmark fuel. For instance, gasoline has relatively higher levels of toxic organics, such as benzene and toluene but lower concentrations of metals. Conversely, we have also found and would continue to expect that typical fuel oils have lower concentrations of toxic organics and higher concentrations of metals than gasoline. We also have found that heavier fuel oils (e.g., No. 6) contain more metals than lighter fuel oils (e.g., No. 2).[197]

In addition, EPA could choose a vegetable oil-based fuel, such as ''tall oil'', rather than a fossil fuel. EPA has no data on concentrations of hazardous constituents in these fuels, however. Also, these fuels are not as widely used as commercial fuels. In keeping with the benchmark approach, EPA believes it is appropriate to base the comparable fuel specification on an appropriate and widely used type of commercial fuel, i.e., fossil fuels.

We specifically request constituent data for gasoline, automotive diesel, and No. 1 (kerosene/Jet fuel), No. 2 (different from automotive diesel), No. 4, and No. 6 fuel oils. These data should be complete and include analyses for all Appendix VIII constituents including nondetect values. When supplying data during the comment period, commenters should follow the same analytical and quality procedures EPA used. It would assist the Agency greatly if the data were supplied in electronic (1.44–MB PC or Macintosh floppy disk) as well as hard-copy form. Electronic versions should be in a spreadsheet form (for instance, Lotus 1,2,3, or Microsoft Excel) or an ASCII file with a description of how the records are classified/organized into which fields. Consult the Technical Background Document for a complete list of constituents and additional information concerning EPA's sampling and analysis and quality assurance protocols used.

B. Sampling, Analysis, and Statistical Protocols Used

This section describes the sampling, analysis, and statistical protocols used to derive the comparable fuels specifications described below. For more detailed discussion, refer to the Technical Background Document.

1. Sampling

EPA obtained a total of 27 fossil fuel samples. They were comprised of eight gasoline and eleven No. 2, one No. 4, and seven No. 6 fuel oil samples. The samples were collected at random from sources across the country: Irvine, CA; north west New Jersey; north east Connecticut; Coffeyville, KS; Fredonia, KS; Norco, LA; Hopewell, VA; and Research Triangle Park, NC.

Only one No. 4 fuel oil sample was obtained. Very little ''No. 4'' fuel oil[198] is sold in the United States. Rather, what is used as No. 4 is essentially a blend of No. 2 and 6 fuel oils. These blends vary, are contract specific, and are not No. 4 fuel oil, per se. EPA specifically requests data on (genuine) No. 4 fuel oil constituent levels.

2. Analysis of the Fuel Samples

Analytical methods have not been defined for all compounds on Part 261, Appendix VIII. Where analytical methods have not been defined, analysis of those constituent levels in fossil fuels are not possible. However, EPA is working on identifying methods for compounds on Appendix VIII which were not analyzed for during this initial analysis. If EPA is able to identify analysis methods for these compounds, constituent specifications for these compounds will be included in the final rule using the same methodology for constituent specifications described in today's notice.

After the samples were obtained, they were analyzed at a laboratory accustomed to analyzing fossil fuels. SW–846 methods were used whenever possible. Where SW–846 methods were not available, established ASTM procedures or other EPA methods for fuel analyses were used. Table VI.1.1 summarizes the analytical methods used.

TABLE VI.1.1: ANALYTICAL METHODS USED FOR COMPARABLE FUELS ANALYSIS

Property of interest	Method
Heating Value	EPA 325.3/PARR.
Kinematic Viscosity	ASTM D240.
Flash Point	SW–846 1010.
Total Nitrogen	ASTM D4629.
Total Halogens	EPA 325.3/PARR.
Antimony	SW–846 7040.
Arsenic	SW–846 7060.
Barium	SW–846 7080.
Beryllium	SW–846 7090.
Cadmium	SW–846 7130.
Chromium	SW–846 7190.
Cobalt	SW–846 7200.
Lead	SW–846 7420.
Manganese	SW–846 7460.
Mercury	SW–846 7470.
Nickel	SW–846 7520.
Selenium	SW–846 7740.
Silver	SW–846 7760.

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[197] See the appendix to this notice for the results of EPA's analysis.

[198] No. 4 fuel oil is defined as fuel that meets the physical specifications established by the American Society of Testing and Materials.

TABLE VI.1.1: ANALYTICAL METHODS USED FOR COMPARABLE FUELS ANALYSIS—Continued

Property of interest	Method
Thallium	SW–846 7840.
Appendix IX Volatile Organics.	SW–846 8240.
Appendix IX Semivolatile Organics.	SW–846 8270.

In addition, the analysis was conducted in such a way as to ensure the lowest detection limits, also called ‘‘quantification limits,’’ possible. Detection limits were determined by calculating the ‘‘method detection limit’’ (MDL) for each analysis. To do this, EPA used a modified version of the procedures defined by EPA in 40 CFR 136, Appendix B, *Definition and Procedure for Determination of Method Detection Limits, Revision 1.1.* The modification involved spiking for each of the samples being analyzed instead of spiking once for all the samples, as stated by the method.

One issue concerning the analysis is that, even when attempts are made to minimize detection limits, detection limits can still be extremely high. This is particularly so for volatile organic compounds in the gasoline samples. There is no feasible analytical way to address this issue, so it is addressed when deriving the comparable fuel specification.

3. Statistical Procedures Used

Due to the small sample sizes of each fuel type, EPA used a nonparametric ‘‘order statistics’’ approach to analyze the fuel data. If enough data are received to determine the distribution of the enlarged data set, statistical procedures appropriate to the distribution, i.e., different than those described here, may be used for the promulgated specification.

‘‘Order statistics’’ involves ranking the data for each constituent from lowest to highest concentration, assigning each data point a percentile value from lowest to highest percentile, respectively. Result percentiles were then calculated from the data percentiles. Consult the Technical Background document for more information regarding the statistical approach.

EPA is considering using either the 90th or 50th percentile values to determine the comparable fuel specification. If the exclusion were to be based on specifications from one or more individual benchmark fuels (e.g., separate gasoline or fuel oil based specifications), EPA believes it is more appropriate to establish the specification(s) based on the 90th percentile rather than the 50th percentile values. The 90th percentile represents an estimate of an upper limit of what is in a particular fuel while the 50th percentile values would exclude up to 50 percent of the fossil fuel samples. For composite specifications (discussed in detail below), EPA is considering using either the 50th or 90th percentile, but the considerations differ. A 50th percentile analysis was conducted because it represents what, ‘‘on average’’, is found in all potential benchmark fuels that were studied. A 90th percentile was also conducted because it represents the upper bound of what is found in all fuels. EPA invites comment on which percentile(s) is appropriate for both the individual specifications as well as the composite specification.

C. Options for the Benchmark Approach

As just described, EPA has several options for deciding what fossil fuel(s) to use as the benchmark. The following options range from developing a suite of comparable fuel specifications based on individual benchmark fuels (i.e., gasoline, No. 2, No. 6) to basing the specification on composite values derived from the analysis of all benchmark fuels.

The Agency invites comment on which of the following options should be selected. Again, EPA desires to provide constructive relief to the regulated community by having a comparable fuel specification that can be used in practice. On the other hand, EPA needs to ensure that the release of toxic compounds is not increased significantly by burning comparable fuels in lieu of fossil fuels. For this reason, we are offering several options for comment. Commenters should also address in their comments the justification needed to support their preferred option.

The options discussed below are not the only possible options. If commenters have other options they wish the Agency to consider, they should recommend them and explain how they meet the objectives of a benchmark approach to comparability.

1. Individual Benchmark Fuel Specifications

Under this option, EPA invites comment on establishing individual specifications based on the benchmark fuels for which EPA has obtained data: gasoline, and No. 2 and No. 6 fuel oils.[199] [200] Each would have a unique set of constituent and physical specifications, based on the individual benchmark fossil fuel. A generator would use one of these specifications (after correcting for heating value) to determine if a waste qualifies for the exclusion. As mentioned in subsection A.2.B., above, heating value of a comparable fuel would have to exceed 11,500 J/g (5,000 BTU/lbm).

EPA envisions that individual fuel specification(s) could be implemented in one of two ways under this approach. First, a facility could use any of the individual benchmark specifications, without regard to what fuel it currently burns. This approach would provide flexibility for the facility in choosing which specification to use. Although this approach could allow higher emissions of certain toxic compounds at the particular site than would be the case if they burned their normal fuel(s), overall (total) emissions of hazardous constituents may be lower since a comparable fuel is unlikely to have high levels of all constituents. In addition, the amounts of excluded waste may well be small relative to the quantity of fossil fuels burned annually.

The second approach is to link the comparable fuel specification to the type of fuel burned at the facility and being displaced by the comparable fuel. In this case, if a facility burns only No. 2 fuel oil, it could only use the No. 2 fuel oil comparable fuel specification to establish whether its current waste stream is a comparable fuel. Implementation issues include the following: what specification would apply if a facility uses a gas or solid fuel, and what is the degree of inflexibility introduced?

EPA prefers the first implementation approach, but invites comment on whether a single fuel should be used to base a comparable fuel specification and if so, which implementation should be adopted.

2. A Composite Fuel as the Benchmark

One issue associated with the single fuel specification approach is that

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[199] This list could be expanded, depending on the amount and quality of data received during the comment period.

[200] EPA is reluctant to propose a No. 4 oil specification at this time. As noted, EPA has been able to obtain only one sample of No. 4 oil. EPA desires more data on genuine samples of this fuel before establishing a comparable fuel specification based on No. 4 fuel oil. As is the case with other types of fuel, if a sufficient number of samples are obtained, a No. 4 fuel oil comparable fuel specification may be promulgated.

gasoline has relatively high levels of volatile organic compounds while No. 6 fuel oil has higher levels of semivolatile organic compounds and metals. If a potential comparable fuel were to have a volatile organic constituent concentration below the gasoline specification but higher than the others, and a particular metal concentration lower than the No. 6 fuel oil specification but higher than gasoline, it would not be a comparable fuel since it meets no single specification entirely. Therefore, EPA is concerned that establishing specifications under this option would limit the utility of the exclusion.

To address this issue, one option is to use a composite approach to setting the comparable fuel specification. In this option, EPA would use a variety of liquid fuels from which certain compounds would be selected to derive the complete specification.

EPA determined composite fuel specifications for this proposal by compositing the data from all fuels analyzed (gasoline and the three fuel oils individually). Compositing all the fuels has the advantage that it may better reflect the range of fuel choices and potential for fuel-switching available nationally to burners. A facility would be allowed to use the composite fuel specification regardless of which fuel(s) it burns.

One technical issue is that EPA has different number of samples for each fuel type. Therefore, the fuel with the largest number of samples would dominate the composite database. To address this issue, EPA's statistical analysis ''normalizes'' the number of samples, i.e., treat each fuel type in the composite equally without regard to the number of samples taken.

The Agency has evaluated establishing a composite specification using: (1) the 90th percentile aggregate values for the benchmark fuels; and (2) the 50th percentile aggregate values for the benchmark fuels. Under either approach, high gasoline volatile organic nondetects would be omitted from the analysis.

The 90th percentile approach has the virtue of being representative of a range of fuels that are burned nationally in combustion devices. It also provides maximum flexibility for the regulated community. However, the 90th percentile composite approach does allow for higher amounts of toxic constituents than other approaches EPA is considering. As a practical matter, though, no excluded fuel is likely to contain constituent levels at or near all of the 90th percentile composite specification level. EPA invites comment on this issue.

The 50th percentile approach ensures the comparable fuel specification is representative of a range of benchmark fuels commonly burned at combustion devices, perhaps even more so than the 90th percentile approach since it better represents an ''average'' level for fuels in general. It also provides flexibility for the regulated community, though the specification levels (and potentially the usefulness) would be lower than those resulting from the 90th percentile approach. If facilities indeed are likely to have at least several constituents near the 90th percentile composite levels, a 50th percentile composite would be more restrictive and less useful than the 90th percentile composite approach.

EPA seeks comments on whether a composite of fuels should be used to base a comparable fuel specification and, if so, whether a 90th or 50th percentile approach would be more appropriate. Further, the Agency seeks comment on whether the exclusion should be based on a suite of specifications comprised of the individual benchmark fuel-based specifications plus a composite specification. Under this approach the generator could select any specification in the suite as the basis for the exclusion.

3. Waste Minimization Approaches

By proposing this comparable fuels exemption the Agency does not wish to discourage pollution prevention/waste minimization opportunities to reduce or eliminate the generation of wastes in favor of burning wastes as comparable fuels. EPA solicits comments on the effect of today's comparable fuels proposal on facilities' efforts to promote source reduction and environmentally sound recycling (which does not include burning for energy recovery as a form of recycling in the RCRA waste management hierarchy.)

D. Comparable Fuel Specification

In this section, EPA will outline the five specifications discussed above: gasoline, No. 2 fuel oil, No. 6 fuel oil, composite 50th percentile values, and composite 90th percentile values. For reasons stated above, the individual fuel specifications were based on the 90th percentile values. EPA is not proposing any particular approach at this time, but invites comments on which approach(es) should be promulgated in a final rule. EPA is also presenting the results of the No. 4 fuel oil sample for comparison.

1. Hazardous Constituent Specifications

a. Gasoline Specification. The gasoline-based specification is presented in Table 1 of the appendix to this preamble. As stated above, gasoline contains more volatile organic compounds (such as benzene and toluene) than the other fuels. This results in detection limits for volatile organic compounds an order of magnitude higher than the other fuel specifications. EPA believes analysis of comparable fuels will more likely result in detection limits much lower than gasoline and similar to those associated with analysis of fuel oils. To address this issue, EPA has performed an analysis of a fuel oil-only composite (one which does not include gasoline in the composite) at the 90th percentile to use as a surrogate for the volatile organic gasoline non-detect values. Those values from the fuel oil-only composite are presented as the volatile organic nondetect values in Table 1. EPA invites comment on whether the approach of substituting fuel oil-only volatile organic nondetect values in lieu of those values for gasoline is appropriate.

b. Number 2 Fuel Oil Specification. The No. 2 fuel oil-based specification is presented in Table 2 of the appendix to this preamble. As suggested above, No. 2 fuel oil contains more volatile organic compounds than the other fuel oils, but less than gasoline. In addition, its metal concentrations are lower than the other fuel oils, but more than gasoline.

c. Number 4 Fuel Oil Specification. The No. 4 fuel oil-based specification is presented in Table 3 of the appendix. It follows a similar trend, having fewer organic constituents than those previous described, but more metals.

However, this specification is based on only one sample. The Agency is concerned that one sample may not be representative of true No. 4 fuel oil. As a result, EPA believes that we will not be able to promulgate a No. 4 fuel oil specification unless more data is received during the comment period.

d. Number 6 Fuel Oil Specification. The No. 6 fuel oil-based specification is presented in Table 4 of the appendix.

e. Composite Fuel Specifications. Two alternative composite fuel specifications are presented in Tables 5 and 6 of the appendix. Table 5 presents a specification based on the aggregate 50th percentile values for the benchmark fuels, and Table 6 presents a specification based on the aggregate 90th percentile values of the benchmark fuels.

As was the case with the gasoline specification, volatile organic detection limits for gasoline are quite large. For this reason, EPA is relying on surrogate values for volatile organic detection limits, one based on the detection limits from a fuel oil-only composite. For the 50th percentile composite fuel specification, the 50th percentile fuel oil-only volatile organic nondetect values were used. The 90th percentile composite fuel specification was handled similarly, using the 90th percentile volatile organic nondetect values from the fuel oil-only composite. See the discussion for the gasoline sample for EPA's concerns regarding gasoline's high detection limits.

2. Physical Specifications (Flash Point and Kinematic Viscosity)

Alternative physical specifications for the options evaluated are presented collectively in Tables 7 and 8 of the appendix. Table 7 presents the results of the analyses EPA conducted. Table 8 presents an alternate approach, using the requirements for viscosity and flash point for fuel oil specified by ASTM. Physical specifications for viscosity and flash point for gasoline are not required by ASTM, but their upper and lower limits, respectively, are available from other reference sources.

When considering a composite physical specifications using the reference values presented in Table 8, EPA believes it is appropriate to use the second highest viscosity and second lowest flash point as the specifications. This would have the effect of not considering the extremes, No. 6 fuel oil viscosity (50.0 cSt at 100°C) and gasoline flash point (−42°C), and using as the specification the viscosity of No. 4 fuel oil (24.0 cSt at 40°C) and the flash point of No. 2 fuel oil (38°C). EPA believes this approach will result in specifications which are representative of comparable fuels and the fossil fuels they displace, and ensure adequate safety during transportation and storage.

Subsection A.2.b. discusses the proposed minimum heating value of 11,500 J/g (5,000 BTU/lbm).

E. Exclusion of Synthesis Gas Fuel

EPA is also proposing to exclude from the definition of solid waste (and, therefore regulation as hazardous waste) a particular type of hazardous waste-derived fuel, namely a type of synthesis gas (''syngas'') meeting particular, stringent specifications. The Agency believes that many fuels produced from hazardous wastes are more waste-like than fuel- or product-like, and must be regulated as such. We are aware, however, of certain fuels and products produced from hazardous waste that are more appropriately classified and managed as products rather than wastes. EPA believes that syngas meeting the requirements of the proposed exclusion is such a material. Syngas is a commercial product which has important uses in industry as both a feedstock and commercial fuel, and it may be used as both a feedstock and commercial fuel at a manufacturing facility. The Agency is therefore proposing this exclusion to clarify the distinction between syngas products meeting these stringent specifications and hazardous wastes and other waste-derived fuels. The Agency believes it is useful to provide a conditional exclusion for these particular fuels, possibly before promulgating the broader rule being proposed today. This is because, although there may be much debate about the generic comparable fuel specification levels discussed above, the syngas at issue here appears to be well within the bounds of what would be excluded, whatever the final rule levels may actually be for other comparable fuels.

The proposal applies to syngas that results from thermal reaction of hazardous wastes which is optimized to both break organic bonds and reformulate the organics into hydrogen gas (H2) and carbon monoxide (CO). This process is more similar to a chemical reaction, rather than to combustion. The process is optimized to produce an end-product, rather than merely to destroy organic matter.

EPA is aware of one such process, proposed to be operated by Molten Metals Technology (MMT). MMT intends to operate a catalytic extraction process (CEP) unit that generates certain gas streams from the thermal reaction of various hazardous wastes, including chlorinated hazardous wastes. See letter of July 21, 1995, from Molten Metal Technology to EPA. This letter and other information on the MMT process are in the docket for today's proposed rule. MMT claims that the syngas generated by the processes has legitimate fuel value (i.e., 6,000 to 7,000 Btu/lb), has a chlorine level of 1 ppmv or less, and does not contain hazardous compounds at higher than parts per billion levels. Thus, this syngas possesses standard product indicia in the form of fuel value plus being the output of a process designed to optimize these properties, and the syngas product does not contain hazardous constituents at levels higher than those present in fossil fuel.

To ensure that any excluded syngas meets these low levels of hazardous compounds relative to levels in fossil fuels in order to be excluded from the definition as a solid waste, the Agency is proposing the following syngas specifications:

—Minimum Btu value of 5,000 Btu/lb;
—Less than 1 ppmv [202] of each hazardous constituent listed in Appendix VIII of Part 261 (that could reasonably be expected to be in the gas), except the limit for hydrogen sulfide is 10 ppmv;
—Less than 1 ppmv of total chlorine; and
—Less than 1 ppmv of total nitrogen, other than diatomic nitrogen (N_2).

EPA seeks comment on whether there are other hazardous waste-derived synthesis gas fuels (i.e., other than MMT's) that meet the criteria for this proposed exclusion.

We also note that conditions imposed for exclusion of syngas fuels in no way precludes the use of syngas as an ingredient in manufacturing, which is evaluated under a different set of criteria, when the syngas is produced from hazardous waste. In other words, if the syngas were to be used as either a product in manufacturing or burned as a fuel, it would be excluded as a product when it met the criteria for use as a product and was used for that purpose and excluded as a fuel when burned.

If EPA adopts this exclusion for syngas fuel, we believe that the implementation procedures for the generic comparable fuel exclusion discussed subsequently in Section F would also be appropriate for syngas. This includes requirements for the syngas producer to notify the Regional Administrator that an excluded fuel is produced, a certification that the syngas meets the exclusion specification levels, and sampling and analysis requirements. EPA invites comment on these implementation procedures for syngases and whether any of these procedures should be modified to address any unique characteristics of syngases.

Finally, we note that in Section F below we discuss whether the burning of hazardous waste excluded under the generic comparable fuel exclusion should be restricted only to stationary sources either with air permits or that otherwise have their air emissions regulated by a federal, state, or local entity. We specifically request comment on whether this restriction would also be appropriate for excluded syngas. Given that the Agency may undertake final rulemaking to provide an exclusion for syngas before promulgating a generic exclusion for

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[202] All specification levels would be documented at normal temperature and pressure of the gas at the point that the exclusion is claimed.

comparable fuels, however, we request comment on whether more restrictive requirements on burning excluded syngas would be appropriate to minimize concern about burning a hazardous waste-derived gas. For example, the exclusion could be limited to syngas which is burned in an industrial boiler, industrial furnace (as defined in 40 CFR 260.10) or incinerator. We note that these units would not necessarily have to be RCRA Subtitle C units.

F. Implementation of the Exclusion

The implementation scheme described here is adapted from the current used oil management system and is tailored to the particular characteristics of the comparable fuel universe.[203] It provides for one-time notification and certification, sampling and analysis, and recordkeeping requirements. Other issues addressed include blending, ensuring that the comparable fuel is burned, and treatment to meet the specification.

1. Notification and Certification

EPA proposes that a generator (or syngas producer[204]) who claims that a (currently defined) hazardous waste meets the specification for exclusion must submit a one-time notification and certification to the Regional Administrator. The notification would state that the generator manages a comparable fuel and certifies (through a responsible company official) that the generator is in compliance with the conditions of the exclusion regarding sampling and analysis, recordkeeping, blending, and ultimate use of the waste as a fuel. EPA understands that a ‘‘generator’’ may be a company with multiple facilities. For this reason, a single company would be allowed to submit one notification, but must specify at what facilities the comparable fuels notification applies. All other provisions apply to each stream at the point of generation.

2. Sampling and Analysis

EPA believes it is appropriate that the generator document by sampling and analysis that the hazardous waste meets the specification. Until such documentation is obtained, the waste would not be excluded. Waste analysis rules for TSDFs would apply to comparable fuel generators. Consequently, generators would implement a comparable fuels analysis plan.

The sampling and analytical procedures for determining that the waste meets the specification must be documented in a comparable fuels analysis plan. The comparable fuel analysis plan would involve sampling and analyzing for all Appendix VIII constituents initially and at least every year thereafter for constituents that the generator could have reason to believe are present in the comparable fuel. EPA specifically invites comment on whether to allow a generator to use process knowledge to determine what compounds to sample and analyze for during the first analysis, as well.

The generator would use current EPA guidance for developing waste analysis plans to derive their comparable fuel analyze plan. This will ensure that generators sample and analysis as often as necessary, i.e., more frequently than every year, for constituents present in the fuel to ensure that excluded waste meets the specification.

Analytical methods provided by SW–846 must be used, unless written approval is obtained from the Regional Administrator to use an equivalent method. EPA invites comment on establishing a procedure similar to Part 63, Appendix A, Method 301 to validate alternate analytical methods. EPA also invites comment on whether to limit the Agency’s time to approve an equivalent method. In this case, the Regional Administrator would have a set period of time, such as 60 days, to respond to the request. If an approval is not received within 60 days, the alternative method is considered approved. If the Regional Administrator later rejects the method, the rejection would only pertain to analyses conducted after the rejection of the method.

3. Use as a Fuel

An integral part of the comparable fuel exclusion is that the fuel must be burned. To ensure that the comparable fuel is burned, the person who claims the exclusion must either:

—Burn the comparable fuel on-site; or
—Ship the waste off-site to a person who in turn burns the comparable fuel.

This provision would not allow any party to manage the fuel other than those who generate or burn the fuel (and other than transportation related handling). EPA is reluctant to allow persons other than the generator and the burner to manage the comparable fuel because it would likely be too difficult to ensure that the excluded fuel meets the specification and is burned. We invite comment on how to allow third party intermediaries, such as fuel blenders, to handle an excluded comparable fuel without precipitating serious enforcement and implementation difficulties.

Additionally, EPA is concerned that comparable fuel shipped directly to an off-site burner may not in fact be burned. Therefore, EPA invites comment on whether, for off-site shipments to a burner, the following information should be retained in the record for each shipment:

—Name and address of the receiving facility;
—Cross-reference to a certification from the facility certifying that the comparable fuel will be burned;
—Quantity of excluded waste shipped;
—Date of shipment; and
—A cross-reference to the analyses performed to determine that the waste meets the specification.

A comparable fuel which is not burned remains a hazardous waste and is subject to regulation cradle-to-grave.[205] This documentation would provide a paper trail to ensure that the comparable fuel is burned.

EPA invites comment on whether the burning of a comparable fuel should be restricted to only stationary sources either with air permits or that otherwise have their air emissions regulated by a federal, state, or local entity. EPA’s primary concern is that excluded fuel may be burned in unregulated combustion devices. EPA believes that unregulated burners may be unaware of or unprepared to handle many unique issues related to fuels other than fossil fuels. In addition, EPA invites comment on whether comparable fuels should be allowed for use in sources other than stationary sources, i.e., mobile sources (on- and off-road automobiles, trucks, and engines) and small engines.

4. Blending To Meet the Specification

The issue of whether to allow blending to meet the comparable fuel specification also needs to be addressed. One alternative is to exclude only those comparable fuels that meet the specification as generated and which are destined for burning. The facilities would be required to demonstrate, for

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[203] Note that used oil has its own separate management system, as allowed under RCRA, tailored to the unique characteristics of used oil recycling practices. The comparable fuel exclusion proposed today would not apply to used oil because it is adequately and appropriately managed under its own tailored system. Used oil will still be managed under 40 CFR Part 279. This proposal in no way reopens the used oil specification or management structure in 40 CFR Part 279.

[204] Requirements applicable to the generator of an excluded fuel would also apply to producers of excluded syngas.

[205] Note that the only disposal method for a comparable fuel is burning. Any disposal method other than burning is a RCRA violation, unless the comparable fuel is properly managed as a hazardous waste.

compliance purposes, that the waste as generated meets the specification and to certify that the waste is destined for burning.

If blending to lower the concentrations of hazardous constituents in a waste were allowed to meet the specification, EPA believes that a very extensive compliance and enforcement system would have to be instituted to ensure that blending was done properly (with any necessary storage and treatment permits) and that the resultant mixture meets the specification continually. This alternative appears to warrant a degree of oversight that may be infeasible from the industry viewpoint and unworkable from the Agency's viewpoint. EPA is also investigating whether blending removes the incentive for facilities to engage in source reduction and recycling of waste. Finally, this alternative raises the issue of whether blending is simply a form of prohibited or objectionable dilution that could result in an overall increase in environmental loading of toxic, persistent, or bioaccumulative substances.

Complicating this issue is the fact that blending to lower hazardous constituent concentrations in used oil is allowed. (40 CFR 279.50(a).) However, EPA believes it is appropriate to deviate from the approach for used oil in this case. Used oil is better defined and understood in its origins and use than currently defined hazardous wastes. Used crankcase oil is a petroleum product analogous to a thick fuel with enriched metal concentrations due to its use for lubricating metal-bearing parts in situations of tight tolerance. In the case of used oil, blending a thick fuel enriched with metals with a thinner fuel with low concentrations of metals is appropriate since the resulting mixture would be wholly a petroleum product with similar levels of metals as other petroleum fuels.

Comparable fuels, however, differ substantially from used oil in both the nature of materials to which the exclusion pertains and the scope of the exclusion. A comparable fuel is presently defined as a hazardous waste and is unlikely to be a petroleum distillate. The issue of toxic organic constituents is important for comparable fuels due to the diversity of processes and process ingredients from which potential comparable fuels may result. This is not relevant for the used oil rules since they deal with the post-use material stemming from a highly consistent and well known petroleum distillate. Therefore, blending used oil would result in a more predictable mixture, one which would be expected to contain the same organic compounds in varying concentrations. The same cannot be said for the large variety of potential comparable fuels, which can vary significantly in the constituents present.

The issue of metals in a comparable fuel is similarly different from the case of used oil. While used oil does contain enriched levels of metals relative to virgin oil or petroleum fuels, those levels are greatly understood (relative to hazardous waste in general) due to their use in only one process, the lubrication of metal-bearing parts. Therefore, there is essentially a real-world limit to the amount and type of metal that could be entrained in a used oil, so blending to meet metal specifications is more appropriate. In the case of comparable fuels if there were no prohibition on blending to meet constituent specifications, a generator would be allowed to take a predominantly metal waste, blend it into a fuel to levels lower than the constituent specification levels, and (through pure dilution) meet the exclusion. For these reasons, EPA believes the specially tailored used oil program does not provide a satisfactory model to use for addressing the issue of blending potential comparable fuels.

We also note that the LDR program specifically prohibits dilution as a form of treatment. (40 CFR 268.3.) Allowing blending to meet the specification may, in effect, allow dilution as a form of treatment contrary to the LDR prohibition for these hazardous wastes. For these reasons, EPA desires to stay consistent with other rules and policies and not allow blending to meet the comparable fuels specification.

Similarly, EPA proposes that the specification for heating value be met on an as-generated basis as well. In other words, blending would not be allowed to meet the heating value specification. If the Agency were to allow blending to meet the heating value specification, wastes with no heating value could be blended with high heating value fossil fuels and meet the comparable fuel heating value specification. EPA does not believe this approach can be justified, allowing a waste which as generated has little or no heating value to be a comparable fuel. Therefore, we propose that heating value be met on an as generated basis.

For these reasons, EPA is proposing that the comparable fuel constituent and heating value specifications be met on an ‘‘as generated’’ basis, and that blending to meet the constituent and heating value specifications not be allowed. However, if the constituent and heating value specifications have been met as generated, EPA believes it may be appropriate for a comparable fuel to be treated like any other fuel and allow it to be blended *after the constituent and heating value specifications have been met.* This includes blending for the purposes of meeting other physical specifications (flash point and viscosity), pH neutralization, etc.

After blending, generators would have to retest the prospective comparable fuel to ensure that blending did not increase the levels of constituents to above the specification levels or decrease it to below the heating value requirement. If the waste were blended with a clean fossil fuel, such as No. 2 fuel oil, it would be sufficient to document that the substance the prospective comparable fuel is being blended with has lower constituent levels and a higher heating value than the comparable fuel specification. If the waste is above constituent specifications or below the heating value requirement after blending, the waste would not be a comparable fuel.

EPA invites comment on the issue of blending only to meet the physical specifications, flash point and kinematic viscosity.

5. Treatment To Meet the Specification

It is possible, as a technical matter, for hazardous wastes to undergo treatment that destroys or removes hazardous constituents and thereby produce a comparable fuel. Likewise, it is possible to treat a waste such that the heating value of the waste is increased. For example, distillation could remove certain organic constituents from the waste matrix, thereby allowing the treated waste to meet the comparable fuel specification. Similarly, decanting to decrease the water concentration of the waste stream would increase the heating value of the waste by concentrating those compounds which are burned. The issue discussed here is whether such processes should be allowed under a comparable fuel regime, and if so, under what circumstances. The Agency is proposing to allow treatment under limited circumstances.

The Agency's concern about allowing such treatment is that it could increase the incentive and opportunity for impermissible blending or otherwise fraudulent treatment. Thus, at the least, EPA would seek to set up controls to reduce the possibility of such practices if treatment were allowed. This might be done by requiring treaters to document that the comparable fuel specification is being satisfied through treatment that destroys or removes hazardous constituents and/or increases heating value by removing constituents from the waste, not through blending or other dilution-type activities. Second, where the treater has a RCRA permit for the storage/treatment activity (i.e., treatment of hazardous waste conducted in any unit except a 90-day generator unit not subject to permitting requirements under § 262.34), the rule could authorize permit writers to add conditions to the permit to assure the integrity of the permitted process. Such conditions could take the form of extra conditions on the treatment process, conditions on the wastes which could be treated to produce comparable fuels, and additional sampling and analysis of both incoming wastes and outgoing comparable fuels. The Agency solicits comment on what limitations or conditions should be imposed on treatment activities and whether and how to adapt such limitations or conditions to the non-permitted context of 90-day generator units.

Finally, it should be noted that if hazardous wastes are treated to produce comparable fuels, only the comparable fuel would be excluded from RCRA subtitle C regulation. The hazardous wastes would be regulated from point of generation until a comparable fuel is produced, so that generation, transport, storage, and treatment of the waste until production of the comparable fuel would remain subject to the applicable subtitle C rules. Also any residuals resulting from treatment remain hazardous wastes as a result of the derived-from rule.

6. Recordkeeping

It is proposed that documentation pertaining to verification that the waste meets the comparable fuel specification and the information on shipments be retained for three years. The sampling and analysis plan and all revisions to the plan since its inception would be retained for as long as the person claims to manage excluded waste, plus three years. Certifications from burners (if required in the final rule) would be retained for as long as the burner is shipped comparable fuels, plus three years.

The generator would retain the records supporting its claim for the exemption. For comparable fuels which are not blended, the records that must be retained are the as generated results. For comparable fuels which are blended to meet the flash point and/or kinematic viscosity specifications, the records which must be retained are those after blending.

7. Small Business Considerations: Inherently Comparable Fuel

Small businesses may, hypothetically, generate wastes (such as mineral spirits used to clean automotive parts) that could meet a comparable fuel specification. However, the Agency is concerned that the proposed implementation scheme for the comparable fuel exclusion may be overly burdensome to small businesses because of the small volume of waste each business may generate. EPA requests data on whether categories of high volume inherently comparable fuel from a large number of small generators exist. If so, EPA would consider providing an exclusion for these fuels in the final rule. For these fuels to be excluded, the Agency would need constituent data from various small generators indicating that these wastes would meet the comparable fuel exclusion levels on a routine basis.

If an inherently comparable fuel exclusion were promulgated in the final rule, the Agency would promulgate a petitioning process whereby classes of generators could document that a specific type of waste is virtually always likely to meet the comparable fuel specification. If the Agency granted the petition through rulemaking, such waste would be classified as inherently comparable fuel. As such, the generator would not be subject to the proposed implementation requirements for the comparable fuel exclusion: notification, sampling and analysis, and recordkeeping. In addition, such inherently comparable fuel could be blended, treated, and shipped off-site without restriction given that it would be excluded from regulation as generated.

EPA invites comment on whether high volumes of comparable fuel is generated from a large number of small generators. If so, the Agency requires data on whether this approach provides relief to small businesses while ensuring protection of human health and the environment. In addition, EPA invites analytical data supporting classification of particular wastes as inherently comparable fuel. The Agency would provide notice and request comment on such data prior to making a final determination that the waste is inherently comparable fuel.

G. Transportation and Storage

Waste derived fuels can pose risks during transportation and storage, not just when burned. For instance, comparable fuels could be reactive and corrosive (virgin fossil fuels are neither), more volatile than fossil fuels, or have other special properties affecting handling and storage. The Agency believes we can exempt comparable fuels from RCRA storage and transportation requirements and therefore rely on the storage and transportation regulations of other federal and state agencies. However, the affected industries may have more direct knowledge of how these requirements actually affect shipments and storage of the potential fuels, particularly with respect to the extent of state regulatory controls. We are therefore asking commenters to give EPA information on the adequacy of DOT and OSHA requirements related to storage and transportation, particularly with respect to whether a combustion facility (including an industrial boiler) will be on proper notice about the nature and behavior of the comparable fuel to allow for safe handling and burning.

In this regard, EPA believes it is appropriate to set a minimum flash point for comparable fuels. (See section A.2. for a general discussion concerning the Comparable Fuels Specification.) The flash point is defined as the minimum temperature at which a substance gives off enough flammable vapors which in contact with a spark or flame will ignite. Setting a minimum flash point would ensure that under ambient conditions the comparable fuel would not ignite during transportation and storage.

A shortcoming of this approach is that a purchaser or other off-site facility may desire a comparable fuel with a flash point lower than the comparable fuel specified flash point. EPA does not wish to preclude low flash point comparable fuels from the exemption. Therefore, the Agency is inclined to allow some waiver of the minimum flash point specification under certain circumstances.

EPA is proposing to allow low flash point comparable fuels if there is some notice to intermediate carriers and the ultimate user of what the flash point of this comparable fuel is. To do this, EPA needs to be assured that these low flash point comparable fuels can be stored, handled, and transported safely. EPA is inclined to believe current DOT and OSHA requirements for transportation and storage of hazardous or combustible liquids are adequate for this purpose, but we specifically seek comment on this issue.

H. Speculative Accumulation

EPA is also proposing that comparable fuels remain subject to the speculative accumulation test found in § 261.2(c)(4). This means that persons generating or burning comparable fuels must actually put a given volume of the fuel to its intended use during a one-year period, namely 75 per cent of what is on hand at the beginning of each calendar year commencing on January 1. See the definition of ''accumulated speculatively'' in § 261.1(c)(8). (The rules also provide for variances to accommodate circumstances where such turnover is not legitimately practical. § 260.31(a).) EPA applies this test to other similar exclusions of recycled secondary materials in the rules (see § 261.2(e)(2)(iii).) This is because over accumulation of hazardous waste-derived recyclables has led to many of the most severe hazardous waste damage incidents. See 50 FR at 658–61 and 634–37 (January 4, 1985). There is no formal recordkeeping requirement associated with the speculative accumulation test, but the burden of proof is on the person claiming the exclusion to show that the test has been satisfied. § 261.2(f) and 50 FR at 636–37.

I. Regulatory Impacts

EPA also requests data from the regulatory community concerning the regulatory impacts of this proposed comparable fuel exclusion. Impact data includes the quantity of waste which would be excluded (by weight) and the cost savings as a result of the exclusion. Based on the data submitted, EPA will develop a full regulatory impact assessment during the final rulemaking.

J. CMA Clean Fuel Proposal

The Chemical Manufacturers Association (CMA) submitted a proposal to exempt certain ''clean'' liquid wastes from RCRA regulation [206]. Unlike EPA's benchmark-based comparable fuel proposal, the CMA approach would establish clean fuel specifications for mercury, LVM, and SVM metals based on the technology-based MACT emission standards proposed today. For mercury, CMA calculated the maximum feed rate the facility would be allowed if it had a given gas flowrate, no mercury control, and yet complied with today's proposed standards. This would establish the maximum mercury concentration of the CMA ''clean fuel'' specification. Limits would be established for LVM and SVM metals in a similar fashion. For chlorine, CMA presented a specification level based on the concentration of chlorine found in coal. Limits for ash content would be derived from No. 4 fuel oil.

The CMA proposal also appears to rely solely on adequate thermal destruction of the organics to control potential organic contamination and risks therefrom. Combustion would be limited to on-site boilers or boilers owned and operated by the clean fuel generator, where these boilers meet a 100 ppmv hourly rolling average CO limit.

CMA's clean fuel proposal would also establish limits on physical specifications. The heating value of a CMA clean fuel would have to be at least 5,000 BTU/lb, viscosity would have to be less that 26.4, and the clean fuel must be a liquid.

Acutely hazardous wastes [207] would not be eligible for CMA's proposed clean fuel exemption, nor would dioxin-listed wastes (hazardous waste numbers F020, F021, F022, F023, F026, F028.)

EPA invites comment on CMA's proposed ''clean fuels'' specification. Specifically, EPA requests commentors address the following issues and questions:

—Is reliance on the technology-based MACT emission standards approach appropriate for establishing a clean fuel exemption under RCRA, either with or without restrictions on the type of device that can be used to burn the clean fuel? How does EPA justify not establishing specific constituent limits for the other five RCRA metals?

—Does a CO limit alone ensure adequate destruction of toxic organics in a clean fuel scenario? Would additional controls, such as an HC limit, limits on inlet temperature to a dry PM APCD, DRE testing, and site-specific risk assessment also be appropriate?

—Does CMA's proposal adequately address new facilities? Would it be appropriate to allow off-site shipment to a facility not owned by the generator if the generator owns no combustion device in the vicinity? If so, how would EPA be able to ensure compliance regarding the CO emissions (and possibly other testing and operational conditions) of a combustion device not owned by the generator?

—Should CMA's clean fuel approach be expanded to include gaseous as well as liquid fuels?

—Are there wastes other than those identified by CMA (acutely toxic and dioxin-listed wastes) which should not be eligible for a ''clean fuel'' exemption? If so, what would be the practical impacts of such expanded ineligibility?

—Are data available documenting that emissions from burning a ''clean fuel'' would not pose a significant risk for the potential combustion and management scenarios in which the clean fuel exclusion from RCRA might be used?

II. Miscellaneous Revisions to the Existing Rules

This section provides several miscellaneous revisions to the RCRA hazardous waste combustion rules provided by 40 CFR Parts 260–270. We note that we are also proposing other revisions to Parts 260–270 that would be conforming revisions to ensure that the RCRA rules are consistent with similar provisions of the proposed Part 63 rules. Those proposed conforming revisions are discussed elsewhere in the preamble.

A. Revisions to the Small Quantity Burner Exemption Under the BIF Rule

The Agency is proposing to revise the small quantity burner (SQB) exemption provided by § 266.108 of the BIF rule because the current exemption may not be protective of human health and the environment. Under the exemption, BIFs could burn up to the exempt quantities absent regulation other than notification and recordkeeping requirements. Under a settlement agreement, the environmental petitioners in *Horsehead Resource Development Company, Inc.*, v. *EPA* (No. 91–1221 and Consolidated Cases), the Agency must reevaluate whether the small quantity burner exemption is sufficiently protective given that the Agency did not consider indirect exposure pathways in calculating the exemption levels. In addition, the petitioners argued that the exemption is inconsistent with the intent of RCRA § 3004(q)(2)(B) which specifically allows the Administrator to exempt facilities which burn *de minimis* quantities of hazardous waste because the exemption as promulgated would allow sources to burn up to 2,000 gallons of hazardous waste per month absent substantive emissions controls. Petitioners believe that 2,000 gallons per month is not a *de minimis* quantity.

EPA attempted to reevaluate exempt quantities considering indirect exposure pathways for, in particular, emissions of dioxins and furans (D/F). Unfortunately, we were not able to adequately predict emission levels of D/F for purposes of conducting a generic, national risk assessment to back-calculate exempt

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[206] See *Revised CMA Proposal for Clean Waste Fuels Exemption to RCRA* dated March 1, 1996.

[207] That is, discarded commercial chemical products listed in § 261.33 (''P'' listed wastes), and acutely hazardous (those with ''H'' hazard codes) wastes listed in §§ 261.31 and 261.32 (hazardous wastes from non-specific and specific sources, ''F'' and ''K'' listed wastes, respectively.)

quantities. We could not effectively predict D/F emissions because: (1) There may be little relationship between quantity of hazardous waste burned and D/F emissions (i.e., other factors may result in high or low D/F emissions); and (2) there are several site-specific factors that can affect D/F emissions, including combustion efficiency (that is affected by factors such as combustion zone temperature, oxygen levels, and residence time in the combustion zone), gas temperature at the particulate matter control device, and presence of precursors such as PCBs.

In addition, we found it difficult to identify an appropriate indirect exposure scenario for purposes of assessing risk to support a generic exemption. We note that to evaluate whether the proposed MACT standards met RCRA protectiveness requirements, we analyzed 11 example facilities assuming the example facilities emitted HAPs at the regulatory option levels. We did not have site-specific stack gas properties (e.g., gas flow rate, gas temperature, stack height) and exposure information to conduct similar indirect exposure assessments for example SQB facilities.

Given these difficulties, the Agency is proposing to revise the SQB exemption to limit exempt quantities to 100 kg/mo (27 gal/mo), which is the current exemption level for small quantity generators (SQG) provided by § 261.5. We believe that this is appropriate given that SQG hazardous waste is already exempt from regulation and thus, may be burned absent emission controls. We note, however, that the SQB exemption can apply to facilities owned or operated by large quantity generators. Thus, under today's proposal, wastes not eligible for the SQG exemption could be eligible for the SQB exemption. Nonetheless, we believe that 27 gal/mo is a reasonable level for the exemption because it is truly a *de minimis* quantity and such quantities can be burned absent emission controls under existing SQG regulations.

We believe that approximately 200 boilers are currently operating under the SQB exemption. Many of these boilers are likely burning quantities in excess of 27 gallons/mo, and so would be subject to full regulation as a BIF under today's proposal. We note, however, that we are also proposing today a comparable fuels exclusion that would exclude from the definition of solid and hazardous waste any material that meets the proposed comparable fuels specification. Although we currently have no information on how many SQBs could use the comparable fuels exclusion, some heretofore SQBs are expected to be eligible for this proposed exclusion.

Sources that burn hazardous waste that do not meet the comparable fuels specification may determine that it is less expensive to send their waste to a commercial burner than comply with the BIF regulations. Those sources that choose to continue burning hazardous waste would be required to comply with the substantive requirements of the BIF rule. Since the BIF rule would subject some of these facilities to RCRA regulation for the first time (assuming no other permitted units are at the facility), these SQB facilities would be eligible for interim status. See 56 FR at 7186 (February 21, 1991) for requirements regarding permit modifications, section 3010 notifications, and Part A permit applications. Such sources would also be required to submit a certification of precompliance (required by § 266.103(b)) within 6 months of the date of publication of the final rule in the Federal Register, and a certification of compliance (required by § 266.103(c)) within 18 months of the date of publication of the final rule.

B. The Waiver of the PM Standard Under the Low Risk Waste Exemption of the BIF Rule Would Not Be Applicable to HWCs

Section 266.109 of the BIF rule provides a conditional exemption from the destruction and removal efficiency (DRE) standard and the particulate matter (PM) emission standard. The DRE standard is waived if the owner or operator complies with prescribed procedures to show that emissions of toxic organics are not likely to pose a potential hazard to human health considering the direct inhalation pathway. The PM standard is waived if the DRE standard is waived and the source complies with the Tier I or adjusted Tier I feedrate limits for metals.

We are proposing today to restrict eligibility for the waiver of the PM standard to BIFs other than cement and lightweight aggregate kilns. This is because: (1) Compliance assurance with the proposed MACT standards for D/F, SVM, and LVM is based on compliance with a CEM-monitored, site-specific PM emission limit;[208] and (2) the proposed MACT PM standard would be used to help minimize emissions of adsorbed non-D/F organic HAPs. Given that this restriction for cement and lightweight aggregate kilns is needed to ensure compliance with the proposed MACT standards, the restriction would be effective at the time that the kiln begins to comply with the MACT standard (i.e., when the source submits the initial notification of compliance).

Finally, we note that, as a practical matter, we believe that this proposed restriction of eligibility for the PM waiver for kilns will have little or no effect on the regulated community. We are not aware of any cement or lightweight aggregate kilns that both meet the conditions for the exemption and have elected or intend to elect to request the waiver.

The Agency solicits comment on the application of waste minimization to lower the volume of waste streams fed to combustors so that the combustor can meet the proposed revised SQB feed limitations. Such reductions might be achieved by meeting the proposed HWIR standards and thus removing entire streams from Subtitle C requirements. The Agency is particularly interested in technical and economic information about commercial or experimental processes to reduce stream volume.

C. The ''Low Risk Waste'' Exemption from the Emission Standards Provided by the Existing Incinerator Standards Would Be Superseded by the MACT Rules

Section 264.340(c) exempts certain incinerators from the emission standards if the hazardous waste burned contains insignificant concentrations of Appendix VIII, Part 261, hazardous constituents which would reasonably be expected to be in the waste. In implementing this provision, the Agency has used various measures of risk potential to define ''insignificant'' concentrations. We believe that a risk-based waiver is inconsistent with today's proposed technology-based MACT standards for incinerators, and in any case could not supersede those standards. Thus, we are proposing that this provision no longer be applicable to an incinerator at the time it begins complying with the MACT standards (i.e., when the initial notification of compliance is submitted).

We also note that § 264.340(b) provides the same exemption from emission standards if the hazardous waste burned does not contain any (i.e., nondetect levels) of the Appendix VIII constituents. We are proposing that this provision also be superseded by the proposed MACT standards because: (1) Detection limits may be high for some waste matrices; and (2) nontoxic organics in the waste can result in emissions of toxic organics under poor combustion conditions or conditions favorable to formation of D/F in the

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[208] Not to exceed the proposed national MACT standard.

post-combustion zone (e.g., a PM control device operating at temperatures above 400°F).

D. Bevill Residues

1. Required Testing Frequency for Bevill Residues

The Agency is proposing to set a minimum sampling and analysis frequency for residues derived from the burning or processing of hazardous waste in units that may qualify for the Bevill exemption by satisfying the requirements of § 266.112 (a) and (b). The Agency believes a minimum testing frequency is necessary to prevent large quantities of hazardous residues from being managed in an environmentally unsound manner.

Current regulations require that waste derived residue be sampled and analyzed ‘‘as often as necessary to determine whether the residue generated during each 24-hour period’’ meets requirements to qualify for the Bevill exemption. Because large volumes of residue are generated in any 24-hour period, it is possible that a facility may have disposed of the residue after a sample had been taken, but before the analysis results are received. The Agency stated in the preamble to the BIF regulations (56 FR 42504 (August 27, 1991)) that ‘‘if the waste derived residue is sampled and analyzed less often than on a daily basis, and subsequent analysis determines that the residue fails the test and is fully regulated hazardous waste, the Agency considers all residue generated since the previous successful analysis to be fully regulated hazardous waste absent documentation otherwise.’’ Residue generated after the failed test may also be considered hazardous waste until the next passing test. The residue disposal area or unit would also become subject to Subtitle C requirements.

In the interest of protecting human health and the environment and avoiding the scenarios mentioned above, the Agency is today proposing that if a facility elects to sample and analyze less frequently than every day, approval must be granted by the Regional Administrator and the sampling and analysis frequency used must be based on and justified by statistical analysis. The Agency is also proposing that, in the event the Regional Administrator approves less than daily sampling at a facility, the facility must, at a minimum, sample and analyze its residues at least once every month for metals and once every six months for other compounds. A more frequent minimum sampling frequency has been proposed for metals because of the variability of metal content in feed materials and because metals cannot be destroyed in the furnace. The proposed sampling frequency will minimize the possibility of large volumes of hazardous residues being placed on the land or otherwise being stored or disposed of contrary to Subtitle C requirements. The Agency does not believe these proposed requirements will unduly burden the regulated community and requests comments on this issue.

The following factors must be considered when determining an appropriate sampling frequency:

—Selection of a statistical method and distribution of data (normal or log normal distribution)
—Feedrates of wastes and all other feed streams
—Volatility of metals in all feed streams
—Physical form of various feed streams (solid versus liquid)
—Type of feed system
—Levels and types of organic constituents in all feedstreams (for example, difficulty of destruction or formation of by-products)
—Levels and types of metals regulated under RCRA, other than those regulated by the BIF regulations (for example, selenium)
—Changes in feed streams
—Changes in operating conditions or equipment
—Operating conditions when sampling compared with those when not sampling
—Trends in partitioning of metals in fly as compared with bottom ash

Facilities with a high variability of hazardous constituents in their residues should closely examine these factors in deciding upon a sampling frequency. Facilities with residues that exhibit little or no constituent variability may be able to sample at the minimum frequency, pending approval of less than daily sampling by the Regional Administrator.

2. Dioxin Testing of Bevill Residues

a. Regulatory History. Under 40 CFR § 266.112 of the boiler/industrial furnace (BIF) rule, EPA codified procedures for owners and operators of Bevill devices to determine whether their residues retain the Bevill exemption when the facilities co-fire or co-process hazardous waste fuels along with fossil fuels or normal raw materials. These procedures were deemed necessary to ensure that the burning of hazardous waste does not alter the residues so that they are no longer the ‘‘high volume, low hazard’’ materials exempted by the Bevill amendment. This test was upheld by the D.C. Circuit in *Horsehead Resource Development Co.* v. *Browner*, 16 F. 3d 1246 (D.C. Cir. 1994).

Specifically, 40 CFR § 266.112 requires facilities that claim the Bevill exemption for residues from co-burning hazardous waste along with Bevill raw materials to conduct sampling and analysis of their residues to document that either: (1) Levels of toxic constituents in the waste-derived residue are not significantly higher than normal (i.e., when not burning hazardous waste) residues; or (2) levels of toxic constituents in waste-derived residue do not exceed health-based levels specified in the rule. This is commonly referred to as the two-part Bevill test. The constituents for which analysis must be conducted include: (1) Appendix VIII, Part 261, hazardous constituents that could reasonably be expected to be in the hazardous waste burned, and that are listed in § 268.40 for F039 non-wastewaters (see 59 FR 4982 of September 19, 1994); and (2) compounds that the Agency has determined are common products of incomplete combustion (i.e., they may be formed during combustion of the waste) and have been listed in Appendix VIII of Part 266.

b. Addition of Dioxin/Furan Compounds to the Appendix VIII, Part 266 Product of Incomplete Combustion List. The Appendix VIII, Part 266 product of incomplete combustion (PIC) list does not currently include polychlorinated dibenzo-p-dioxin (PCDD) and polychlorinated dibenzo-furan (PCDF) compounds. In addition, most BIF facilities do not burn wastes which could reasonably be expected to contain PCDD/PCDF compounds. Thus, few § 266.112 facilities have been analyzing their residues on a routine basis for PCDD/PCDF compounds to determine whether burning hazardous waste has affected the character of the residue.

EPA believes that it is important to add PCDD/PCDF compounds to the PIC list in order to make residue analysis for PCDD/PCDFs a mandatory component of the two-part Bevill test. First, dioxin/furan compounds are likely to be PICs and, as such, should rightfully be included on the PIC list. As described in Chapter 4 of the May 1994 Draft Combustion Emissions Technical Resource Document (CETRED), there is a considerable body of evidence to show that PCDD/PCDF compounds can be formed in the post-combustion regions of boilers, industrial furnaces and incinerators, even if no PCDD/PCDF compounds are fed to the combustion device. Secondly, the level of dioxins in residues can be influenced by hazardous waste burning activities. The October 1994 Cement Kiln Dust Notice of Data Availability, which augmented the December 1993 Report to Congress on Cement Kiln Dust, provided a regression analysis to determine the impact of hazardous waste fuel use on dioxin and furan concentrations. Every one of the dioxins and furans evaluated appeared in significantly higher concentrations in cement kiln dust generated by plants that burned hazardous waste fuel in comparison with plants that did not burn any hazardous waste fuels. The Report concluded that the strength and consistency of this relationship for cement kiln dust was striking, and that it provides very strong evidence that dioxin and furan concentrations in the dust are systematically higher at plants that burn hazardous waste fuel.

Finally, it is important to note that, where the potential for excess risks were identified in the Report, the constituents of concern included metals and dioxin/furan compounds. Metals are already covered by the two-part test of § 266.112. However, it is equally important to include PCDDs/PCDFs in the two-part test to make sure that residues from hazardous waste-burning devices continue to meet the high volume, low hazard criteria presumed by the Bevill exemption.

c. Use of Land Disposal Restriction Standards as Interim Limits for PCDD/PCDFs. On November 9, 1993, EPA published an interim final rule establishing alternate concentration limits for nonmetals to be used for the health-based comparison portion of the two-part Bevill test (i.e., 40 CFR § 266.112(b)(2)). The alternate levels were based on the land disposal restriction (LDR) limits for F039 non-wastewaters pending further administrative action to determine whether more appropriate health-based levels should be developed. Although the LDR limits are not health-based levels, the Agency noted in the preamble (58 FR at 59598 (Nov. 9, 1994)) that the technology-based LDR treatment limits should serve to identify residues that have the ''low toxicity'' attribute that is one of the key bases for the temporary exemption of Bevill residues from the definition of hazardous waste. See *Horsehead Resource Development Co.* v. *Browner,* 16 F. 3d. The Agency also noted that the LDR levels are promulgated limits and so have been scrutinized and subject to public comment in previous rulemakings.

As part of today's proposal to add PCDD/PCDF constituents to the Appendix VIII, Part 266 PIC list, the Agency would continue the interim practice of basing the concentration limits for the health-based portion of the two-part Bevill test on the LDR F039 nonwastewater levels. The LDR regulation establishes concentration limits of 1 part-per-billion (ppb) for total HxPCDDs, total HxPCDFs, total PePCDDs, total PePCDFs, total TCDDs and total TCDFs. The Agency believes that these levels for dioxin/furan compounds will serve as adequate screening levels on an interim basis to ensure that residues from hazardous waste-burning devices continue to meet the ''low toxicity'' attribute presumed by the Bevill exemption.

The Report to Congress on Cement Kiln Dust provides some support for the 1 ppb PCDD/PCDF screening criteria. In baseline risk modeling for fifteen case study facilities managing CKD on-site, dioxin/furan compounds were not identified as contributors to adverse health effects for either direct or indirect exposure pathways (see Report, Exhibit 6–14). Risk from PCDD/PCDFs only reached levels of concern when the Agency performed a sensitivity analysis to examine the change in risks that would occur at five baseline facilities based on the hypothetical management of CKD containing the highest measured PCDD/PCDF concentrations found in EPA's sampling at 11 cement plants. The highest concentrations were observed in samples from a cement facility, and were at least 2½ times higher than concentrations observed at any other facility. All of the samples from that facility exceeded 1 ppb for at least one homolog listed as part of the LDR F039 criteria (i.e., total HxPCDDs, total HxPCDFs, total PePCDDs, total PePCDFs, total TCDDs or total TCDFs). Thus, the levels which showed potential for adverse health effects in the site-specific modeling would be screened by application of the 1 ppb criteria listed in the F039 LDR. By comparison, none of the samples from facilities other than the above facility had any PCDD/PCDF homologs exceeding 1 ppb.

The Agency is proposing continued use of the LDR levels because it does not believe that it is appropriate to establish a more specific health-based level for dioxin/furan compounds at this time.[209] A separate regulatory process is underway which will establish controls on management of cement kiln dust (60 FR 7366). Any health-based level established in advance of these controlled CKD management standards would quickly become obsolete because, at a minimum, the fate and transport assumptions would be different. The Agency specifically requests comment regarding whether the interim LDR F039 limits for PCDD/PCDF constituents are appropriate. Alternatively, the Agency requests information regarding an appropriate methodology for establishing more specific health-based limits.

d. Clarification of Appendix VIII, Part 266 PIC List Applicability. There has historically been some confusion regarding whether each of the constituents listed on the Appendix VIII, Part 266 list must be a mandatory component of the residue testing at every facility, or whether a facility could exclude some of the constituents on the list. Today, the Agency clarifies that the Appendix VIII, Part 266 list is applicable to every facility in its entirety, without exclusion.

3. Application of Derived From Rule to Residues From Hazardous Waste Combustion in non-Bevill Boilers and Industrial Furnaces

As part of a settlement agreement of the lawsuit over the 1991 BIF regulations, EPA agreed to reconsider the appropriateness of applying the derived from rule to residues from co-processing listed hazardous waste fuels and raw materials in non-Bevill boilers and industrial furnaces. An example would be an oil-fired boiler burning listed hazardous waste fuel and generating emission control dusts or scrubber effluents, which dusts or effluents would not be considered to be Bevill excluded. If this type of burning occurs in a boiler or furnace whose residues are otherwise within the scope of the Bevill amendment, the residues remain exempted from subtitle C (i.e. remain exempted by virtue of the Bevill amendment) so long as they are not ''significantly affected'' by burning hazardous waste. § 266.112. A residue is not significantly affected if there is no statistically significant increase between baseline, non-hazardous waste-derived residues, or if hazardous constituents in the residue do not exceed health-based (or health-based surrogate) levels. *Id.* Consistent with the settlement agreement mentioned above, EPA solicits comment as to whether this same type of test could be applied to burning of hazardous waste in non-Bevill boilers and furnaces. The logic could be that if hazardous properties are not contributed by the hazardous waste, the derived from rule should not apply.

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[209] EPA notes that, by establishing LDR exemption levels for Bevill residue, the Agency is not suggesting that: (1) the technology-based treatment standards are equivalent to, or appropriate to use as, health-based limits; or (2) Bevill excluded residues should necessarily be subject to the LDR rules. See 58 FR at 59603 (November 9, 1994). These issues are the subject of other rulemakings.

EPA's inclination is not to apply any type of significantly affected test to residues at this time. The recently-proposed exit levels, and methodology, in the Hazardous Waste Identification Rule (HWIR) provide a means of automatic exit from the subtitle C system when wastes (including derived-from wastes) are no longer hazardous. Furthermore, the ''significantly affected'' test is closely linked to the Bevill amendment, and in fact defines the scope of that amendment in co-processing situations. EPA sees no persuasive reason to apply the test to non-Bevill residues, particularly when the Agency has proposed a means whereby such residues can automatically exit the system. It appears to EPA to be the better approach to make subtitle C exit determinations on the basis of hazards actually posed by the waste rather than by comparisons with a non-waste baseline. (Indeed, this is one component of the significantly affected test already. See § 266.112(b)(2).) The Agency solicits comment on this matter, however.

E. Applicability of Regulations to Cyanide Wastes

The Agency has received several inquiries regarding the applicability of § 266.100(c)(2)(i) criteria for processing cyanide wastes solely for metal recovery. Specifically, cyanide wastes do not meet the common dictionary meaning of being an organic, but can be destroyed by industrial furnaces. The Agency's intent of this exemption was to preclude burning of waste streams that contain greater than 500 ppm nonmetal compounds listed in Appendix VIII of Part 61, that are provided a level of destruction by the furnace. The Agency inappropriately chose the word 'organic' instead of 'nonmetal' in the above regulation. An amendment is being proposed to provide the needed clarification that wastes containing cyanides are eligible to be included in this exemption. We are also proposing similar amendments (i.e., revisions to use the term ''nonmetal'' rather than ''organic'') to subparagraphs (c)(2)(ii), (c)(3)(i)(B), and (c)(3)(ii).

F. Shakedown Concerns

There is a concern within the Agency that some new units do not effectively use their allotted 720 hour pre-trial burn period (commonly referred to as ''shakedown'') or extensions thereof to correct operational problems prior to the trial burn period. This ineffective use of the pretrial burn period can potentially lead to emission exceedances which pose unnecessary risks to human health and the environment. In addition, failure(s) during trial burn testing at one or more test conditions reduce a facility's flexibility to burn hazardous waste in a subsequent permit developed from the trial burn or may even lead to a need to perform other trial burns or a termination of the permit. A failure to perform adequate shakedown may also lead to difficulties in making an interpretation of trial burn data and in setting of permit conditions due to excessive variability in trial burn operation.

The Agency believes that an approach using system start-up and system problem solving with the use of a non-hazardous waste feed followed by a gradual, carefully planned introduction of hazardous waste feed is essential to avoid the potential problems which could result from the burning of hazardous waste in an undiagnosed system which may not yet be operating at steady state conditions. The absence of this type of approach has caused many previous trial burns not to be carried through to completion or has caused them to occur in a very different fashion from that prescribed in the trial burn plan. Other efforts during the trial burn have resulted in diminished operating allowances or in the need for additional trial burn testing. As a result of these occurrences, the Agency is proposing three options which center around the pretrial burn period in an attempt to enhance regulatory control over trial burn testing. The Agency is also requesting comment on the applicability of these options to interim status facilities. The shakedown period has, in the past, been applied exclusively to new facilities and has not addressed existing facilities operating under interim status. The Agency believes that these options could apply to interim status facilities if the newly proposed waste to be burned represented a very different waste than that which had been burned.

As its primary option, the Agency would require that facilities be required to show the Director prior to trial burn dates being scheduled that the facility has provided a minimum showing of operational readiness. This showing of operational readiness would be one which has been established by the Director and would be incorporated as part of the permit application process for both interim status and new devices. The manner in which this notification of readiness would occur would be determined by the Director. A trial burn could not be scheduled until this minimum showing to the Director has occurred. Criteria for trial burn readiness would include, but would not be limited to the following examples: (1) The ability of a facility to show that it has operated the device to be permitted under its planned trial burn conditions (*e.g.* temperature, feedrate) for a specified time period set by the Director, or (2) the ability of a facility to operate for a designated period of time (to be established by the Director) without an Automatic Waste Feed Cut-Off (AWFCO) occurring. To show readiness to the Director, the composition of the feed stream to the device during this showing would need to be nearly identical (if not identical) to the waste intended to be burned during the operational lifetime of the facility. This similarity should be consistent with respect to the physical, thermal, and fluid characteristics of the waste not only being burned during the trial burn tests, but also during the lifetime of the facility. It is the Agency's belief that facilities which fail their trial burn tests often fail because facilities tend to stress their devices for the first time only during trial burn testing. The system has to that point never undergone ''break point'' testing with an increased feedrate or maximum capacity feedrate. A trial burn should not be scheduled until a facility has shown the Director that it can operate without constant shutdowns at feedrates consistent with that of the trial burn.

A second option which the Agency offers for comment is a more restrictive option. This option proposes requirements on both the operations prior to and following the shakedown period. It incorporates the notification requirements found in the primary option along with an additional notification requirement which would occur prior to the beginning of shakedown. This option would require a facility to notify the Director that it has achieved steady state operation with non-hazardous waste during this period leading up to shakedown at operational levels set by Director (*e.g.* flowrates) which are comparable to that to be tested at trial burn and to certify that the device is ready to begin shakedown operations. As before, this option would also require a facility to notify the Director following shakedown that operational readiness with hazardous waste has been achieved and to certify that the device is ready for trial burn tests. Although this option would impose two more operational requirements for a facility, it would ensure that the facility has brought the device up to operational standards whereby the addition of hazardous waste would not represent an excessive risk to human health or the environment. The Agency believes that this option would also provide for a more efficient trial burn since it has required a facility to become operational without constant shutdowns prior to the trial burn prior to shakedown and after shakedown. Portions of this option may not be directly applicable to interim status facilities since they have been burning hazardous waste to date and may have most of their operational problems worked out.

A third option upon which the Agency is requesting comment is a ''guidance only'' option. Although this option would not impose any specific regulatory requirements for a showing of operational readiness prior to or after a shakedown period, it would provide guidance to industry and permit writers on how to effectively achieve preparedness prior to a trial burn without the need of formalizing it within the constraints of the regulations. Permit writers would have the ability, as they do now, to set readiness demonstration requirements if they deem it necessary for a specific site.

G. Extensions of Time Under Certification of Compliance

The Boiler and Industrial Furnace Rule, at 40 CFR § 266.103(c)(7), allows a facility to obtain a case-by-case extension under certain circumstances when events were outside of the control of the facility. There have been questions as to whether this provision meant that after August 21, 1992, a facility could no longer apply for a case-by-case extension. The Agency wants to clarify that it never intended this restrictive interpretation and so is proposing to amend this section to provide the clarification. EPA intended the case-by-case extension to apply at any time during the certification of compliance cycle, including during Revised Certification of Compliance under § 266.103(c)(8), and during Periodic Recertifications under § 266.103(d). See 56 FR at 7182 (February 21, 1991). The basis of granting the case-by-case extension is proposed to remain unchanged by today's rule. Additionally, EPA is clarifying that the automatic one year extension is not valid for facilities which were not in existence on August 21, 1991.

H. Technical Amendments to the BIF Rule

1. Facility Requirements at Closure

EPA is today proposing to amend § 266.103(l) to stipulate that at closure, the owner or operator must remove all hazardous waste and hazardous waste residues not only from the boiler or industrial furnace, but also from its air pollution control system (APCS). Although the APCS is an integral part of the facility, this minor amendment will make it explicitly clear that no hazardous waste or residues can remain in the APCS after closure.

2. Definitions under the BIF Rule

We are adding several definitions under § 260.10 for frequently used terms in combustion regulations like fugitive emissions, automatic waste feed cutoff system, run, air pollution control system and operating record. The purpose is to clarify these technical terms of thermal treatment, expedite permit writing as well as increase the enforceability of obvious technical violations. Some of these definitions already exist in the air regulations.

I. Clarification of Regulatory Status of Fuel Blenders

EPA is proposing to revise 40 CFR 266.101 (''Management prior to burning'') to clarify that fuel blending activities, including those which constitute treatment, are regulated under RCRA. Section 266.101 (formerly 266.34) was written with the understanding that hazardous waste fuel-blending activities were traditionally performed in containers or tank systems where the storage standards of Part 264 could be applied. The Agency believes that protection of human health and the environment is accomplished when the permit addresses the containment of the waste being treated. Therefore, no direct reference to ''treatment'' was included in Section 266.34; treatment was understood to be implicit in the regulation, as shown by the reference in section 261.6 to the ''* * * applicable provisions of Part 270.'' EPA has in fact explicitly interpreted § 266.101 (formerly § 266.34) to require tank storage standards to apply to tanks in which hazardous waste fuels are blended. See 52 FR 11820 (April 13, 1987).

More recently, it has come to the Agency's attention that fuel blenders may be using devices such as microwave units and distillation columns in their hazardous waste handling operations that differ from the traditional fuel-blending practices. These practices are, in fact, hazardous waste treatment activities requiring a RCRA permit, without which the unit cannot operate. For many such operations, the ''miscellaneous unit'' requirements of Part 264, Subpart X, would apply. Due to various inquiries regarding this issue, EPA has written several policy memoranda confirming that treatment, as well as storage, conducted by fuel blenders requires a RCRA permit. These memoranda are part of the Agency's RCRA Permit Policy Compendium and are available from the RCRA Hotline. They are also included in this rulemaking docket. EPA is taking this opportunity to clarify this issue in the regulations by revising the language in § 266.101.

J. Change in Reporting Requirements for Secondary Lead Smelters Subject to MACT

EPA recently promulgated MACT standards for the secondary lead smelter source category. 60 FR 29750 (June 23, 1995). In that rule, the Agency found, with unanimous support from commenters, that RCRA emission standards were unnecessary at the present time for these sources since the MACT standards provide significant health protection, area secondary lead sources will be regulated by these MACT standards, and the ultimate issue of the protectiveness of the standard will be evaluated during the section 112(f) residual risk determination.

EPA is proposing here to modify existing § 266.100(c), which provides an exemption from RCRA air emission standards for (among other sources) industrial furnaces burning hazardous waste solely for material recovery. Secondary lead smelters complying with conditions enumerated in § 266.100(c)(l) and (3) are among this type of industrial furnace. The Agency is proposing to amend § 266.100(c)and is proposing to add a new § 266.100(g) to state that RCRA provisions for air emissions do not apply to secondary lead smelters when the MACT rule takes effect (in June, 1997), provided the smelters do not burn hazardous wastes containing greater than 500 ppm nonmetal hazardous constituents (or burn wastes enumerated in 40 CFR Part 266 Appendix XI), submit a one-time notice to EPA or an authorized state, sample and analyze as necessary to document the basis for their claim, and keep appropriate records. These amendments also could take the form of an exemption (subject to the same conditions) for such secondary lead smelters from the present proposed rule.

This proposed amendment is similar to the exemption found in the existing RCRA BIF rules but does eliminate certain recordkeeping and reporting requirements for secondary lead smelters presently required as a condition of the RCRA exemption. The Agency tentatively does not believe these extra reporting requirements are needed once the MACT standards take effect. At the same time, secondary lead smelters choosing to burn hazardous wastes different from those evaluated in the secondary lead NESHAP (i.e. hazardous wastes with greater than 500 ppm toxic nonmetals or those hazardous waste not listed in Appendix XI to Part 266) would have to meet applicable standards for hazardous waste combustion units (i.e. either the existing BIF standards or revised standards based on MACT), as well as those for secondary lead smelters. EPA would administer this proposal by not requiring a secondary lead smelter that has already submitted a notification to EPA or an authorized state under existing 266.100(c)(l) or (3), to renotify under proposed 266.100 (g).

PART SEVEN: ANALYTICAL AND REGULATORY REQUIREMENTS

I. Executive Order 12866

Under Executive Order 12866, (58 FR 51735 (October 4, 1993)) the Agency must determine whether this regulatory action is ''significant.'' A determination of significance will subject this action to full OMB review and compliance under Executive Order 12866 requirements. 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 the terms of the Executive Order.

The Agency believes that today's proposal, represents a significant action. If adopted, the proposed rule would most likely result in a cost greater than $100 million. As a result, this rulemaking action, and supporting analyses, are subject to full OMB review under the requirements of the Executive Order. The Agency has prepared ''Regulatory Impact Assessment for Proposed Hazardous Waste Combustion MACT Standards'' and ''Addendum to the Regulatory Impact Assessment for Proposed Hazardous Waste Combustion MACT Standards'' in support of today's action; this report is available in the public docket for today's rule. A summary of this analysis and findings is presented below.

II. Regulatory Options

During the regulatory developmental phases, EPA considered seven different regulatory MACT options for existing sources. Refer to the RIA for a detailed discussion of the seven options. This preamble discusses and assesses the floor option and the Agency preferred option. For more detail on the specific methodology used in developing floor and ''beyond-the-floor'' control levels, the reader should refer to the preamble Options section, Part Four of this preamble. Below is a summary of the impact of floor levels and the preferred option 1 on the combustion industry.

III. Assessment of Potential Costs and Benefits

A. Introduction

The Agency has prepared a regulatory impact assessment to accompany today's proposed rulemaking. The Agency has evaluated cost, economic impacts, and other impacts such as environmental justice, unfunded mandates, regulatory takings, and waste minimization incentives. The focus of the economic impact assessment was on how the MACT standards may affect the hazardous waste-burning industry. The Agency would like to note that although the cement kiln industry profits are generated by two components: cement production and hazardous waste burning, the RIA only estimated the impact the MACT standards will have on hazardous waste burning. The Agency is in the process of beginning an analysis that will study the impact of today's rule on cement production, cement prices, and competition in the cement industry. The Agency would like to solicit comments and request information in this area as we begin our research.

To develop cost estimates, EPA categorized the combustion units by size, and estimated engineering costs for the air pollution control devices (APCDs) needed to achieve the standards in the regulatory options. Based on information regarding current emissions and APCD trains EPA developed assumptions regarding the type of upgrades that units would require. Because EPA's data was limited, this analysis is meant to develop estimates of national economic impacts, and not site specific impacts.

B. Analysis and Findings

Total annual compliance costs for the floor option and the Agency's proposed standards range in costs from an estimated $93 million to $136 million.

TOTAL ANNUAL COMPLIANCE COSTS

[Millions]

Options	Cement kilns	LWA kilns	Commercial incinerators	On-site incinerators	Total
6 percent Floor	$27	$2	$13	$50	$93
6 percent BTF	44	4	20	67	136

This rule will result in a significant impact to the combustion industry. The regulatory impact assessment used a number screening indicators to assess the impact of this rule. One indicator the analysis used was the average total annual compliance cost per unit. This indicator assesses the relative impact the rule has on each facility type in the combustion universe. According to this indicator, cement kilns incur the greatest average incremental cost per unit totaling $770,000 annually for the floor and $1.1 million annually for the proposed standards, which include beyond the floor standards. The cost per unit for LWAKs range from $490,000 to $825,000 and for on-site incinerators from $340,000 to $486,000. Commercial incinerators annual average cost per unit total $493,000 for the floor and $730,000 for the proposed standards. One should note however, that the per unit costs are presented assuming no market exit. Once market exit occurs, per unit should be significantly lower particularly for on-site incinerators.

Looking at the price per ton, in the baseline, cement kilns have the lowest cost ($104 per ton) to burn hazardous waste today with commercial incinerators have $800 per ton costs and on-site incinerators have $28,460 per ton costs. For compliance costs, cement kilns have the smallest impact ($40 to $50 per ton) with on-site incinerators experiencing a high compliance cost of $47 to $57 per ton.

EPA also looked at baseline cost of burning hazardous waste as a percentage of compliance cost. This indicator assesses the relative impact of facilities within the sector but it also can be a predictor for how prices might increase for burning hazardous waste. According to the table below, the floor compliance costs are 40 percent of the current baseline cost of burning hazardous waste for cement kilns and over 20 percent for LWAKs. Many on-site incinerators and commercial incinerators have existing APCDs and have larger volumes of waste to distribute compliance costs across, thus compliance costs tend to be a smaller addition to baseline costs.

AVERAGE TOTAL ANNUAL BASELINE—INCREMENTAL COMPLIANCE

[Cost per Ton]

Options	Cement kilns	LWA kilns	Commercial incinerators	On-site incinerators
Baseline	$104	$194	$806	$28,500
6 percent Floor	$40	$39	$23	$47
6 percent BTF	50	56	31	57

Note: Baseline costs were calculated by identifying all costs associated with hazardous waste burning. Thus, for commercial incinerators and on-site incinerators, all costs associated with unit construction, operation and maintenance are included. This also includes RCRA permits and existing APCDs. The costs for on-site burners are extremely high because total costs for incineration is distributed across the small amount of hazardous waste burned. For cement kilns and LWAKs, only those incremental costs associated with burning hazardous waste are included such as, permits. The cost of the actual units (which have a primary purpose of producing cement or aggregate) are not included in the baseline. Also these costs are after consolidation occurs.

Although cement kilns incur a significant impact, they still have the lowest average waste burning cost after the regulation. As the table above illustrates in the post-regulatory scenario, cement kilns cost per ton for burning waste would total $154 compared to a cost per ton for commercial incinerators of $837. EPA expects that this advantage for cement kilns in the market will allow them to continue to set the market price for waste burning.

Not all facilities however, will be able to absorb the compliance cost to this rule and remain competitive. The economic impact assessment estimates that of the facilities which are currently burning hazardous waste 3 cement kilns, 2 LWAK, 6 commercial incinerators and 85 on-site incinerators will likely stop burning waste in the long term. Most of these units are ones which burn smaller amount of hazardous waste.

C. Total Incremental Cost per Incremental Reduction in HAP Emissions

Cost effectiveness is calculated by first estimating the compliance expenditures associated with the specific hazardous air pollutant (HAP). The estimation of costs per HAP is often difficult to ascertain because the air pollution control devices usually control more than one HAP. Therefore, estimation of precise cost per HAP was not feasible. Once the compliance expenditures has been estimated, the total mass emission reduction achieved when combustion facilities comply with the standards for a given option must be estimated. With the total compliance costs and the total mass emissions, the total incremental cost per incremental reduction in HAP emissions can be estimated. For a more detailed discussion of how the cost per HAP was calculated, please see chapter 5 of ''Regulatory Impact Assessment for Proposed Hazardous Waste Combustion MACT Standards''.

Results of the cost-effectiveness calculations for each HAP for all facilities are found below. For results on a facility-type level, please see chapter 5 of the RIA. Considering all facilities as a group, the results indicate that dioxin, mercury, and metals cost per unit reduction are quite high. This is the case because small amounts of the dioxin and metals are released into the environment. For other pollutants, expenditures per ton are much lower.

COST EFFECTIVENESS FOR ALL FACILITIES

HAP	Unit	Baseline to 6 percent floor	6 percent floor to 6 percent BTF
D/F	$/g	$12,000	$560,000
Mercury	$/lb	2,600	5,400
LVM	$/Mton	407,000	NA
SVM	$/Mton	315,000	NA
Chlorine	$/Mton	7,000	2,240
Particulate.	$/Mton	4,400	3,200
CO	$/Mton	1,360	NA
THC	$/Mton	2,800	NA

Note: NA = Zero incremental reduction in HAP emissions (Dollars divided by zero = NA).

D. Human Health Benefits

1. Dioxin benefits

Polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans, hereafter referred to collectively as dioxins, are ubiquitous in the environment. The more highly chlorinated dioxins, which are extremely stable under environmental conditions, persist in the environment for decades and are found particularly in soils, sediments, and foods. It has been hypothesized that the primary mechanism by which dioxins enter the terrestrial food chain is through atmospheric deposition.[210] Dioxins may be emitted directly to the atmosphere by a variety of anthropogenic sources or indirectly through volatilization or particle resuspension from reservoir sources such as soils, sediments, and vegetation.

The most well known incident of environmental contamination with dioxins occurred in Seveso, Italy in an industrial accident. Symptoms of acute

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[210] USEPA, ''Estimating Exposure to Dioxin-Like Compounds'', Volume I, June 1994.

exposures such as chloracne occurred immediately following the incident. Since then, significant increases in certain types of cancers have also been observed.[211] After evaluating a variety of carcinogenicity studies in human populations and laboratory animals, EPA has concluded that 2,3,7,8-tetrachlorodibenzo-p-dioxin and related compounds are probable human carcinogens.[212] EPA estimates that a dose of 0.01 picograms on a toxicity equivalent (TEQ) basis per kilogram body weight per day is associated with a plausible upper bound lifetime excess cancer risk of one in one million (1×10 − 6).[213] Toxicity equivalence is based on the premise that a series of common biological steps are necessary for most if not all of the observed effects, including cancer, from exposures to 2,3,7,8 chlorine-substituted dibenzo-p-dioxin and dibenzofuran compounds in vertebrates, including humans. Given the levels of background TEQ exposures discussed below, as many as 600 cancer cases may be attributable to dioxin exposures each year in the United States.

EPA has also concluded that there is adequate evidence from both human populations and laboratory animals, as well as other experimental data, to support the inference that humans are likely to respond with a broad spectrum of non-cancer effects from exposure to dioxins if exposures are high enough. Although it is not possible given existing information to state exactly how or at what levels exposed humans will respond, the margin of exposure between background TEQ levels and levels where effects are detectable in humans is considerably smaller than previously thought.[214]

Dioxins are commonly found in food produced for human consumption. Consumption of dioxin contaminated food is considered the primary route of exposure in the general population. EPA evaluated data collected in four U.S. studies, three of which included analyses of all 2,3,7,8 chlorine-substituted congeners of dibenzo-p-dioxin and dibenzofuran. EPA's evaluation concluded that ''background'' levels in beef, milk, pork, chicken, and eggs are approximately 0.5, 0.07, 0.3, 0.2, and 0.1 parts per trillion fresh weight, respectively, on a toxicity equivalent (TEQ) basis.[215] EPA then used these background levels, together with information on food consumption, to estimate dietary intake in the general population. That estimate is 120 picograms TEQ per day.[216]

EPA has also collected data on dioxins in fish taken from 388 locations nationwide and found that 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.[217] (Of the 2,3,7,8 chlorine-substituted congeners, only octachlorodibenzo-p-dioxin and octachlorodibenzofuran were not analyzed.) Seven of the compounds, including 2,3,7,8–TCDD, were detected at over half the locations. Detection limits were generally at or below 1 part per trillion on a toxicity equivalent basis. The median (50th percentile) concentration in fish on a toxicity equivalent basis (TEQ) was 3 parts per trillion (ppt) while the 90th percentile was approximately 30 ppt TEQ. Five percent of the sites exceeded 50 ppt TEQ. At most sites, both a composite sample of bottom feeders and a composite sample of game fish were collected. At sites considered representative of background levels, the median concentration was 0.5 ppt TEQ.

EPA has estimated that hazardous waste incinerators and hazardous waste-burning cement and lightweight aggregate kilns currently emit 0.08, 0.86, and less than 0.01 kg TEQ of dioxins per year, respectively, or a total of 0.94 kg TEQ per year. Excluding non-hazardous waste-burning cement kilns, an emission rate of approximately 9 kg TEQ per year is estimated for all other U.S. sources.[218] Therefore, hazardous waste-burning sources represent about 9 percent of total anthropogenic emissions of dioxins in the U.S. The following table shows hazardous waste-burning sources relative to other major emitters of dioxins:

Source category	Dioxin emissions (kg TEQ/year)
Medical Waste Incinerators	5.1
Municipal Waste Incinerators	3.0
Hazardous Waste-burning Incinerators, Cement Kilns, and Lightweight Aggregate Kilns	0.9

There is information to suggest, however, that dioxin emissions nationwide from all sources are higher than have been estimated. Public comments on EPA's dioxin reassessment have identified a number of possible additional sources of dioxins, including decomposition of materials containing chlorophenols (i.e. wood treated with PCP), metals processing industries, diesel fuel and unleaded gasoline, PCB manufacturing, and re-entrainment of reservoir sources. Reservoir sources may be a significant source of vapor phase dioxins. On the other hand, emissions from at least one of the sources, medical waste incinerators, is probably significantly overestimated. Supporting the view that dioxin emissions may be higher than previously estimated are indications that deposition may be considerably greater than can be accounted for by presently identified emissions.

The impact of emissions on exposure and risk depends on the relative geographic locations of the emission sources and receptors which contribute to exposure and risk, primarily farm animals. This applies to both near field dispersion and long-range transport and it affects exposure and risk both in determining whether the trajectory of an air parcel impacts receptors of concern and in determining the chemical fate of the emissions. The fate of dioxins depends on degradation processes that can occur in the atmosphere. These processes can increase or decrease the toxicity of the original emissions through dechlorination. This process can have different effects on different emission sources, depending on the congener distributions, residence time in the atmosphere, and climatic conditions.

Considering all these factors, it is apparent that hazardous waste-burning sources contribute significantly to the overall loading of dioxins to the environment, although the relative magnitude of the contribution remains to be determined. While there is not a one-to-one relationship between emissions and risk, it may be inferred that hazardous waste-burning sources likely do contribute significantly to dioxin levels in foods used for human consumption and, to an extent as yet unknown, the estimated 600 cancer cases attributable to dioxin exposures annually.

EPA estimates that dioxin emissions from hazardous waste-burning sources will be reduced to 0.07 kg TEQ per year at the floor levels and to 0.01 kg TEQ per year at the proposed beyond the floor standard. These reductions would result in decreases of approximately 8

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[211] USEPA, ''Health Assessment Document for 2,3,7,8–Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds, Volume II, June 1994.

[212] USEPA, ''Health Assessment Document for 2,3,7,8–Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds, Volume III,'' August 1994.

[213] *Ibid.*

[214] *Ibid.*

[215] USEPA, ''Estimating Exposure to Dioxin-Like Compounds,'' Volume II, June 1994.

[216] *Ibid.*

[217] USEPA, ''National Study of Chemical Residues in Fish,'' Office of Science and Technology, September 1992.

[218] USEPA, ''Estimating Exposure to Dioxin-Like Compounds'', Volume II, June 1994.

and 9 percent, respectively in total estimated anthropogenic U.S. emissions. EPA expects that reductions in dioxin emissions from hazardous waste-burning sources, in conjunction with reductions in emissions from other dioxin-emitting sources, will help reduce dioxin levels over time in foods used for human consumption and, therefore, reduce the likelihood of adverse health effects, including cancer, occurring in the general population.

2. Mercury Benefits

Mercury has long been a concern in both occupational and environmental settings. The most bioavailable form of mercury and, therefore, the form most likely to have an adverse effect, is methyl mercury. Human exposures to methyl mercury occur primarily from ingestion of fish. As a result of mercury contamination, there are currently fish consumption bans or advisories in effect for at least one waterbody in over two thirds of the States.

Nationally, about 60 percent of all fish consumption bans and advisories are due to mercury. In several States the mercury advisories are statewide, with the most widespread concerns being in the northern Great Lakes states and Florida. The bans and advisories vary from State to State with respect to the levels of concern, the recommended limits on consumption, and other factors. Therefore, it is difficult to develop a national estimate of potential risk based on this information. Nevertheless, these bans and advisories provide one indication of the extent and severity of mercury contamination.

Even low levels of mercury in surface waters can lead to high levels of mercury in fish. EPA has estimated that bioaccumulation factors, which represent the ratio of the total mercury concentration in fish tissue to the total concentration in filtered water, range from 5,000 to 10,000,000 depending on the species of fish, the age of the fish, and the waterbody the fish inhabit.

The most well known example of mercury poisoning from ingestion of fish occurred in the vicinity of Minamata Bay, Japan. Severe neurological effects resembling cerebral palsy occurred in the offspring of exposed pregnant women. EPA has estimated what it considers a safe level of exposure to methyl mercury. This level, referred to as the reference dose, is 1E–4 mg/kg-day. The reference dose is based on an evaluation of 81 maternal-infant pairs exposed to methyl mercury in an incident in Iraq in which methyl mercury treated seed grain was diverted for use in making bread. Sources of uncertainty in the reference dose are the relatively small number of maternal-infant pairs in the Iraqi study, the short duration of maternal exposure (approximately three months), latency in the appearance of effects (from as little as a month to as long as a year), possible misclassification of maternal exposures, differences in the vehicle of exposure (i.e., grain versus fish), and the selection of the neurologic and behavioral endpoints used in the analysis. EPA intends to further evaluate the reference dose for methyl mercury when the results from studies of fish-eating populations become available.

EPA collected data on chemical residues in fish taken from 388 locations nationwide and found that at 92 percent of the locations, fish contained detectable levels of mercury.[219] (Detection limits varied between 0.001 and 0.05 parts per million.) The median (50th percentile) mercury concentration in fish was 0.2 ppm while the 90th percentile was 0.6 ppm. Two percent of the sites exceeded 1 ppm. At most sites, both a composite sample of bottom feeders and a composite sample of game fish were collected. The highest concentration, 1.8 ppm, was measured at a remote site considered to represent background conditions.

Similar results have been obtained in other studies, strongly suggesting that long-range atmospheric transport and deposition of anthropogenic emissions is occurring. Air emissions of mercury contribute, then, to both regional and global deposition, as well as deposition locally. Congress, in fact, explicitly found this to be the case and required EPA to prioritize MACT controls for mercury for this reason. (See S. Rep. No. 228, 101st Cong. 1st Sess. at 153–54.)

An indication of the significance of mercury contamination in fish is illustrated by combining data on the levels of mercury in fish with data on fish consumption and comparing it to the reference dose for methyl mercury. For example, a fish consumption rate of 140 g/day (a 90th percentile rate associated with recreational fishing) in conjunction with a mercury concentration of 0.6 μg/g (a 90th percentile concentration) translates into an average daily dose of 1E–3 mg/kg-day, or 10 times the reference dose. Using the same fish concentration with a mean fish consumption rate for recreational anglers of 30 g/day gives a dose that is three times the reference dose. At the median fish concentration of 0.2 μg/g and a fish consumption rate of 30 g/day, the dose is nearly 90 percent of the reference dose. These results indicate that for persons who eat significant amounts of freshwater fish, exposures to mercury are significant when compared with EPA's estimate of the threshold at which effects may occur in susceptible individuals. However, it must be recognized that EPA's threshold estimate represents a lower bound; the true threshold may be higher than EPA's estimate.

EPA has estimated that hazardous waste incinerators and hazardous waste-burning cement and lightweight aggregate kilns currently emit 4.2, 5.6, and 0.3 Mg of mercury per year, respectively, or a total of 10.1 Mg per year. In addition, EPA estimates that approximately 230 Mg per year are emitted by all other U.S. sources. Based on these estimates, hazardous waste-burning sources represent about 4 percent of total anthropogenic emissions of mercury in the U.S. Therefore, hazardous waste-burning sources do contribute to the overall loading of mercury to the environment and, it may be inferred, to mercury levels in fish.

EPA estimates that mercury emissions from hazardous waste-burning sources will be reduced to 3.3 Mg per year at the proposed floor levels and to 2.0 Mg per year at the proposed beyond the floor standard. These reductions would result in reductions of total anthropogenic U.S. emissions of approximately 3 percent. EPA expects that reductions in mercury emissions from hazardous waste-burning sources, in conjunction with reductions in emissions from other mercury-emitting sources, will help reduce mercury levels in fish over time and, therefore, reduce the likelihood of adverse health effects occurring in fish-consuming populations.

E. Other Benefits

Other benefits that EPA investigated 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 suggest that only when assuming very high emissions water quality criteria is exceeded in the watersheds small in size and located near waste combustion facilities. These watersheds are typically located near cement kilns appear to exceed the water quality criteria. According to the property value analysis, there may be property value benefits associated with reduction in emission from combustion facilities. The property value work is on-going and is undergoing refinements. In addition, EPA investigated other benefits such as benefits received from

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[219] USEPA, ''National Study of Chemical Residues in Fish,'' Office of Science and Technology, September 1992.

avoided clean-up as result of reduced particulate matter releases. For further detail, please see chapter 5 of the RIA.

IV. Other Regulatory Issues

A. Environmental Justice

The U.S. EPA completed analyses that identified demographic characteristics of populations near cement plants and commercial hazardous waste incinerators and compared them to the populations of county and state. The analysis focuses on the spatial relationship between cement plants and incinerators and minority and low income populations. The study does not describe the actual health status of these populations, and how their health might be affected proximity to facilities.

EPA used a sample of 41 cement plants was analyzed from a universe of 113 plants and a sample of 21 commercial incinerators was analyzed from a universe of 35. The complete methodology results of the analyses are found in two reports filed in the docket titled, ''Race , Ethnicity, and Poverty Status of the Populations Living Near Cement Plants in the United States and Race,'' ''Ethnicity, and Poverty Status of the Populations Living Near Commercial Incinerators.'' Below is a summary of the key results found in the studies.

The Agency looked at whether minority percentages within a one mile radius are significantly different than the minority percentages at the county for all cement plants and sample of incinerators, the results are as follows:

- 27 percent of the universe of all cement plants (29 plants) and 37 percent of sample of incinerators (21 plants) have minority percentages within a one mile radius which exceed the corresponding county minority percentages by more than five percentage points.
- 36 percent of the universe of all cement plants (41 plants) and 44 percent of sample of incinerators have minority percentages within a one mile radius which fall below the corresponding county minority percentages by more than five percentage points.
- 38 percent of the universe of all cement plants (43 plants) and 20 percent of sample of incinerators minority percentages within a one mile radius which fall within five percentage points (above or below) of the corresponding county minority percentages.

With regard to the question of whether poverty percentages within a one mile radius significantly different from the poverty percentages for the county for all cement plants. The results are as follows:

- 18 percent of the universe of all cement plants (20 plants) and 36 percent of the sample of incinerators (21 plants) have poverty percentages at a one mile radius which exceed the corresponding county poverty percentages by more than five percentage points.
- 22 percent of the universe of all cement plants (25 plants) and 37 percent of the sample of incinerators (21 plants) have poverty percentages at a one mile radius which fall below the corresponding county poverty percentages by more than five percentage points.
- 60 percent of the universe of all cement plants (68 plants) and 28 percent of sample of incinerators (21 plants) have poverty percentages at a one mile radius which fall within five percentage points (above or below) of the corresponding county poverty percentages.

B. Unfunded Federal Mandates

The Agency also evaluated the proposed MACT standards for compliance with the Unfunded Mandates Reform Act (UMRA) of 1995. Today's rule contains no Federal mandates under the regulatory provisions of Title II of the UMBRA for State, local or tribal governments or the private sector. The Agency concluded that the rule implements requirement specifically set forth by Congress, as stated in the Clean Air Act and the Resource Conservation Recovery Act. In addition, promulgation of these MACT standards is not expected to result in mandated costs of $100 million or more to any state, local, or tribal governments, in any one year. Finally, the MACT standards will not significantly or uniquely affect small governments.

C. Regulatory Takings

EPA found no indication that the MACT standards would be considered a ''taking,'' as defined by legislation currently being considered by Congress. Property would not be physically invaded or taken for public use without the consent of the owner. Also, the MACT standards will 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

The RIA results do not incorporate waste minimization at this time. However, the Agency did analyze the potential for waste minimization and the preliminary results suggest that generators have a number of options for reducing or eliminating waste at a much lower cost. 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, EPA estimated the period of time required for the cost of the waste minimization measure to be returned in reduced combustion expenditures. The assessment of waste minimization yields estimates of the tonnage of combusted waste that might be eliminated. Comprehensive data to evaluate waste minimization were not available. Improved information on the capital investment and operating costs associated with waste minimization are needed.

Overall, EPA was able to estimate that 630,000 tons of waste, a significant portion of all combusted waste, may be amenable to waste minimization. Three waste generating processes account for the reduction. These processes include solvent and product recovery, product processing waste, and process waste removal and cleaning. EPA is continuing analysis of waste minimization options and requests comments and information in this area. For a complete description of the analysis, see the regulatory impact assessment.

E. Evaluation of Impacts on Certain Generators

EPA is aware of the potential impact today's proposal may have on small business hazardous waste generators. The emission standards proposed today will require many combustion facilities to install new emission control equipment, undertake expanded monitoring, and comply with additional recordkeeping and reporting requirements. Combustion facilities will incur higher capital and operating costs as a result of today's rule. Some facilities are predicted to leave the waste management business altogether. As capacity decreases and costs increase, facilities are likely to increase the waste management prices they charge generators.

EPA believes many larger generators will respond to waste management cost increases by accelerating their waste minimization efforts. By undertaking cost-effective waste minimization initiatives, companies can reduce the amount of waste requiring combustion, thereby deflecting some of the impacts of increases in waste management costs. The same waste minimization options may not be so readily available to smaller businesses. Small businesses often do not have the financial resources to make the capital or process improvements necessary to minimize hazardous waste generation, even if such improvements will have a net cost benefit in the long run. In addition, small businesses often lack the technical expertise necessary for effective waste minimization.

Those small businesses that are unable to minimize waste generation will either incur higher costs to operate their businesses or, if allowed under federal and state regulations, manage their hazardous wastes using unregulated disposal options. Many small businesses, because they generate less than 100 kg per month or less than 10 kg of acutely hazardous waste per month, are classified as conditionally exempt small quantity generators (CESQGs). CESQGs are exempt from many of the generator requirements under 40 CFR 262 and are not required under the federal RCRA regulations to manage their wastes in TSDFs. Many CESQGs, however, send their wastes to third-party collection companies who mix CESQG waste with waste from larger generators and manage it as a fully regulated hazardous waste. Increases in waste management costs due to today's proposal could encourage some number of third-party collection companies to segregate CESQG wastes and manage them using less expensive, yet legal, alternatives, such as unpermitted boilers, space heaters, and non-TSDF cement kilns.

EPA plans to revise the Regulatory Impact Assessment (RIA) issued with today's rule to include additional analysis, as appropriate and feasible, focusing on these issues. EPA is seeking comments on any of the issues raised here.

V. Regulatory Flexibility Analysis

The Regulatory Flexibility Act (RFA) of 1980 requires Federal agencies to consider impact on ''small entities'' throughout the regulatory process. Section 603 of the RFA calls for an initial screening analysis to be preformed 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 in the Act are only those ''businesses, organizations and governmental jurisdictions subject to regulation.''

EPA 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, EPA identified 11 firms which may be small entities. The proposed rule is unlikely to adversely affect many small businesses for two important reasons. First, few combustion units are owned by businesses that meet the SBA definition as a small business. Furthermore, over one-third of those that are considered small have a relatively small number of employees, but have an annual sales in excess of $50 million per year.

Second, small entities most impacted by the rule are those that burn very little waste and hence face very high cost per ton burned. Those that burn very little waste in their existing units will discontinue burning hazardous waste rather than comply with the proposed rule and dispose of waste off-site. EPA looked at the costs of alternative disposal and concludes the costs of discontinuing burning wastes will not be so high as to result in a significant impact. Therefore, EPA believes that today's proposed rule will have a minor impact on small businesses.

VI. Paperwork Reduction Act

The information collection requirements in this proposed rule have been submitted for approval to the Office of Management and Budget (OMB) under the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. Two Information Collection Request (ICR) documents have been prepared by EPA. One ICR document covers the reporting and recordkeeping requirements for NESHAPs from hazardous waste combustors and the other ICR document covers the new and amended reporting and recordkeeping requirements for boilers and industrial furnaces burning hazardous waste. Copies may be obtained from Sandy Farmer, OPPE Regulatory Information Division; U.S. Environmental Protection Agency (2136); 401 M St., SW; Washington, DC 20460 or by calling (202) 260–2740.

The annual public reporting and recordkeeping burden for the NESHAP collection of information is estimated to average 36 hours per response. The annual public reporting and recordkeeping burden for the BIF collection of information is estimated to average 2 hours per response. These estimates include 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 respond to a collection of information; search existing 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 displayed in 40 CFR Part 9.

Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Chief, OPPE Regulatory Information Division; U.S. Environmental Protection Agency (2136); 401 M St., SW; Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503, marked ''Attention: Desk Officer for EPA.'' Include the ICR number in any correspondence. The final rule will respond to any OMB or public comments on the information collection requirements contained in this proposal.

VII. Request for Data

EPA requests the following data to help refine the RIA:

(1) Waste Quantity Burned: data on hazardous and non-hazardous waste burned at on-site facilities (by combustion unit) broken down by quantity of liquids, sludges, and solids.

(2) Price Data: Aggregate prices by waste type and how they vary by geographic region and waste contamination level.

(3) Combustion Alternatives:

—Information on likelihood of on-site incinerators shipping waste to on-site boilers as an alternative.

—Realistic waste minimization practices. Information on how combustion and waste minimization prices become attractive.

—Information on the type of commercial incinerator most likely to receive waste from on-site facilities to ship waste off-site.

(4) Capacity: practical capacity levels for each combustion unit.

Appendix—Comparable Fuel Constituent and Physical Specifications

Note: All numbers in the tables of this appendix are expressed to *two* significant figures.

TABLE 1.—DETECTION AND DETECTION LIMIT VALUES FOR A POSSIBLE GASOLINE SPECIFICATION

Chemical name	Concentration limit (mg/kg at 10,000 BTU/lb)	Maximum detection limit (mg/kg)
Total Nitrogen as N	9.2	
Total Halogens as Cl	25	
Antimony	(1)	7.0
Arsenic	(1)	0.14
Barium	(1)	14
Beryllium	(1)	0.70
Cadmium	(1)	0.70
Chromium	(1)	1.4
Cobalt	(1)	2.8
Lead	(1)	7.0
Manganese	(1)	0.70
Mercury	(1)	0.10
Nickel	(1)	2.8
Selenium	(1)	0.14
Silver	(1)	1.4
Thallium	(1)	14
α-Naphthylamine	(1)	670
α,α-Dimethylphenethylamine	(1)	670
β-Naphthylamine	(1)	670
1,1-Dichloroethylene	(1)	34
1,1,2-Trichloroethane	(1)	34
1,1,2,2-Tetrachloroethane	(1)	34
1,2-Dibromo-3-chloropropane	(1)	34
1,2-Dichloroethylene (cis- or trans-)	(1)	34
1,2,3-Trichloropropane	(1)	34
1,2,4-Trichlorobenzene	(1)	670
1,2,4,5-Tetrachlorobenzene	(1)	670
1,3,5-Trinitrobenzene	(1)	670
1,4-Dichloro-2-butene (cis- or trans-)	(1)	34
1,4-Naphthoquinone	(1)	670
2-Acetylaminofluorene	(1)	670
2-Chloroethyl vinyl ether	(1)	34
2-Chloronaphthalene	(1)	670
2-Chlorophenol	(1)	670
2-Piccoline	(1)	670
2,3,4,6-Tetrachlorophenol	(1)	670
2,4-Dichlorophenol	(1)	670
2,4-Dimethylphenol	(1)	670
2,4-Dinitrophenol	(1)	670
2,4-Dinitrotoluene	(1)	670
2,4,5-Trichlorophenol	(1)	670
2,4,6-Trichlorophenol	(1)	670
2,6-Dichlorophenol	(1)	670
2,6-Dinitrotoluene	(1)	670
3–3′-Dimethylbenzidine	(1)	670
3–Methylcholanthrene	(1)	670
3,3′-Dichlorobenzidine	(1)	670
4-Aminobiphenyl	(1)	670
4-Bromophenyl phenyl ether	(1)	670
4,6-Dinitro-o-cresol	(1)	670
5-Nitro-o-toluidine	(1)	670
7,12-Dimethylbenz[a]anthracene	(1)	670
Acetonitrile	(1)	34
Acetophenone	(1)	670
Acrolein	(1)	34
Acrylonitrile	(1)	34
Allyl chloride	(1)	34
Aniline	(1)	670
Aramite	(1)	670
Benzene	3500	
Benzidine	(1)	670
Benzo [a] anthracene	340	
Benzo [a] pyrene	340	
Benzo [b] fluoranthene	(1)	670
Benzo [k] fluoranthene	(1)	670
Bromoform	(1)	34
Butyl benzyl phthalate	(1)	670

TABLE 1.—DETECTION AND DETECTION LIMIT VALUES FOR A POSSIBLE GASOLINE SPECIFICATION—Continued

Chemical name	Concentration limit (mg/kg at 10,000 BTU/lb)	Maximum detection limit (mg/kg)
Carbon disulfide	(1)	34
Carbon tetrachloride	(1)	34
Chlorobenzene	(1)	34
Chlorobenzilate	(1)	670
Chloroform	(1)	34
Chloroprene	(1)	34
Chrysene	340	
cis-1,3-Dichloropropene	(1)	34
Cresol (o-, m-, or p-)	(1)	670
Di-n-butyl phthalate	(1)	670
Di-n-octyl phthalate	340	
Diallate	(1)	670
Dibenzo [a,h] anthracene	340	
Dibenz [a,j] acridine	(1)	670
Dichlorodifluoromethane	(1)	34
Diethyl phthalate	(1)	670
Dimethoate	(1)	670
Dimethyl phthalate	(1)	670
Dinoseb	(1)	670
Diphenylamine	(1)	670
Disulfoton	(1)	670
Ethyl methacrylate	(1)	34
Ethyl methanesulfonate	(1)	670
Famphur	(1)	670
Fluoranthene	(1)	670
Fluorene	(1)	670
Hexachlorobenzene	(1)	670
Hexachlorobutadiene	(1)	670
Hexachlorocyclopentadiene	(1)	670
Hexachloroethane	(1)	670
Hexachlorophene	(1)	17000
Hexachloropropene	(1)	670
Indeno(1,2,3-cd) pyrene	(1)	670
Isobutyl alcohol	(1)	34
Isodrin	(1)	670
Isosafrole	(1)	670
Kepone	(1)	1300
m-Dichlorobenzene	(1)	670
Methacrylonitrile	(1)	34
Methapyrilene	(1)	670
Methyl bromide	(1)	34
Methyl chloride	(1)	34
Methyl ethyl ketone	(1)	34
Methyl iodide	(1)	34
Methyl methacrylate	(1)	34
Methyl methanesulfonate	(1)	670
Methyl parathion	(1)	670
Methylene chloride	(1)	34
N-Nitrosodi-n-butylamine	(1)	670
N-Nitrosodiethylamine	(1)	670
N-Nitrosomethylethylamine	(1)	670
N-Nitrosomorpholine	(1)	670
N-Nitrosopiperidine	(1)	670
N-Nitrosopyrrolidine	(1)	670
Naphthalene	2800	
Nitrobenzene	(1)	670
o-Dichlorobenzene	(1)	670
o-Toluidine	(1)	670
O,O-Diethyl O-pyrazinyl phospho- thioate	(1)	670
O,O,O-Triethyl phosphorothionate	(1)	670
p-(Dimethylamino) azobenzene	(1)	670
p-Chloro-m-cresol	(1)	670
p-Chloroaniline	(1)	670
p-Dichlorobenzene	(1)	670
p-Nitroaniline	(1)	670
p-Nitrophenol	(1)	670
p-Phenylenediamine	(1)	670
Parathion	(1)	670
Pentachlorobenzene	(1)	670
Pentachloroethane	(1)	34

TABLE 1.—DETECTION AND DETECTION LIMIT VALUES FOR A POSSIBLE GASOLINE SPECIFICATION—Continued

Chemical name	Concentration limit (mg/kg at 10,000 BTU/lb)	Maximum detection limit (mg/kg)
Pentachloronitrobenzene	(1)	670
Pentachlorophenol	(1)	670
Phenacetin	(1)	670
Phenol	(1)	670
Phorate	(1)	670
Pronamide	(1)	670
Pyridine	(1)	670
Safrole	(1)	670
Tetrachloroethylene	(1)	34
Tetraethyldithiopyrophosphate	(1)	670
Toluene	35000	
Trichloroethylene	(1)	34
Trichlorofluoromethane	(1)	34
Vinyl Chloride	(1)	34

[1] Non-detect.

TABLE 2.—DETECTION AND DETECTION LIMIT VALUES FOR A POSSIBLE NUMBER 2 FUEL OIL SPECIFICATION

Chemical name	Concentration limit (mg/kg at 10,000 BTU/lb)	Maximum detection limits (mg/kg)
Total Nitrogen as N	110	
Total Halogens as Cl	25	
Antimony	(1)	6.0
Arsenic	(1)	0.12
Barium	(1)	12
Beryllium	(1)	0.60
Cadmium	(1)	0.60
Chromium	(1)	1.2
Cobalt	(1)	2.4
Lead	6.6	
Manganese	(1)	0.60
Mercury	(1)	0.11
Nickel	(1)	2.4
Selenium	0.070	
Silver	(1)	1.2
Thallium	(1)	12
α-Naphthylamine	(1)	1200
α,α-Dimethylphenethylamine	(1)	1200
β-Naphthylamine	(1)	1200
1,1-Dichloroethylene	(1)	34
1,1,2-Trichloroethane	(1)	34
1,1,2,2-Tetrachloroethane	(1)	34
1,2-Dibromo-3-chloropropane	(1)	34
1,2-Dichloroethylene (cis- or trans-)	(1)	34
1,2,3-Trichloropropane	(1)	34
1,2,4-Trichlorobenzene	(1)	1200
1,2,4,5-Tetrachlorobenzene	(1)	1200
1,3,5-Trinitrobenzene	(1)	1200
1,4-Dichloro-2-butene (cis- or trans-)	(1)	34
1,4-Naphthoquinone	(1)	1200
2-Acetylaminofluorene	(1)	1200
2-Chloroethyl vinyl ether	(1)	34
2-Chloronaphthalene	(1)	1200
2-Chlorophenol	(1)	1200
2-Piccoline	(1)	1200
2,3,4,6-Tetrachlorophenol	(1)	1200
2,4-Dichlorophenol	(1)	1200
2,4-Dimethylphenol	(1)	1200
2,4-Dinitrophenol	(1)	1200
2,4-Dinitrotoluene	(1)	1200
2,4,5-Trichlorophenol	(1)	1200
2,4,6-Trichlorophenol	(1)	1200
2,6-Dichlorophenol	(1)	1200
2,6-Dinitrotoluene	(1)	1200
3-3′-Dimethylbenzidine	(1)	1200
3-Methylcholanthrene	(1)	1200
3,3′-Dichlorobenzidine	(1)	1200

TABLE 2.—DETECTION AND DETECTION LIMIT VALUES FOR A POSSIBLE NUMBER 2 FUEL OIL SPECIFICATION—Continued

Chemical name	Concentration limit (mg/kg at 10,000 BTU/lb)	Maximum detection limits (mg/kg)
4-Aminobiphenyl	(1)	1200
4-Bromophenyl phenyl ether	(1)	1200
4,6-Dinitro-o-cresol	(1)	1200
5-Nitro-o-toluidine	(1)	1200
7,12-Dimethylbenz[a]anthracene	(1)	1200
Acetonitrile	(1)	34
Acetophenone	(1)	1200
Acrolein	(1)	34
Acrylonitrile	(1)	34
Allyl chloride	(1)	34
Aniline	(1)	1200
Aramite	(1)	1200
Benzene	21	
Benzidine	(1)	1200
Benzo[a]anthracene	610	
Benzo[a]pyrene	610	
Benzo[b]fluoranthene	(1)	1200
Benzo[k]fluoranthene	(1)	1200
Bromoform	(1)	34
Butyl benzyl phthalate	(1)	1200
Carbon disulfide	(1)	34
Carbon tetrachloride	(1)	34
Chlorobenzene	(1)	34
Chlorobenzilate	(1)	1200
Chloroform	(1)	34
Chloroprene	(1)	34
Chrysene	610	
cis-1,3-Dichloropropene	(1)	34
Cresol (o-, n-, or p-)	(1)	1200
Di-n-butyl phthalate	(1)	1200
Di-n-octyl phthalate	610	
Diallate	(1)	1200
Dibenzo[a,h]anthracene	610	
Dibenz[a,j]acridine	(1)	1200
Dichlorodifluoromethane	(1)	34
Diethyl phthalate	(1)	1200
Dimethoate	(1)	1200
Dimethyl phthalate	(1)	1200
Dinoseb	(1)	1200
Diphenylamine	(1)	1200
Disulfoton	(1)	1200
Ethyl methacrylate	(1)	34
Ethyl methanesulfonate	(1)	1200
Famphur	(1)	1200
Fluoranthene	(1)	1200
Fluorene	(1)	1200
Hexachlorobenzene	(1)	1200
Hexachlorobutadiene	(1)	1200
Hexachlorocyclopentadiene	(1)	1200
Hexachloroethane	(1)	1200
Hexachlorophene	(1)	29000
Hexachloropropene	(1)	1200
Indeno(1,2,3-cd)pyrene	(1)	1200
Isobutyl alcohol	(1)	34
Isodrin	(1)	1200
Isosafrole	(1)	1200
Kepone	(1)	2300
m-Dichlorobenzene	(1)	1200
Methacrylonitrile	(1)	34
Methapyrilene	(1)	1200
Methyl bromide	(1)	34
Methyl chloride	(1)	34
Methyl ethyl ketone	(1)	34
Methyl iodide	(1)	34
Methyl methacrylate	(1)	34
Methyl methanesulfonate	(1)	1200
Methyl parathion	(1)	1200
Methylene chloride	(1)	34
N-Nitrosodi-n-butylamine	(1)	1200
N-Nitrosomorpholine	(1)	1200

TABLE 2.—DETECTION AND DETECTION LIMIT VALUES FOR A POSSIBLE NUMBER 2 FUEL OIL SPECIFICATION—Continued

Chemical name	Concentration limit (mg/kg at 10,000 BTU/lb)	Maximum detection limits (mg/kg)
N-Nitrosopiperidine	(1)	1200
N-Nitrosopyrrolidine	(1)	1200
N-Nitrosodiethylamine	(1)	1200
N-Nitrosomethylethylamine	(1)	1200
Naphthalene	1200	
Nitrobenzene	(1)	1200
o-Dichlorobenzene	(1)	1200
o-Toluidine	(1)	1200
O,O Diethyl O-pyrazinyl phospho-thioate	(1)	1200
O,O,O-Triethyl phosphorothionate	(1)	1200
p-(Dimethylamino) azobenzene	(1)	1200
p-Chloro-m-cresol	(1)	1200
p-Chloroaniline	(1)	1200
p-Dichlorobenzene	(1)	1200
p-Nitroaniline	(1)	1200
p-Nitrophenol	(1)	1200
p-Phenylenediamine	(1)	1200
Parathion	(1)	1200
Pentachlorobenzene	(1)	1200
Pentachloroethane	(1)	34
Pentachloronitrobenzene	(1)	1200
Pentachlorophenol	(1)	1200
Phenacetin	(1)	1200
Phenol	(1)	1200
Phorate	(1)	1200
Pronamide	(1)	1200
Pyridine	(1)	1200
Safrole	(1)	1200
Tetrachloroethylene	(1)	34
Tetraethyldithiopyrophosphate	(1)	1200
Toluene	150	
Trichloroethylene	(1)	34
Trichlorofluoromethane	(1)	34
Vinyl Chloride	(1)	34

[1] Non-detect.

TABLE 3.—DETECTION AND DETECTION LIMIT VALUES FOR A POSSIBLE NUMBER 4 FUEL OIL SPECIFICATION

Chemical name	Concentration limit (mg/kg at 10,000 BTU/lb)	Maximum detection limits (mg/kg)
Total Nitrogen as N	1500	
Total Halogens as Cl	10	
Antimony	(1)	11
Arsenic	(1)	0.23
Barium	(1)	23
Beryllium	(1)	1.1
Cadmium	(1)	1.1
Chromium	(1)	2.3
Cobalt	(1)	4.6
Lead	9.9	
Manganese	(1)	1.1
Mercury	(1)	0.18
Nickel	16	
Selenium	0.13	
Silver	(1)	2.3
Thallium	(1)	23
α-Naphthylamine	(1)	200
α,α-Dimethylphenethylamine	(1)	200
β-Naphthylamine	(1)	200
1,1-Dichloroethylene	(1)	17
1,1,2-Trichloroethane	(1)	17
1,1,2,2-Tetrachloroethane	(1)	17
1,2-Dibromo-3-chloropropane	(1)	17
1,2-Dichloroethylene (cis- or trans-)	(1)	17
1,2,3-Trichloropropane	(1)	17
1,2,4-Trichlorobenzene	(1)	200
1,2,4,5-Tetrachlorobenzene	(1)	200

TABLE 3.—DETECTION AND DETECTION LIMIT VALUES FOR A POSSIBLE NUMBER 4 FUEL OIL SPECIFICATION—Continued

Chemical name	Concentration limit (mg/kg at 10,000 BTU/lb)	Maximum detection limits (mg/kg)
1,3,5-Trinitrobenzene	(1)	200
1,4-Dichloro-2-butene (cis- or trans-)	(1)	17
1,4-Naphthoquinone	(1)	200
2-Acetylaminofluorene	(1)	200
2-Chloroethyl vinyl ether	(1)	17
2-Chloronaphthalene	(1)	200
2-Chlorophenol	(1)	200
2-Piccoline	(1)	200
2,3,4,6-Tetrachlorophenol	(1)	200
2,4-Dichlorophenol	(1)	200
2,4-Dimethylphenol	(1)	200
2,4-Dinitrophenol	(1)	200
2,4-Dinitrotoluene	(1)	200
2,4,5-Trichlorophenol	(1)	200
2,4,6-Trichlorophenol	(1)	200
2,6-Dichlorophenol	(1)	200
2,6-Dinitrotoluene	(1)	200
3-3′-Dimethylbenzidine	(1)	200
3-Methylcholanthrene	(1)	200
3,3′-Dichlorobenzidine	(1)	200
4-Aminobiphenyl	(1)	200
4-Bromophenyl phenyl ether	(1)	200
4,6-Dinitro-o-cresol	(1)	200
5-Nitro-o-toluidine	(1)	200
7,12-Dimethylbenz[a]anthracene	(1)	200
Acetonitrile	(1)	17
Acetophenone	(1)	200
Acrolein	(1)	17
Acrylonitrile	(1)	17
Allyl chloride	(1)	17
Aniline	(1)	200
Aramite	(1)	200
Benzene	22	
Benzidine	(1)	200
Benzo[a]anthracene	100	
Benzo[a]pyrene	100	
Benzo[b]fluoranthene	(1)	200
Benzo[k]fluoranthene	(1)	200
Bromoform	(1)	17
Butyl benzyl phthalate	(1)	200
Carbon disulfide	(1)	17
Carbon tetrachloride	(1)	17
Chlorobenzene	(1)	17
Chlorobenzilate	(1)	200
Chloroform	(1)	17
Chloroprene	(1)	17
Chrysene	100	
cis-1,3-Dichloropropene	(1)	17
Cresol (o-, m-, or p-)	(1)	200
Di-n-butyl phthalate	(1)	200
Di-n-octyl phthalate	100	
Diallate	(1)	200
Dibenzo[a,h]anthracene	100	
Dibenz[a,j]acridine	(1)	200
Dichlorodifluoromethane	(1)	17
Diethyl phthalate	(1)	200
Dimethoate	(1)	200
Dimethyl phthalate	(1)	200
Dinoseb	(1)	200
Diphenylamine	(1)	200
Disulfoton	(1)	200
Ethyl methacrylate	(1)	17
Ethyl methanesulfonate	(1)	200
Famphur	(1)	200
Fluoranthene	(1)	200
Fluorene	110	
Hexachlorobenzene	(1)	200
Hexachlorobutadiene	(1)	200
Hexachlorocyclopentadiene	(1)	200
Hexachloroethane	(1)	200

TABLE 3.—DETECTION AND DETECTION LIMIT VALUES FOR A POSSIBLE NUMBER 4 FUEL OIL SPECIFICATION—Continued

Chemical name	Concentration limit (mg/kg at 10,000 BTU/lb)	Maximum detection limits (mg/kg)
Hexachlorophene	(1)	5000
Hexachloropropene	(1)	200
Indeno(1,2,3-cd)pyrene	(1)	200
Isobutyl alcohol	(1)	17
Isodrin	(1)	200
Isosafrole	(1)	200
Kepone	(1)	400
m-Dichlorobenzene	(1)	200
Methacrylonitrile	(1)	17
Methapyrilene	(1)	200
Methyl bromide	(1)	17
Methyl chloride	(1)	17
Methyl ethyl ketone	(1)	17
Methyl iodide	(1)	17
Methyl methacrylate	(1)	17
Methyl methanesulfonate	(1)	200
Methyl parathion	(1)	200
Methylene chloride	(1)	17
N-Nitrosodi-n-butylamine	(1)	200
N-Nitrosomethylethylamine	(1)	200
N-Nitrosomorpholine	(1)	200
N-Nitrosopiperidine	(1)	200
N-Nitrosopyrrolidine	(1)	200
N-Nitrosodiethylamine	(1)	200
Naphthalene	340	
Nitrobenzene	(1)	200
o-Dichlorobenzene	(1)	200
o-Toluidine	(1)	200
O,O Diethyl O-pyrazinyl phosphoro- thioate	(1)	200
O,O,O-Triethyl phosphorothionate	(1)	200
p-(Dimethylamino)azobenzene	(1)	200
p-Chloro-m-cresol	(1)	200
p-Chloroaniline	(1)	200
p-Dichlorobenzene	(1)	200
p-Nitroaniline	(1)	200
p-Nitrophenol	(1)	200
p-Phenylenediamine	(1)	200
Parathion	(1)	200
Pentachlorobenzene	(1)	200
Pentachloroethane	(1)	17
Pentachloronitrobenzene	(1)	200
Pentachlorophenol	(1)	200
Phenacetin	(1)	200
Phenol	(1)	200
Phorate	(1)	200
Pronamide	(1)	200
Pyridine	(1)	200
Safrole	(1)	200
Tetrachloroethylene	(1)	17
Tetraethyldithiopyrophosphate	(1)	200
Toluene	110	
Trichloroethylene	(1)	17
Trichlorofluoromethane	(1)	17
Vinyl Chloride	(1)	17

[1] Non-detect.

TABLE 4.—DETECTION AND DETECTION LIMIT VALUES FOR A POSSIBLE NUMBER 6 FUEL OIL SPECIFICATION

Chemical name	Concentration limit (mg/kg at 10,000 BTU/lb)	Maximum detection level (mg/kg)
Total Nitrogen as N	3500	
Total Halogens as Cl	10	
Antimony	6.5	
Arsenic	(1)	0.20
Barium	(1)	20
Beryllium	(1)	1.0
Cadmium	(1)	1.0

TABLE 4.—DETECTION AND DETECTION LIMIT VALUES FOR A POSSIBLE NUMBER 6 FUEL OIL SPECIFICATION—Continued

Chemical name	Concentration limit (mg/kg at 10,000 BTU/lb)	Maximum detection level (mg/kg)
Chromium	(1)	2.0
Cobalt	(1)	4.1
Lead	30	
Manganese	(1)	1.0
Mercury	(1)	0.22
Nickel	36	
Selenium	0.12	
Silver	(1)	2.0
Thallium	(1)	20
α-Naphthylamine	(1)	640
α,α-Dimethylphenethylamine	(1)	640
β-Naphthylamine	(1)	640
1,1-Dichloroethylene	(1)	20
1,1,2-Trichloroethane	(1)	20
1,1,2,2-Tetrachloroethane	(1)	20
1,2-Dibromo-3-chloropropane	(1)	20
1,2-Dichloroethylene (cis- or trans-)	(1)	20
1,2,3-Trichloropropane	(1)	20
1,2,4-Trichlorobenzene	(1)	640
1,2,4,5-Tetrachlorobenzene	(1)	640
1,3,5-Trinitrobenzene	(1)	640
1,4-Dichloro-2-butene (cis- or trans-)	(1)	20
1,4-Naphthoquinone	(1)	640
2-Acetylaminofluorene	(1)	640
2-Chloroethyl vinyl ether	(1)	20
2-Chloronaphthalene	(1)	640
2-Chlorophenol	(1)	640
2-Piccoline	(1)	640
2,3,4,6-Tetrachlorophenol	(1)	640
2,4-Dichlorophenol	(1)	640
2,4-Dimethylphenol	(1)	640
2,4-Dinitrophenol	(1)	640
2,4-Dinitrotoluene	(1)	640
2,4,5-Trichlorophenol	(1)	640
2,4,6-Trichlorophenol	(1)	640
2,6-Dichlorophenol	(1)	640
2,6-Dinitrotoluene	(1)	640
3-3′-Dimethylbenzidine	(1)	640
3-Methylcholanthrene	(1)	640
3,3′-Dichlorobenzidine	(1)	640
4-Aminobiphenyl	(1)	640
4-Bromophenyl phenyl ether	(1)	640
4,6-Dinitro-o-cresol	(1)	640
5-Nitro-o-toluidine	(1)	640
7,12-Dimethylbenz[a]anthracene	(1)	640
Acetonitrile	(1)	20
Acetophenone	(1)	640
Acrolein	(1)	20
Acrylonitrile	(1)	20
Allyl chloride	(1)	20
Aniline	(1)	640
Aramite	(1)	640
Benzene	11	
Benzidine	(1)	640
Benzo[a]anthracene	930	
Benzo[a]pyrene	530	
Benzo[b]fluoranthene	420	
Benzo[k]fluoranthene	(1)	640
Bromoform	(1)	20
Butyl benzyl phthalate	(1)	640
Carbon disulfide	(1)	20
Carbon tetrachloride	(1)	20
Chlorobenzene	(1)	20
Chlorobenzilate	(1)	640
Chloroform	(1)	20
Chloroprene	(1)	20
Chrysene	1300	
cis-1,3-Dichloropropene	(1)	20
Cresol (o-, m-, p-)	(1)	640
Di-n-butylphthalate	(1)	640

TABLE 4.—DETECTION AND DETECTION LIMIT VALUES FOR A POSSIBLE NUMBER 6 FUEL OIL SPECIFICATION—Continued

Chemical name	Concentration limit (mg/kg at 10,000 BTU/lb)	Maximum detection level (mg/kg)
Di-n-octyl phthalate	350	
Diallate	(1)	640
Dibenzo[a,h]anthracene	350	
Dibenz[a,j]acridine	(1)	640
Dichlorodifluoromethane	(1)	20
Diethyl phthalate	(1)	640
Dimethoate	(1)	640
Dimethyl phthalate	(1)	640
Dinoseb	(1)	640
Diphenylamine	(1)	640
Disulfoton	(1)	640
Ethyl methacrylate	(1)	20
Ethyl methanesulfonate	(1)	640
Famphur	(1)	640
Fluoranthene	(1)	640
Fluorene	350	
Hexachlorobenzene	(1)	640
Hexachlorobutadiene	(1)	640
Hexachlorocyclopentadiene	(1)	640
Hexachloroethane	(1)	640
Hexachlorophene	(1)	16000
Hexachloropropene	(1)	640
Indeno(1,2,3-cd)pyrene	350	
Isobutyl alcohol	(1)	20
Isodrin	(1)	640
Isosafrole	(1)	640
Kepone	(1)	1300
m-Dichlorobenzene	(1)	640
Methacrylonitrile	(1)	20
Methapyrilene	(1)	640
Methyl bromide	(1)	20
Methyl chloride	(1)	20
Methyl ethyl ketone	(1)	20
Methyl iodide	(1)	20
Methyl methacrylate	(1)	20
Methyl methanesulfonate	(1)	640
Methyl parathion	(1)	640
Methylene chloride	(1)	20
N-Nitrosodi-n-butylamine	(1)	640
N-Nitrosomethylethylamine	(1)	640
N-Nitrosomorpholine	(1)	640
N-Nitrosopiperidine	(1)	640
N-Nitrosopyrrolidine	(1)	640
N-Nitrosodiethylamine	(1)	640
Naphthalene	570	
Nitrobenzene	(1)	640
o-Dichlorobenzene	(1)	640
o-Toluidine	(1)	1300
O,O Diethyl O-pyrazinyl phosphothioate	(1)	640
O,O,O-Triethyl phosphorothionate	(1)	640
p-(Dimethylamino)azobenzene	(1)	640
p-Chloro-m-cresol	(1)	640
p-Chloroaniline	(1)	640
p-Dichlorobenzene	(1)	640
p-Nitroaniline	(1)	640
p-Nitrophenol	(1)	640
p-Phenylenediamine	(1)	640
Parathion	(1)	640
Pentachlorobenzene	(1)	640
Pentachloroethane	(1)	20
Pentachloronitrobenzene	(1)	640
Pentachlorophenol	(1)	640
Phenacetin	(1)	640
Phenol	(1)	640
Phorate	(1)	640
Pronamide	(1)	640
Pyridine	(1)	640
Safrole	(1)	640
Tetrachloroethylene	(1)	20
Tetraethyldithiopyrophosphate	(1)	640

TABLE 4.—DETECTION AND DETECTION LIMIT VALUES FOR A POSSIBLE NUMBER 6 FUEL OIL SPECIFICATION—Continued

Chemical name	Concentration limit (mg/kg at 10,000 BTU/lb)	Maximum detection level (mg/kg)
Toluene	41	....
Trichloroethylene	(1)	20
Trichlorofluoromethane	(1)	20
Vinyl Chloride	(1)	20

[1] Non-detect.

TABLE 5.—DETECTION AND DETECTION LIMIT VALUES FOR A POSSIBLE COMPOSITE FUEL SPECIFICATION—50TH PERCENTILE ANALYSIS

Chemical name	Concentration limit (mg/kg at 10,000 BTU/lb)	Maximum detection limits (mg/kg)
Total Nitrogen as N	170	....
Total Halogens as Cl	10	....
Antimony	4.7	....
Arsenic	(1)	0.14
Barium	(1)	18
Beryllium	(1)	0.90
Cadmium	(1)	0.90
Chromium	(1)	1.8
Cobalt	(1)	3.6
Lead	7.0	....
Manganese	(1)	0.90
Mercury	(1)	0.11
Nickel	2.4	....
Selenium	0.090	....
Silver	(1)	1.8
Thallium	(1)	18
α-Naphthylamine	(1)	220
α,α-Dimethylphenethylamine	(1)	220
β-Naphthylamine	(1)	220
1,1-Dichloroethylene	(1)	17
1,1,2-Trichloroethane	(1)	17
1,1,2,2-Tetrachloroethane	(1)	17
1,2-Dibromo-3-chloropropane	(1)	17
1,2-Dichloroethylene (cis- or trans-)	(1)	17
1,2,3-Trichloropropane	(1)	17
1,2,4-Trichlorobenzene	(1)	220
1,2,4,5-Tetrachlorobenzene	(1)	220
1,3,5-Trinitrobenzene	(1)	220
1,4-Dichloro-2-butene (cis- or trans-)	(1)	17
1,4-Naphthoquinone	(1)	220
2-Acetylaminofluorene	(1)	220
2-Chloroethyl vinyl ether	(1)	17
2-Chloronaphthalene	(1)	220
2-Chlorophenol	(1)	220
2-Piccoline	(1)	220
2,3,4,6-Tetrachlorophenol	(1)	220
2,4-Dichlorophenol	(1)	220
2,4-Dimethylphenol	(1)	220
2,4-Dinitrophenol	(1)	220
2,4-Dinitrotoluene	(1)	220
2,4,5-Trichlorophenol	(1)	220
2,4,6-Trichlorophenol	(1)	220
2,6-Dichlorophenol	(1)	220
2,6-Dinitrotoluene	(1)	220
3-3′-Dimethylbenzidine	(1)	220
3-Methylcholanthrene	(1)	220
3,3′-Dichlorobenzidine	(1)	220
4-Aminobiphenyl	(1)	220
4-Bromophenyl phenyl ether	(1)	220
4,6-Dinitro-o-cresol	(1)	220
5-Nitro-o-toluidine	(1)	220
7,12-Dimethylbenz[a]anthracene	(1)	220
Acetonitrile	(1)	17
Acetophenone	(1)	220
Acrolein	(1)	17
Acrylonitrile	(1)	17

TABLE 5.—DETECTION AND DETECTION LIMIT VALUES FOR A POSSIBLE COMPOSITE FUEL SPECIFICATION—50TH PERCENTILE ANALYSIS—Continued

Chemical name	Concentration limit (mg/kg at 10,000 BTU/lb)	Maximum detection limits (mg/kg)
Allyl chloride	(1)	17
Aniline	(1)	220
Aramite	(1)	220
Benzene	21	
Benzidine	(1)	220
Benzo[a]anthracene	140	
Benzo[a]pyrene	140	
Benzo[b]fluoranthene	140	
Benzo[k]fluoranthene	(1)	220
Bromoform	(1)	17
Butyl benzyl phthalate	(1)	220
Carbon disulfide	(1)	17
Carbon tetrachloride	(1)	17
Chlorobenzene	(1)	17
Chlorobenzilate	(1)	220
Chloroform	(1)	17
Chloroprene	(1)	17
Chrysene	140	
cis-1,3-Dichloropropene	(1)	17
Cresol (o-, n-, or p-)	(1)	220
Di-n-butyl phthalate	(1)	220
Di-n-octyl phthalate	120	
Diallate	(1)	220
Dibenzo[a,h]anthracene	140	
Dibenz[a,j]acridine	(1)	220
Dichlorodifluoromethane	(1)	17
Diethyl phthalate	(1)	220
Dimethoate	(1)	220
Dimethyl phthalate	(1)	220
Dinoseb	(1)	220
Diphenylamine	(1)	220
Disulfoton	(1)	220
Ethyl methacrylate	(1)	17
Ethyl methanesulfonate	(1)	220
Famphur	(1)	220
Fluoranthene	(1)	220
Fluorene	120	
Hexachlorobenzene	(1)	220
Hexachlorobutadiene	(1)	220
Hexachlorocyclopentadiene	(1)	220
Hexachloroethane	(1)	220
Hexachlorophene	(1)	5500
Hexachloropropene	(1)	220
Indeno(1,2,3-cd)pyrene	140	
Isobutyl alcohol	(1)	17
Isodrin	(1)	220
Isosafrole	(1)	220
Kepone	(1)	440
m-Dichlorobenzene	(1)	220
Methacrylonitrile	(1)	17
Methapyrilene	(1)	220
Methyl bromide	(1)	17
Methyl chloride	(1)	17
Methyl ethyl ketone	(1)	17
Methyl iodide	(1)	17
Methyl methacrylate	(1)	17
Methyl methanesulfonate	(1)	220
Methyl parathion	(1)	220
Methylene chloride	(1)	17
N-Nitrosodi-n-butylamine	(1)	220
N-Nitrosomethylethylamine	(1)	220
N-Nitrosomorpholine	(1)	220
N-Nitrosopiperidine	(1)	220
N-Nitrosopyrrolidine	(1)	220
N-Nitrosodiethylamine	(1)	220
Naphthalene	360	
Nitrobenzene	(1)	220
o-Dichlorobenzene	(1)	220
o-Toluidine	(1)	270

TABLE 5.—DETECTION AND DETECTION LIMIT VALUES FOR A POSSIBLE COMPOSITE FUEL SPECIFICATION—50TH PERCENTILE ANALYSIS—Continued

Chemical name	Concentration limit (mg/kg at 10,000 BTU/lb)	Maximum detection limits (mg/kg)
O,O-Diethyl O-pyrazinyl phosphothioate	(1)	220
O,O,O-Triethyl phosphorothinoate	(1)	220
p-(Dimethylamino) azobenzene	(1)	220
p-Chloro-m-cresol	(1)	220
p-Chloroaniline	(1)	220
p-Dichlorobenzene	(1)	220
p-Nitroaniline	(1)	220
p-Nitrophenol	(1)	220
p-Phenylenediamine	(1)	220
Parathion	(1)	220
Pentachlorobenzene	(1)	220
Pentachloroethane	(1)	17
Pentachloronitrobenzene	(1)	220
Pentachlorophenol	(1)	220
Phenacetin	(1)	220
Phenol	(1)	220
Phorate	(1)	220
Pronamide	(1)	220
Pyridine	(1)	220
Safrole	(1)	220
Tetrachloroethylene	(1)	17
Tetraethyldithiopyrophosphate	(1)	220
Toluene	110	
Trichloroethylene	(1)	17
Trichlorofluoromethane	(1)	17
Vinyl Chloride	(1)	17

[1] Non-detect.

TABLE 6.—DETECTION AND DETECTION LIMIT VALUES FOR A POSSIBLE COMPOSITE FUEL SPECIFICATION—90TH PERCENTILE ANALYSIS

Chemical name	Concentration limit (mg/kg at 10,000 BTU/lb)	Maximum detection limit (mg/kg)
Total Nitrogen as N	1800	
Total Halogens as Cl	25	
Antimony	5.8	
Arsenic	(1)	0.22
Barium	(1)	22
Beryllium	(1)	1.1
Cadmium	(1)	1.1
Chromium	(1)	2.2
Cobalt	(1)	4.4
Lead	22	
Manganese	(1)	1.1
Mercury	(1)	0.18
Nickel	18	
Selenium	0.12	
Silver	(1)	2.2
Thallium	(1)	22
α-Naphthylamine	(1)	700
α,α-Dimethylphenethylamine	(1)	700
β-Naphthylamine	(1)	700
1,1-Dichloroethylene	(1)	34
1,1,2-Trichloroethane	(1)	34
1,1,2,2-Tetrachloroethane	(1)	34
1,2-Dibromo-3-chloropropane	(1)	34
1,2-Dichloroethylene (cis- or trans-)	(1)	34
1,2,3-Trichloropropane	(1)	34
1,2,4-Trichlorobenzene	(1)	700
1,2,4,5-Tetrachlorobenzene	(1)	700
1,3,5-Trinitrobenzene	(1)	900
1,4-Dichloro-2-butene (cis- or trans-)	(1)	34
1,4-Naphthoquinone	(1)	700
2-Acetylaminofluorene	(1)	700
2-Chloroethyl vinyl ether	(1)	34
2-Chloronaphthalene	(1)	700

TABLE 6.—DETECTION AND DETECTION LIMIT VALUES FOR A POSSIBLE COMPOSITE FUEL SPECIFICATION—90TH PERCENTILE ANALYSIS—Continued

Chemical name	Concentration limit (mg/kg at 10,000 BTU/lb)	Maximum detection limit (mg/kg)
2-Chlorophenol	(1)	700
2-Piccoline	(1)	700
2,3,4,6-Tetrachlorophenol	(1)	700
2,4-Dichlorophenol	(1)	700
2,4-Dimethylphenol	(1)	700
2,4-Dinitrophenol	(1)	700
2,4-Dinitrotoluene	(1)	700
2,4,5-Trichlorophenol	(1)	700
2,4,6-Trichlorophenol	(1)	700
2,6-Dichlorophenol	(1)	700
2,6-Dinitrotoluene	(1)	700
3-3′-Dimethylbenzidine	(1)	700
3-Methylcholanthrene	(1)	700
3,3′-Dichlorobenzidine	(1)	700
4-Aminobiphenyl	(1)	700
4-Bromophenyl phenyl ether	(1)	700
4,6-Dinitro-o-cresol	(1)	700
5-Nitro-o-toluidine	(1)	700
7,12-Dimethylbenz[a]anthracene	(1)	700
Acetonitrile	(1)	34
Acetophenone	(1)	700
Acrolein	(1)	34
Acrylonitrile	(1)	34
Allyl chloride	(1)	34
Aniline	(1)	700
Aramite	(1)	700
Benzene	3300	
Benzidine	(1)	700
Benzo[a]anthracene	610	
Benzo[a]pyrene	530	
Benzo[b]fluoranthene	390	
Benzo[k]fluoranthene	(1)	700
Bromoform	(1)	34
Butyl benzyl phthalate	(1)	700
Carbon disulfide	(1)	34
Carbon tetrachloride	(1)	34
Chlorobenzene	(1)	34
Chlorobenzilate	(1)	700
Chloroform	(1)	34
Chloroprene	(1)	34
Chrysene	610	
cis-1,3-Dichloropropene	(1)	34
Cresol (o-, n-, or p-)	(1)	700
Di-n-butyl phthalate	(1)	700
Di-n-octyl phthalate	360	
Diallate	(1)	700
Dibenzo[a,h]anthracene	360	
Dibenz[a,j]acridine	(1)	700
Dichlorodifluoromethane	(1)	34
Diethyl phthalate	(1)	700
Dimethoate	(1)	700
Dimethyl phthalate	(1)	700
Dinoseb	(1)	700
Diphenylamine	(1)	700
Disulfoton	(1)	700
Ethyl methacrylate	(1)	34
Ethyl methanesulfonate	(1)	700
Famphur	(1)	700
Fluoranthene	(1)	700
Fluorene	360	
Hexachlorobenzene	(1)	700
Hexachlorobutadiene	(1)	700
Hexachlorocyclopentadiene	(1)	700
Hexachloroethane	(1)	700
Hexachlorophene	(1)	18000
Hexachloropropene	(1)	700
Indeno(1,2,3-cd)pyrene	360	
Isobutyl alcohol	(1)	34
Isodrin	(1)	700

TABLE 6.—DETECTION AND DETECTION LIMIT VALUES FOR A POSSIBLE COMPOSITE FUEL SPECIFICATION—90TH PERCENTILE ANALYSIS—Continued

Chemical name	Concentration limit (mg/kg at 10,000 BTU/lb)	Maximum detection limit (mg/kg)
Isosafrole	(1)	700
Kepone	(1)	1400
m-Dichlorobenzene	(1)	700
Methacrylonitrile	(1)	34
Methapyrilene	(1)	700
Methyl bromide	(1)	34
Methyl chloride	(1)	34
Methyl ethyl ketone	(1)	34
Methyl iodide	(1)	34
Methyl methacrylate	(1)	34
Methyl methanesulfonate	(1)	700
Methyl parathion	(1)	700
Methylene chloride	(1)	34
N-Nitrosodi-n-butylamine	(1)	700
N-Nitrosomethylethylamine	(1)	700
N-Nitrosomorpholine	(1)	700
N-Nitrosopiperidine	(1)	700
N-Nitrosopyrrolidine	(1)	700
N-Nitrosodiethylamine	(1)	700
Naphthalene	1300	
Nitrobenzene	(1)	700
o-Dichlorobenzene	(1)	700
o-Toluidine	(1)	1000
O,O-Diethyl O-pyrazinyl phophorothioate	(1)	700
O,O,O-Triethyl phosphorothionate	(1)	700
p-(Dimethylamino)azobenzene	(1)	700
p-Chloro-m-cresol	(1)	700
p-Chloroaniline	(1)	700
p-Dichlorobenzene	(1)	700
p-Nitroaniline	(1)	700
p-Nitrophenol	(1)	700
p-Phenylenediamine	(1)	700
Parathion	(1)	700
Pentachlorobenzene	(1)	700
Pentachloroethane	(1)	34
Pentachloronitrobenzene	(1)	700
Pentachlorophenol	(1)	700
Phenacetin	(1)	700
Phenol	(1)	700
Phorate	(1)	700
Pronamide	(1)	700
Pyridine	(1)	700
Safrole	(1)	700
Tetrachloroethylene	(1)	34
Tetraethyldithiopyrophosphate	(1)	700
Toluene	25,000	
Trichloroethylene	(1)	34
Trichlorofluoromethane	(1)	34
Vinyl Chloride	(1)	34

[1] Non-detect.

TABLE 7.—POSSIBLE PHYSICAL SPECIFICATIONS—FROM EPA'S DATA

Fuel type (physical param)	Gasoline	No. 2	No. 4	No. 6	Comp. 50th	Comp 90th
Flash Point (°C)	< 0	44	66	69	63	< 0
Kinematic viscosity (cSt @ 40°C)		3.7	6.4	660	6.4	

Note: Kinematic viscosity for gasoline is less than measureable levels.

TABLE 8.—POSSIBLE PHYSICAL SPECIFICATIONS—FROM ASTM AND OTHER PUBLISHED LITERATURE

Fuel type[220] (parameter)	Gasoline	No. 2	No. 4	No. 6
Flashpoint (°C)	[221] – 42	38	55	60
Kinematic viscosity (cSt@40 °C)	[222] 0.6	3.4	24	50 (at 100 °C)

[220] Fuel oil specifications from ASTM Designation D 396–92, *Standard Specifications for Fuel Oils.*

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Volatile organic compounds
Waste treatment and disposal
Zinc

40 CFR Part 63

Air pollution control
Hazardous substances
Reporting and recordkeeping requirements

40 CFR Part 260

Administrative practice and procedure
Confidential business information
Environmental Protection Agency
Hazardous waste

40 CFR Part 261

Environmental Protection Agency
Hazardous waste
Recycling
Reporting and recordkeeping requirements

40 CFR Part 264

Air pollution control
Environmental Protection Agency
Hazardous waste
Insurance
Packaging and containers
Reporting and recordkeeping requirements
Security measures
Surety bonds

40 CFR Part 265

Air pollution control
Environmental Protection Agency
Hazardous waste
Insurance
Packaging and containers
Reporting and recordkeeping requirements
Security measures
Surety bonds
Water supply

40 CFR Part 266

Energy
Environmental Protection Agency
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: March 20, 1996.

Carol M. Browner,
Administrator.

For the reasons set out in the preamble, it is proposed to amend Title 40 of the Code of Federal Regulations as follows:

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

I. In part 60:

1. The authority citation for part 60 continues to read as follows:

Authority: 42 USC 7401, 7411, 7414, 7416, 7429, and 7601.

2. Appendix B in Part 60 is amended by adding four entries to the table of contents, and by adding new performance specifications 4B, 8A, 10, 11, and 12:

Appendix B—Performance Specifications

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Performance Specification 4B—Specifications and test procedures for carbon monoxide and oxygen continuous monitoring systems in stationary sources.

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Performance Specification 8A—Specifications and test procedures for total hydrocarbon continuous monitoring systems in hazardous waste-burning stationary sources.

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Performance Specification 10—Specifications and test procedures for multi-metals continuous monitoring sytems in stationary sources.

Performance Specification 11—Specifications and test procedures for particulate matter continuous monitoring systems in stationary sources.

Performance Specification 12—Specifications and test procedures for total mercury monitoring systems in stationary sources.

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Performance Specification 4B—Specifications and test procedures for carbon monoxide and oxygen continuous monitoring systems in stationary sources.

1. Applicability and Principle

1.1 Applicability. 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

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[221] Felder, M.F., and R.W. Rousseau, *Elementary Principles of Chemical Processes,* John Wiley and Sons, New York, 1978, 420.

[222] Perry, Robert H., Don W. Green, and James O. Moloney, *Perry's Chemical Engineers' Handbook: Sixth Edition,* McGraw-Hill Book Co., New York, 1984, 9–13.

of the dry volume of stack effluent sampled, and (b) an automatic sampling system.

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 other times besides the initial test.

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, and calibration drift tests, and interferant tests are conducted to determine conformance of the CEMS with the specification.

2. 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 the time 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 be (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 concentrations 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, appendix A, 40 CFR part 60. The monitoring system samples sequentially at the reference and traverse points throughout the testing period for five minutes at each point.

4. Performance and Equipment Specifications

4.1 Data Recorder Scale. For O_2, same as specified in PS 3, except that the span shall 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 shall be 200 ppm and the high range span shall 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 shall not exceed 2 minutes.

5. 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.

6.0 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 (percent)
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 shall 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.''

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Performance Specification 8A—Specifications and test procedures for total hydrocarbon continuous monitoring systems in hazardous waste-burning stationary sources.

1. Applicability and Principle

1.1 Applicability. These performance specifications apply to hydrocarbon (HC) continuous emission monitoring systems (CEMS) installed on hazardous waste-burning 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 shall 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 shall 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. 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 shall 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 shall 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 shall 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 shall 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 shall 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 shall 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 shall 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 shall pass through the measurement section of the analyzer without interruption. The detector shall measure the sample concentration at least once every 15 seconds. An average emission rate shall be computed and recorded at least once every 60 seconds.

4.9 Hourly Rolling Average Calculation. The CEMS shall 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 shall 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 shall 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.

Source: ______________________

Monitor: ______________________

Serial Number: ______________________

Date: ______________________

Location: ______________________

Span: ______________________

Day	Date	Time	Calibration value	Monitor response	Difference	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

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 shall 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

7.1 Calibration Error. Calculate CE using Equation 1.

$$CE = \left| d / FS \right| \times 100 \qquad (Eq.1)$$

Where:

d = Mean difference between CEMS response and the known reference concentration, determined using Equation 2.

$$d = \frac{1}{n} \sum_{i=1}^{n} d_i \qquad (Eq.2)$$

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.

Source: ______________________________

Monitor: ______________________________

Serial Number: __________________________

Date: ______________________________

Location: ______________________________

Span: ______________________________

Run No.	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

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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Performance Specification 10—Specifications and test procedures for multi-metals continuous monitoring systems in stationary sources.

1. Applicability and Principle

1.1 Applicability. This specification is to be used for evaluating the acceptability of multi-metals 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) a diluent (O_2) monitor (which must meet its own performance specifications: 40 CFR part 60, Appendix B, Performance Specification 3), (b) flow monitoring equipment to allow measurement of the dry volume of stack effluent sampled, and (c) an automatic sampling system.

A multi-metals CEMS must be capable of measuring the total concentrations (regardless of speciation) of two or more of the following metals in both their vapor and solid forms: Antimony (Sb), Arsenic (As), Barium (Ba), Beryllium (Be), Cadmium (Cd), Chromium (Cr), Lead (Pb), Mercury (Hg), Silver (Ag), Thallium (Tl), Manganese (Mn), Cobalt (Co), Nickel (Ni), and Selenium (Se). Additional metals may be added to this list at a later date by addition of appendices to this performance specification. If a CEMS does not measure a particular metal or fails to meet the performance specifications for a particular metal, then the CEMS may not be used to determine emission compliance with the applicable regulation for that metal.

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 other times besides the initial test. See Sec. 60.13 (c) and ''Quality Assurance Requirements For Multi-Metals Continuous Emission Monitoring Systems Used For Compliance Determination.''

1.2 Principle. Installation and measurement location specifications, performance specifications, test procedures, and data reduction procedures are included in this specification. Reference method tests and calibration drift tests are conducted to determine conformance of the CEMS with the specification.

2. Definitions

2.1 Continuous Emission Monitoring System (CEMS). The total equipment required for the determination of a metal 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 metals concentrations and generates a proportional output.

2.1.3 Diluent Analyzer (if applicable). That portion of the CEMS that senses the diluent gas (O_2) 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 Point CEMS. A CEMS that measures the metals concentrations either at a single point or along a path equal to or less than 10 percent of the equivalent diameter of the stack or duct cross section.

2.3 Path CEMS. A CEMS that measures the metals concentrations along a path greater than 10 percent of the equivalent diameter of the stack or duct cross section.

2.4 Span Value. The upper limit of a metals concentration measurement range defined as twenty times the applicable emission limit for each metal. The span value shall be documented by the CEMS manufacturer with laboratory data.

2.5 Relative Accuracy (RA). The absolute mean difference between the metals concentrations 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 tests divided by the mean of the RM tests or the applicable emission limit.

2.6 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.

2.7 Zero Drift (ZD). The difference in the CEMS output readings for zero input after a stated period of operation during which no unscheduled maintenance, repair, or adjustment took place.

2.8 Representative Results. Defined by the RA test procedure defined in this specification.

2.9 Response Time. The time interval between the start of a step change in the system input and the time when the pollutant analyzer output reaches 95 percent of the final value.

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.

2.11 Batch Sampling. Batch sampling refers to the technique of sampling the stack effluent continuously and concentrating the pollutant in some capture medium. Analysis is performed periodically after sufficient time has elapsed to concentrate the pollutant to levels detectable by the analyzer.

2.12 Calibration Standard. Calibration standards consist of a known amount of metal(s) that are presented to the pollutant analyzer portion of the CEMS in order to calibrate the drift or response of the analyzer. The calibration standard may be, for example, a solution containing a known metal concentration, or a filter with a known mass loading or composition.

3. Installation and Measurement Location Specifications

3.1 The CEMS Installation and measurement location. Install the CEMS at an accessible location downstream of all pollution control equipment where the metals concentrations measurements are directly representative or can be corrected so as to be representative of the total emissions from the affected facility. Then select representative measurement points or paths for monitoring in locations that the CEMS will pass the RA test (see Section 7). If the cause of failure to meet the RA test is determined to be the measurement location and a satisfactory correction technique cannot be established, the Administrator may require the CEMS to be relocated.

Measurement locations and points or paths that are most likely to provide data that will meet the RA requirements are listed below.

3.1.1 Measurement Location. The measurement location should be (1) at least eight equivalent diameters downstream of the nearest control device, point of pollutant generation, bend, or other point at which a change of pollutant concentration or flow disturbance may occur, and (2) at least two equivalent diameters upstream from the effluent exhaust. The equivalent duct diameter is calculated as per 40 CFR part 60, Appendix A, Method 1, Section 2.1.

3.1.2 Point CEMS. The measurement point should be (1) no less than 1.0 meter from the stack or duct wall or (2) within or centrally located over the centroidal area of the stack or duct cross section. Selection of traverse points to determine the representativeness of the measurement location should be made according to 40 CFR part 60, Appendix A, Method 1, Sections 2.2 and 2.3.

3.1.3 Path CEMS. The effective measurement path should be (1) totally within the inner area bounded by a line 1.0 meter from the stack or duct wall, or (2) have at least 70 percent of the path within the inner 50 percent of the stack or duct cross sectional area, or (3) be centrally located over any part of the centroidal area.

3.2 Reference Method (RM) Measurement Location and Traverse Points. The RM measurement location should be (1) at least eight equivalent diameters downstream of the nearest control device, point of pollutant generation, bend, or other point at which a change of pollutant concentration or flow disturbance may occur, and (2) at least two equivalent diameters upstream from the effluent exhaust. The RM and CEMS locations need not be the same, however the difference may contribute to failure of the CEMS to pass the RA test, thus they should be as close as possible without causing interference with one another. The equivalent duct diameter is calculated as per 40 CFR part 60, Appendix A, Method 1, Section 2.1. Selection of traverse measurement point locations should be made according to 40 CFR part 60, Appendix A, Method 1, Sections 2.2 and 2.3. If the RM traverse line interferes with or is interfered by the CEMS measurements, the line may be displaced up to 30 cm (or 5 percent of the equivalent diameter of the cross section, whichever is less) from the centroidal area.

4. Performance and Equipment Specifications

4.1 Data Recorder Scale. The CEMS data recorder response range must include zero and a high level value. The high level value must be equal to the span value. If a lower high level value is used, the CEMS must have the capability of providing multiple outputs with different high level values (one of which is equal to the span value) or be capable of automatically changing the high level value as required (up to the span value) such that the measured value does not exceed 95 percent of the high level value.

4.2 Relative Accuracy (RA). The RA of the CEMS must be no greater than 20 percent of the mean value of the RM test data in terms of units of the emission standard for each metal, or 10 percent of the applicable standard, whichever is greater.

4.3 Calibration Drift. The CEMS design must allow the determination of calibration drift at concentration levels commensurate with the applicable emission standard for each metal monitored. The CEMS calibration may not drift or deviate from the reference value (RV) of the calibration standard used for each metal by more than 5 percent of the emission standard for each metal. The calibration shall be performed at a point equal to 80 to 120 percent of the applicable emission standard for each metal.

4.4 Zero Drift. The CEMS design must allow the determination of calibration drift at the zero level (zero drift) for each metal. If this is not possible or practicable, the design must allow the zero drift determination to be made at a low level value (zero to 20 percent of the emission limit value). The CEMS zero point for each metal shall not drift by more than 5 percent of the emission standard for that metal.

4.5 Sampling and Response Time. The CEMS shall sample the stack effluent continuously. Averaging time, the number of measurements in an average, and the averaging procedure for reporting and determining compliance shall conform with that specified in the applicable emission regulation.

4.5.1 Response Time for Instantaneous, Continuous CEMS. The response time for the CEMS must not exceed 2 minutes to achieve 95 percent of the final stable value.

4.5.2 Waiver from Response Time Requirement. A source owner or operator may receive a waiver from the response time requirement for instantaneous, continuous CEMS in section 4.5.1 from the Agency if no CEM is available which can meet this specification at the time of purchase of the CEMS.

4.5.3 Response Time for Batch CEMS. The response time requirement of Sections 4.5.1 and 4.5.2 do not apply to batch CEMS. Instead it is required that the sampling time be no longer than one third of the averaging period for the applicable standard. In addition, the delay between the end of the sampling period and reporting of the sample analysis shall be no greater than one hour. Sampling is also required to be continuous except in that the pause in sampling when the sample collection media are changed should be no greater than five percent of the averaging period or five minutes, whichever is less.

5. Performance Specification Test Procedure

5.1 Pretest Preparation. Install the CEMS and prepare the RM test site according to the specifications in Section 3, and prepare the

CEMS for operation according to the manufacturer's written instructions.

5.2 Calibration and Zero Drift Test Period. While the affected facility is operating at more than 50 percent of normal load, or as specified in an applicable subpart, determine the magnitude of the calibration drift (CD) and zero drift (ZD) once each day (at 24-hour intervals) for 7 consecutive days according to the procedure given in Section 6. To meet the requirements of Sections 4.3 and 4.4 none of the CD's or ZD's may exceed the specification. All CD determinations must be made following a 24-hour period during which no unscheduled maintenance, repair, or manual adjustment of the CEMS took place.

5.3 RA Test Period. Conduct a RA test following the CD test period. Conduct the RA test according to the procedure given in Section 7 while the affected facility is operating at more than 50 percent of normal load, or as specified in the applicable subpart.

6.0 The CEMS Calibration and Zero Drift Test Procedure

This performance specification is designed to allow calibration of the CEMS by use of standard solutions, filters, etc. that challenge the pollutant analyzer part of the CEMS (and as much of the whole system as possible), but which do not challenge the entire CEMS, including the sampling interface. Satisfactory response of the entire system is covered by the RA requirements.

The CD measurement is to verify the ability of the CEMS to conform to the established CEMS calibration used for determining the emission concentration. Therefore, if periodic automatic or manual adjustments are made to the CEMS zero and calibration settings, conduct the CD test immediately before the adjustments, or conduct it in such a way that the CD and ZD can be determined.

Conduct the CD and ZD tests at the points specified in Sections 4.3 and 4.4. Record the CEMS response and calculate the CD according to:

$$\mathrm{CD} = \frac{\left(\mathrm{R_{CEM}} - \mathrm{R_V}\right)}{\mathrm{R_V}} \times 100, \tag{1}$$

Where CD denotes the calibration drift of the CEMS in percent, R_{CEM} is the CEMS response, and R_V is the reference value of the high level calibration standard. Calculate the ZD according to:

$$\mathrm{ZD} = \frac{\left(\mathrm{R_{CEM}} - \mathrm{R_V}\right)}{\mathrm{R_{EM}}} \times 100, \tag{2}$$

Where ZD denotes the zero drift of the CEMS in percent, R_{CEM} is the CEMS response, R_V is the reference value of the low level calibration standard, and REM is the emission limit value.

7. Relative Accuracy Test Procedure

7.1 Sampling Strategy for RA Tests. The RA tests are to verify the initial performance of the entire CEMS system, including the sampling interface, by comparison to RM measurements. Conduct the RM measurements in such a way that they will yield results representative of the emissions from the source and can be correlated to the CEMS data. Although it is preferable to conduct the diluent (if applicable), moisture (if needed), and pollutant measurements simultaneously, the diluent and moisture measurements that are taken within a 30 to 60-minute period, which includes the pollutant measurements, may be used to calculate dry pollutant concentration.

A measure of relative accuracy at a single level is required for each metal measured for compliance purposes by the CEMS. Thus the concentration of each metal must be detectable by both the CEMS and the RM. In addition, the RA must be determined at three levels (0 to 20, 40 to 60, and 80 to 120 percent of the emission limit) for one of the metals which will be monitored, or for iron. If iron is chosen, the three levels should be chosen to correspond to those for one of the metals that will be monitored using known sensitivities (documented by the manufacturer) of the CEMS to both metals.

In order to correlate the CEMS and RM data properly, note the beginning and end of each RM test period of each run (including the exact time of day) in the CEMS data log. Use the following strategy for the RM measurements:

7.2 Correlation of RM and CEMS Data. Correlate the CEMS and RM test data as to the time and duration by first determining from the CEMS final output (the one used for reporting) the integrated average pollutant concentration for each RM test period. Consider system response time, if important, and confirm that the pair of results are on a consistent moisture, temperature, and diluent concentration basis. Then compare each integrated CEMS value against the corresponding average RM value.

7.3 Number of tests. Obtain a minimum of three pairs of CEMS and RM measurements for each metal required and at each level required (see Section 7.1). If more than nine pairs of measurements are obtained, then up to three pairs of measurements may be rejected so long as the total number of measurement pairs used to determine the RA is greater than or equal to nine. However, all data, including the rejected data, must be reported.

7.4 Reference Methods. Unless otherwise specified in an applicable subpart of the regulations, Method 3B, or its approved alternative, is the reference method for diluent (O_2) concentration. Unless otherwise specified in an applicable subpart of the regulations, the manual method for multi-metals in 40 CFR part 266, Appendix IX, Section 3.1 (until superseded by SW–846), or its approved alternative, is the reference method for multi-metals.

As of March 22, 1995 there is no approved alternative RM to Method 29 (for example, a second metals CEMS, calibrated absolutely according to the alternate procedure to be specified in an appendix to this performance specification to be added when an absolute system calibration procedure becomes available and is approved).

7.5 Calculations. Summarize the results on a data sheet. An example is shown in Figure 2–2 of 40 CFR part 60, Appendix B, Performance Specification 2. Calculate the mean of the RM values. Calculate the arithmetic differences between the RM and CEMS output sets, and then calculate the mean of the differences. Calculate the standard deviation of each data set and CEMS RA using the equations in Section 8.

7.6 Undetectable Emission Levels. In the event of metals emissions concentrations from the source being so low as to be undetectable by the CEMS operating in its normal mode (i.e., measurement times and frequencies within the bounds of the performance specifications), then spiking of the appropriate metals in the feed or other operation of the facility in such a way as to raise the metal concentration to a level detectable by both the CEMS and the RM is required in order to perform the RA test.

8. Equations

8.1 Arithmetic Mean. Calculate the arithmetic mean of a data set as follows:

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i, \tag{3}$$

Where n is equal to the number of data points.

8.1.1 Calculate the arithmetic mean of the difference, d, of a data set, using Equation 3 and substituting d for x. Then

$$d_i = x_i - y_i, \tag{4}$$

Where x and y are paired data points from the CEMS and RM, respectively.

8.2 Standard Deviation. Calculate the standard deviation (SD) of a data set as follows:

$$\mathrm{SD} = \sqrt{\frac{\sum_{i=1}^{n} x_i^2 - \frac{1}{n}\left(\sum_{i=1}^{n} x_i\right)^2}{n-1}}, \tag{5}$$

8.3 Relative Accuracy (RA). Calculate the RA as follows:

$$\mathrm{RA} = \frac{\bar{d} + \frac{t_{0.975}}{\sqrt{n}}(\mathrm{SD})}{\bar{R}_{RM}}, \tag{6}$$

Where $\bar{d}$ is equal to the arithmetic mean of the difference, d, of the paired CEMS and RM data set, calculated according to Equations 3 and 4, SD is the standard deviation calculated according to Equation 5, $\bar{R}_{RM}$ is equal to either the average of the RM data set, calculated according to Equation 3, or the value of the emission standard, as applicable (see Section 4.2), and $t_{0.975}$ is the t-value at 2.5 percent error confidence, see Table 1.

TABLE 1

[t-Values]

n[a]	$t_{0.975}$	n[a]	$t_{0.975}$	n[a]	$t_{0.975}$
2	12.706	7	2.447	12	2.201
3	4.303	8	2.365	13	2.179
4	3.182	9	2.306	14	2.160
5	2.776	10	2.262	15	2.145
6	2.571	11	2.228	16	2.131

[a] The values in this table are already corrected for n-1 degrees of freedom. Use n equal to the number of individual values.

9. Reporting

At a minimum (check with the appropriate regional office, or State, or local agency for additional requirements, if any) summarize in tabular form the results of the CD tests and the RA tests or alternate RA procedure as appropriate. Include all data sheets, calculations, and records of CEMS response necessary to substantiate that the performance of the CEMS met the performance specifications.

The CEMS measurements shall be reported to the agency in units of μg/m^3 on a dry basis, corrected to 20°C and 7 percent O$_2$.

10. Alternative Procedures

A procedure for a total system calibration, when developed, will be acceptable as a procedure for determining RA. Such a procedure will involve challenging the entire CEMS, including the sampling interface, with a known metals concentration. This procedure will be added as an appendix to this performance specification when it has been developed and approved. The RA requirement of Section 4.2 will remain unchanged.

11. Bibliography

1. 40 CFR part 60, Appendix B, ''Performance Specification 2—Specifications and Test Procedures for SO$_2$ and NO$_x$ Continuous Emission Monitoring Systems in Stationary Sources.''

2. 40 CFR part 60, Appendix B, ''Performance Specification 1—Specification and Test Procedures for Opacity Continuous Emission Monitoring Systems in Stationary Sources.''

3. 40 CFR part 60, Appendix A, ''Method 1—Sample and Velocity Traverses for Stationary Sources.''

4. 40 CFR part 266, Appendix IX, Section 2, ''Performance Specifications for Continuous Emission Monitoring Systems.''

5. Draft Method 29, ''Determination of Metals Emissions from Stationary Sources,'' Docket A–90–45, Item II–B–12, and EMTIC CTM–012.WPF.

6. ''Continuous Emission Monitoring Technology Survey for Incinerators, Boilers, and Industrial Furnaces: Final Report for Metals CEM's,'' prepared for the Office of Solid Waste, U.S. EPA, Contract No. 68–D2–0164 (4/25/94).

Performance Specification 11—Specifications and test procedures for particulate matter continuous monitoring systems in stationary sources.

1. Applicability and Principle

1.1 Applicability. This specification is to be used for evaluating the acceptability of particulate matter 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) a diluent (O$_2$) monitor (which must meet its own performance specifications: 40 CFR part 60, Appendix B, Performance Specification 3), b) flow monitoring equipment to allow measurement of the dry volume of stack effluent sampled, and c) an automatic sampling system.

This performance specification requires site specific calibration of the PM CEMS' response against manual gravimetric method measurements. The range of validity of the response calibration is restricted to the range of particulate mass loadings used to develop the calibration relation. Further, if conditions at the facility change (i.e., changes in emission control system or fuel type), then a new response calibration is required. Since the validity of the response calibration may be affected by changes in the properties of the particulate, such as density, index of refraction, and size distribution, the limitations of the CEMS used should be evaluated with respect to these possible changes on a site specific basis.

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 other times besides the initial test. See Sec. 60.13 (c) and ''Quality Assurance Requirements For Particulate Matter Continuous Emission Monitoring Systems Used For Compliance Determination.''

1.2 Principle. Installation and measurement location specifications, performance specifications, test procedures, and data reduction procedures are included in this specification. Reference method tests and calibration drift tests are conducted to determine conformance of the CEMS with the specification.

2. Definitions

2.1 Continuous Emission Monitoring System (CEMS). The total equipment required for the determination of particulate matter mass 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 particulate matter concentration and generates a proportional output.

2.1.3 Diluent Analyzer (if applicable). That portion of the CEMS that senses the diluent gas (O$_2$) 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 Point CEMS. A CEMS that measures particulate matter mass concentrations either at a single point or along a path equal to or less than 10 percent of the equivalent diameter of the stack or duct cross section.

2.3 Path CEMS. A CEMS that measures particulate matter mass concentrations along a path greater than 10 percent of the equivalent diameter of the stack or duct cross section.

2.4 Span Value. The upper limit of the CEMS measurement range. The span value shall be documented by the CEMS manufacturer with laboratory data.

2.5 Confidence Interval. The interval with upper and lower limits within which the CEMS response calibration relation lies with a given level of confidence.

2.6 Tolerance Interval. The interval with upper and lower limits within which are contained a specified percentage of the population with a given level of confidence.

2.7 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.

2.8 Zero Drift (ZD). The difference in the CEMS output readings for zero input after a stated period of operation during which no unscheduled maintenance, repair, or adjustment took place.

2.9 Representative Results. Defined by the reference method test procedure defined in this specification.

2.10 Response Time. The time interval between the start of a step change in the system input and the time when the pollutant analyzer output reaches 95 percent of the final value.

2.11 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.

2.12 Batch Sampling. Batch sampling refers to the technique of sampling the stack effluent continuously and concentrating the pollutant in some capture medium. Analysis is performed periodically after sufficient time has elapsed to concentrate the pollutant to levels detectable by the analyzer.

2.13 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.

3. Installation and Measurement Location Specifications

3.1 The CEMS Installation and measurement location. Install the CEMS at an accessible location downstream of all pollution control equipment where the particulate matter mass concentrations measurements are directly representative or can be corrected so as to be representative of the total emissions from the affected facility. Then select representative measurement points or paths for monitoring in locations that the CEMS will meet the calibration requirements (see Section 7). If the cause of failure to meet the calibration requirements is determined to be the measurement location and a satisfactory correction technique cannot be established, the Administrator may require the CEMS to be relocated.

Measurement locations and points or paths that are most likely to provide data that will meet the calibration requirements are listed below.

3.1.1 Measurement Location. The measurement location should be (1) at least eight equivalent diameters downstream of the nearest control device, point of pollutant generation, bend, or other point at which a change of pollutant concentration or flow disturbance may occur and (2) at least two equivalent diameters upstream from the effluent exhaust. The equivalent duct diameter is calculated as per 40 CFR part 60, Appendix A, Method 1, Section 2.1.

3.1.2 Point CEMS. The measurement point should be (1) no less than 1.0 meter from the stack or duct wall or (2) within or centrally located over the centroidal area of the stack or duct cross section. Selection of traverse points to determine the representativeness of the measurement location should be made according to 40 CFR part 60, Appendix A, Method 1, Section 2.2 and 2.3.

3.1.3 Path CEMS. The effective measurement path should be (1) totally within the inner area bounded by a line 1.0 meter from the stack or duct wall, or (2) have at least 70 percent of the path within the inner 50 percent of the stack or duct cross sectional area, or (3) be centrally located over any part of the centroidal area.

3.1.4 Sampling Requirement for Saturated Flue Gas. If the CEMS is to be installed downstream of a wet air pollution control system such that the flue gases are saturated with water, then the CEMS must isokinetically extract and heat a sample of the flue gas for measurement so that the pollutant analyzer portion of the CEMS measures only dry particulate. Heating shall be to a temperature above the water condensation temperature of the extracted gas and shall be maintained at all points in the sample line, from where the flue gas is extracted to and including the pollutant analyzer. Performance of a CEMS design configured in this manner must be documented by the CEMS manufacturer.

3.2 Reference Method (RM) Measurement Location and Traverse Points. The RM measurement location should be (1) at least eight equivalent diameters downstream of the nearest control device, point of pollutant generation, bend, or other point at which a change of pollutant concentration or flow disturbance may occur and (2) at least two equivalent diameters upstream from the effluent exhaust. The RM and CEMS locations need not be the same, however the difference may contribute to failure of the CEMS to pass the RA test, thus they should be as close as possible without causing interference with one another. The equivalent duct diameter is calculated as per 40 CFR part 60, Appendix A, Method 1, Section 2.1. Selection of traverse measurement point locations should be made according to 40 CFR part 60, Appendix A, Method 1, Sections 2.2 and 2.3. If the RM traverse line interferes with or is interfered by the CEMS measurements, the line may be displaced up to 30 cm (or 5 percent of the equivalent diameter of the cross section, whichever is less) from the centroidal area.

4. Performance and Equipment Specifications

4.1 Span and Data Recorder Scale.

4.1.1 Span. The span of the instrument shall be three times the applicable emission limit. The span value shall be documented by the CEMS manufacturer with laboratory data.

4.1.2 Data Recorder Scale. The CEMS data recorder response range must include zero and a high level value. The high level value must be equal to the span value. If a lower high level value is used, the CEMS must have the capability of providing multiple outputs with different high level values (one of which is equal to the span value) or be capable of automatically changing the high level value as required (up to the span value) such that the measured value does not exceed 95 percent of the high level value.

4.2 CEMS Response Calibration Specifications. The CEMS response calibration relation must meet the following specifications.

4.2.1 Correlation Coefficient. The correlation coefficient shall be ≥ 0.90.

4.2.2 Confidence Interval. The confidence interval (95 percent) at the emission limit shall be within ±20 percent of the emission limit value.

4.2.3 Tolerance Interval. The tolerance interval at the emission limit shall have 95 percent confidence that 75 percent of all possible values are within ±35 percent of the emission limit value.

4.3 Calibration Drift. The CEMS design must allow the determination of calibration drift at concentration levels commensurate with the applicable emission standard. The CEMS calibration may not drift or deviate from the reference value (RV) of the calibration standard by more than 2 percent of the reference value. The calibration shall be performed at a point equal to 80 to 120 percent of the applicable emission standard.

4.4 Zero Drift. The CEMS design must allow the determination of calibration drift at the zero level (zero drift). If this is not possible or practicable, the design must allow the zero drift determination to be made at a low level value (zero to 20 percent of the emission limit value). The CEMS zero point shall not drift by more than 2 percent of the emission standard.

4.5 Sampling and Response Time. The CEMS shall sample the stack effluent continuously. Averaging time, the number of measurements in an average, and the averaging procedure for reporting and determining compliance shall conform with that specified in the applicable emission regulation.

4.5.1 Response Time. The response time of the CEMS should not exceed 2 minutes to achieve 95 percent of the final stable value. The response time shall be documented by the CEMS manufacturer.

4.5.2 Response Time for Batch CEMS. The response time requirement of Section 4.5.1 does not apply to batch CEMS. Instead it is required that the sampling time be no longer than one third of the averaging period for the applicable standard. In addition, the delay between the end of the sampling time and reporting of the sample analysis shall be no greater than one hour. Sampling is also required to be continuous except in that the pause in sampling when the sample collection media are changed should be no greater than five percent of the averaging period or five minutes, whichever is less.

5. Performance Specification Test Procedure

5.1 Pretest Preparation. Install the CEMS and prepare the RM test site according to the specifications in Section 3, and prepare the CEMS for operation according to the manufacturer's written instructions.

5.2 Calibration and Zero Drift Test Period. While the affected facility is operating at more than 50 percent of normal load, or as specified in an applicable subpart, determine the magnitude of the calibration drift (CD) and zero drift (ZD) once each day (at 24-hour intervals) for 7 consecutive days according to the procedure given in Section 6. To meet the requirements of Sections 4.3 and 4.4 none of the CD's or ZD's may exceed the specification. All CD determinations must be made following a 24-hour period during which no unscheduled maintenance, repair, or manual adjustment of the CEMS took place.

5.3 CEMS Response Calibration Period. Calibrate the CEMS response following the CD test period. Conduct the calibration according to the procedure given in Section 7 while the affected facility is operating at more than 50 percent of normal load, or as specified in the applicable subpart.

6.0 The CEMS Calibration and Zero Drift Test Procedure

This performance specification is designed to allow calibration of the CEMS by use of calibration standard that challenges the pollutant analyzer part of the CEMS (and as much of the whole system as possible), but which does not challenge the entire CEMS, including the sampling interface. Satisfactory response of the entire system is covered by the CEMS response calibration requirements.

The CD measurement is to verify the ability of the CEMS to conform to the established CEMS response calibration used for determining the emission concentration. Therefore, if periodic automatic or manual adjustments are made to the CEMS zero and calibration settings, conduct the CD test immediately before the adjustments, or conduct it in such a way that the CD and ZD can be determined.

Conduct the CD and ZD tests at the points specified in Sections 4.3 and 4.4. Record the CEMS response and calculate the CD according to:

$$CD = \frac{\left(R_{CEM} - R_V\right)}{R_V} \times 100, \qquad (1)$$

Where CD denotes the calibration drift of the CEMS in percent, R_{CEM} is the CEMS response, and R_V is the reference value of the high level calibration standard. Calculate the ZD according to:

$$ZD = \frac{\left(R_{CEM} - R_V\right)}{R_{EM}} \times 100, \qquad (2)$$

Where ZD denotes the zero drift of the CEMS in percent, R_{CEM} is the CEMS response, R_V is the reference value of the low level calibration standard, and R_{EM} is the emission limit value.

7. CEMS Response Calibration Procedure

7.1 Sampling Strategy for Response Calibration. The CEMS response calibration is carried out in order to verify and calibrate the performance of the entire CEMS system, including the sampling interface, by comparison to RM measurements. Conduct the RM measurements in such a way that they will yield results representative of the emissions from the source and can be correlated to the CEMS data. Although it is preferable to conduct the diluent (if applicable), moisture (if needed), and pollutant measurements simultaneously, the diluent and moisture measurements that are taken within a 30 to 60-minute period, which includes the pollutant measurements, may be used to calculate dry pollutant concentration.

7.2 Correlation of RM and CEMS Data. In order to correlate the CEMS and RM data properly, note the beginning and end of each RM test period of each run (including the exact time of day) in the CEMS data log. Correlate the CEMS and RM test data as to the time and duration by first determining from the CEMS final output (the one used for reporting) the integrated average pollutant concentration for each RM test period. Consider system response time, if important, and confirm that the pair of results are on a consistent moisture, temperature, and diluent concentration basis. Then compare each integrated CEMS value against the corresponding average RM value.

7.3 Number of tests. The CEMS response calibration shall be carried out by making simultaneous CEMS and RM measurements at three (or more) different levels of particulate mass concentrations. Three (or more) sets of measurements shall be obtained at each level. A total of at least 15 measurements shall be obtained. The different levels of particulate mass concentration should be obtained by varying the process conditions as much as the process allows within the range of normal operation. Alternatively, emission levels may be varied by adjusting the particulate control system. It is recommended that the CEMS be calibrated over PM levels ranging from a minimum normal level to a level roughly twice the emission limit, as this will provide the smallest confidence interval bounds on the calibration relation at the emission limit level.

7.4 Reference Methods. Unless otherwise specified in an applicable subpart of the regulations, Method 3B, or its approved alternative, is the reference method for diluent (O_2) concentration. Unless otherwise specified in an applicable subpart of the regulations, Method 5 (40 CFR Part 60, Appendix A), or its approved alternative, is the reference method for particulate matter mass concentration.

7.5 Calculations. Summarize the results on a data sheet. An example is shown is shown in Figure 2–2 of 40 CFR part 60, Appendix B, Performance Specification 2. Calculate the calibration relation, correlation coefficient, and confidence and tolerance intervals using the equations in Section 8.

8. Equations

8.1 Linear Calibration Relation. A linear calibration relation may be calculated from the calibration data by performing a linear least squares regression. The CEMS data are taken as the x values, and the reference method data as the y values. The calibration relation, which gives the predicted mass emission, $\hat{y}$, based on the CEMS response x, is given by

$$\hat{y} = a \cdot x + b \qquad (3)$$

where:

$$a = \frac{S_{xy}}{S_{xx}} \qquad (4)$$

and

$$b = \overline{y} - a \cdot \overline{x} \qquad (5)$$

The mean values of the data sets are given by

$$\overline{x} = \frac{1}{n}\sum_{i=1}^{n} x_i, \overline{y} = \frac{1}{n}\sum_{i=1}^{n} y_i \qquad (6)$$

Where x_i and y_i are the absolute values of the individual measurements and n is the number of data points. The values S_{xx}, S_{yy}, and S_{xy} are given by

$$S_{xx} = \sum_{i=1}^{n}\left(x_i - \overline{x}\right)^2, S_{yy} = \sum_{i=1}^{n}\left(y_i - \overline{y}\right)^2, S_{xy} = \sum_{i=1}^{n}\left(x_i - \overline{x}\right)\cdot\left(y_i - \overline{y}\right) \qquad (7)$$

From which the scatter of y values about the regression line (calibration relation) s_L can be determined:

$$s_L = \sqrt{\frac{S_{yy}}{n-2}\left(1 - \frac{S_{xy}^2}{S_{xx} \cdot S_{yy}}\right)} \qquad (8)$$

The two-sided confidence interval y_c for the predicted concentration $\hat{y}$ at point x is given by

$$y_c = \hat{y} \pm t_f \cdot s_L \sqrt{\frac{1}{n} + \frac{(x - \overline{x})^2}{S_{xx}}}, \text{ with } f = n - 2 \qquad (9)$$

The two-sided tolerance interval y_t for the regression line is given by

$$y_T = \hat{y} \pm k_T \cdot s_L \qquad (10)$$

At the point x with k_T=un′ v_f and f=n −, where

$$n' = \frac{n}{1 + \frac{n \cdot (x - \overline{x})^2}{S_{xx}}}, n' \geq 2. \qquad (11)$$

The tolerance factor un′ for 75 percent of the population is given in Table I as a function of n′. The factor v_f as a function of f is also given in Table I as well as the t-factor at the 95 percent confidence level.

The correlation coefficient r may be calculated from

$$r = a\sqrt{\frac{S_{xx}}{S_{yy}}} \qquad (12)$$

TABLE I.—FACTORS FOR CALCULATION OF CONFIDENCE AND TOLERANCE INTERVALS

f	t_f	v_f	n′	un′ (75)
7	2.365	1.7972	7	1.233
8	2.306	1.7110	8	1.223
9	2.262	1.6452	9	1.214
10	2.228	1.5931	10	1.208
11	2.201	1.5506	11	1.203
12	2.179	1.5153	12	1.199
13	2.160	1.4854	13	1.195
14	2.145	1.4597	14	1.192
15	2.131	1.4373	15	1.189
16	2.120	1.4176	16	1.187
17	2.110	1.4001	17	1.185
18	2.101	1.3845	18	1.183
19	2.093	1.3704	19	1.181
20	2.086	1.3576	20	1.179
21	2.080	1.3460	21	1.178
22	2.074	1.3353	22	1.177
23	2.069	1.3255	23	1.175
24	2.064	1.3165	24	1.174
25	2.060	1.3081	25	1.173

8.2 Quadratic Calibration Relation. In some cases a quadratic regression will provide a better fit to the calibration data than a linear regression. If a quadratic regression is used to determine a calibration relation, a test to determine if the quadratic regression gives a better fit to the data than a linear regression must be performed, and the relation with the best fit must be used.

8.2.1 Quadratic Regression. A least-squares quadratic regression gives the best fit coefficients b_0, b_1, and b_2 for the calibration relation:

$$\hat{y} = b_0 + b_1 x + b_2 x^2 \qquad (13)$$

The coefficients b_0, b_1, and b_2 are determined from the solution to the matrix equation Ab=B where:

$$A = \begin{bmatrix} n & S_1 & S_2 \\ S_1 & S_2 & S_3 \\ S_2 & S_3 & S_4 \end{bmatrix}, \qquad b = \begin{bmatrix} b_0 \\ b_1 \\ b_2 \end{bmatrix}, \qquad B = \begin{bmatrix} S_5 \\ S_6 \\ S_7 \end{bmatrix}.$$

and

$$S_1 = \sum_{i=1}^{n}\left(x_i\right), S_2 = \sum_{i=1}^{n}\left(x_i^2\right), S_3 = \sum_{i=1}^{n}\left(x_i^3\right), S_4 = \sum_{i=1}^{n}\left(x_i^4\right), \qquad (14)$$

$$S_5 = \sum_{i=1}^{n} y_i, S_6 = \sum_{i=1}^{n}\left(x_i y_i\right), S_7 = \sum_{i=1}^{n}\left(x_i^2 y_i\right).$$

The solutions to b_0, b_1, and b_2 are:

$$b_0 = \left(S_5 \cdot S_2 \cdot S_4 + S_1 \cdot S_3 \cdot S_7 + S_2 \cdot S_6 \cdot S_3 - S_7 \cdot S_2 \cdot S_2 - S_3 \cdot S_3 \cdot S_5 - S_4 \cdot S_6 \cdot S_1\right) / \det A \qquad (15)$$

$$b_1 = \left(n \cdot S_6 \cdot S_4 + S_5 \cdot S_3 \cdot S_2 + S_2 \cdot S_1 \cdot S_7 - S_2 \cdot S_6 \cdot S_2 - S_7 \cdot S_3 \cdot n - S_4 \cdot S_1 \cdot S_5\right) / \det A \qquad (16)$$

$$b_2 = \left(n \cdot S_2 \cdot S_7 + S_1 \cdot S_6 \cdot S_2 + S_5 \cdot S_1 \cdot S_3 - S_2 \cdot S_2 \cdot S_5 - S_3 \cdot S_6 \cdot n - S_7 \cdot S_1 \cdot S_1\right) / \det A \qquad (17)$$

Where:

$$\det A = n \cdot S_2 \cdot S_4 + S_1 \cdot S_3 \cdot S_2 + S_2 \cdot S_1 \cdot S_3 - S_2 \cdot S_2 \cdot S_2 - S_3 \cdot S_3 \cdot S_2 - S_4 \cdot S_1 \cdot S_1 \qquad (18)$$

8.2.2 Confidence Interval. For any positive value of x, the confidence interval is given by:

$$y_{CI} = \hat{y} \pm t_f \cdot s_Q \sqrt{\Delta} \qquad (19)$$

Where:

$f = n - 3,$

t_f is given in Table I,

$$s_Q = \sqrt{\frac{1}{n-3}\sum_{i=1}^{n}\left(\hat{y}_i - y_i\right)^2}, \text{ and} \qquad (20)$$

$$\Delta = C_0 + 2C_1 x + \left(2C_2 + C_3\right)x^2 + 2C_4 x^3 + C_5 x^4. \qquad (21)$$

The C coefficients are given below:

$$C_0 = \frac{S_2 \cdot S_4 - S_3^2}{D}, C_1 = \frac{S_3 \cdot S_2 - S_1 \cdot S_4}{D}, C_2 = \frac{S_1 \cdot S_3 - S_2^2}{D},$$

$$C_3 = \frac{nS_4 - S_2^2}{D}, C_4 = \frac{S_1 \cdot S_2 - nS_3}{D}, C_5 = \frac{nS_2 - S_1^2}{D} \qquad (22)$$

Where:

$$D = n\left(S_2 \cdot S_4 - S_3^2\right) + S_1\left(S_3 \cdot S_2 - S_1 \cdot S_4\right) + S_2\left(S_1 \cdot S_3 - S_2^2\right). \quad (23)$$

8.2.3 Tolerance Interval. For any positive value of x, the tolerance interval is given by:

$$y_{TI} = \hat{y} \pm k_T \cdot s_Q, \qquad (24)$$

Where:

$$k_T = u_{n'} \cdot v_f \text{ with } f = n - 3, \text{ and} \qquad (25)$$

$$n' = 1/\Delta \text{ with } n' \geq 2. \qquad (26)$$

The v_f and $u_{n,}$ factors can also be found in Table I.

8.3 Test to Determine Best Regression Fit. The test to determine if the fit using a quadratic regression is better than the fit using a linear regression is based on the values of s calculated in the two formulations. If s_L denotes the value of s from the linear regression and s_Q the value of s from the quadratic regression, then the quadratic regression gives a better fit at the 95 percent confidence level if the following relationship is fulfilled:

$$\frac{(n-2) \cdot s_L^2 - (n-3) \cdot s_Q^2}{s_Q^2} > F_f \qquad (27)$$

With f = n-3 and the value of F_f at the 95 percent confidence level as a function of f taken from Table II below.

TABLE II.—VALUES FOR F_f

f	F_f	f	$F\phi$
1	161.4	16	4.49
2	18.51	17	4.45
3	10.13	18	4.41
4	7.71	19	4.38
5	6.61	20	4.35
6	5.99	22	4.30
7	5.59	24	4.26
8	5.32	26	4.23
9	5.12	28	4.20
10	4.96	30	4.17
11	4.84	40	4.08
12	4.75	50	4.03
13	4.67	60	4.00
14	4.60	80	3.96
15	4.54	100	3.94

9. Reporting

At a minimum (check with the appropriate regional office, or State, or local agency for additional requirements, if any) summarize in tabular form the results of the CD tests and the CEMS response calibration. Include all data sheets, calculations, and records of CEMS response necessary to substantiate that the performance of the CEMS met the performance specifications.

The CEMS measurements shall be reported to the agency in units of mg/m^3 on a dry basis, corrected to 20°C and 7 percent O_2.

10. Bibliography

1. 40 CFR part 60, Appendix B, “Performance Specification 2—Specifications and Test Procedures for SO_2 and NO_X Continuous Emission Monitoring Systems in Stationary Sources.”

2. 40 CFR part 60, Appendix B, “Performance Specification 1—Specification and Test Procedures for Opacity Continuous Emission Monitoring Systems in Stationary Sources.”

3. 40 CFR part 60, Appendix A, “Method 1—Sample and Velocity Traverses for Stationary Sources.”

4. 40 CFR part 266, Appendix IX, Section 2, “Performance Specifications for Continuous Emission Monitoring Systems.”

5. ISO 10155, “Stationary Source Emissions—Automated Monitoring of Mass Concentrations of Particles: Performance Characteristics, Test Procedures, and Specifications,” available from ANSI.

6. G. Box, W. Hunter, J. Hunter, Statistics for Experimenters (Wiley, New York, 1978).

7. M. Spiegel, Mathematical Handbook of Formulas and Tables (McGraw-Hill, New York, 1968).

Performance Specification 12—Specifications and test procedures for total mercury continuous monitoring systems in stationary sources.

1. Applicability and Principle

1.1 Applicability. This specification is to be used for evaluating the acceptability of total mercury continuous emission monitoring systems (CEMS) at the time of or soon after installation and whenever specified in the regulations. The CEMS must be capable of measuring the total concentration (regardless of speciation) of both vapor and solid phase mercury. The CEMS may include, for certain stationary sources, (a) a diluent (O_2) monitor (which must meet its own performance specifications: 40 CFR part 60, Appendix B, Performance Specification 3), (b) flow monitoring equipment to allow measurement of the dry volume of stack effluent sampled, and (c) an automatic sampling system.

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 other times besides the initial test.

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, and calibration drift tests, and interferant tests are conducted to determine conformance of the CEMS with the specification. Calibration error is assessed with standards for elemental mercury (Hg(0)) and mercuric chloride ($HgCl_2$). The ability of the CEMS to provide a measure of total mercury (regardless of speciation and phase) at the facility at which it is installed is demonstrated by comparison to manual reference method measurements.

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(s) and generates a proportional output.

2.1.3 Diluent Analyzer (if applicable). That portion of the CEMS that senses the diluent gas (O_2) 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 Point CEMS. A CEMS that measures the pollutant concentrations either at a single point or along a path equal to or less than 10 percent of the equivalent diameter of the stack or duct cross section.

2.3 Path CEMS. A CEMS that measures the pollutant concentrations along a path greater than 10 percent of the equivalent diameter of the stack or duct cross section.

2.4 Span Value. The upper limit of a pollutant concentration measurement range defined as twenty times the applicable emission limit. The span value shall be documented by the CEMS manufacturer with laboratory data.

2.5 Relative Accuracy (RA). The absolute mean difference between the pollutant concentration(s) 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 tests divided by the mean of the RM tests or the applicable emission limit.

2.6 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.

2.7 Zero Drift (ZD). The difference in the CEMS output readings for zero input after a stated period of operation during which no unscheduled maintenance, repair, or adjustment took place.

2.8 Representative Results. Defined by the RA test procedure defined in this specification.

2.9 Response Time. The time interval between the start of a step change in the system input and the time when the pollutant analyzer output reaches 95 percent of the final value.

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.

2.11 Batch Sampling. Batch sampling refers to the technique of sampling the stack effluent continuously and concentrating the pollutant in some capture medium. Analysis is performed periodically after sufficient time has elapsed to concentrate the pollutant to levels detectable by the analyzer.

2.12 Calibration Standard. Calibration standards consist of a known amount of pollutant that is presented to the pollutant analyzer portion of the CEMS in order to calibrate the drift or response of the analyzer. The calibration standard may be, for example, a solution containing a known concentration, or a filter with a known mass loading or composition.

2.13 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. Install the CEMS at an accessible location downstream of all pollution control equipment where the mercury concentration measurements are directly representative or can be corrected so as to be representative of the total emissions from the affected facility. Then select representative measurement points or paths for monitoring in locations that the CEMS will pass the RA test (see Section 7). If the cause of failure to meet the RA test is determined to be the measurement location and a satisfactory correction technique cannot be established, the Administrator may require the CEMS to be relocated.

Measurement locations and points or paths that are most likely to provide data that will meet the RA requirements are listed below.

3.1.1 Measurement Location. The measurement location should be (1) at least eight equivalent diameters downstream of the nearest control device, point of pollutant generation, bend, or other point at which a change of pollutant concentration or flow disturbance may occur and (2) at least two equivalent diameters upstream from the effluent exhaust. The equivalent duct diameter is calculated as per 40 CFR part 60, Appendix A, Method 1, Section 2.1.

3.1.2 Point CEMS. The measurement point should be (1) no less than 1.0 meter from the stack or duct wall or (2) within or centrally located over the centroidal area of the stack or duct cross section. Selection of traverse points to determine the representativeness of the measurement location should be made according to 40 CFR part 60, Appendix A, Method 1, Section 2.2 and 2.3.

3.1.3 Path CEMS. The effective measurement path should be (1) totally within the inner area bounded by a line 1.0 meter from the stack or duct wall, or (2) have at least 70 percent of the path within the inner 50 percent of the stack or duct cross sectional area, or (3) be centrally located over any part of the centroidal area.

3.2 Reference Method (RM) Measurement Location and Traverse Points. The RM measurement location should be (1) at least eight equivalent diameters downstream of the nearest control device, point of pollutant generation, bend, or other point at which a change of pollutant concentration or flow disturbance may occur and (2) at least two equivalent diameters upstream from the effluent exhaust. The RM and CEMS locations need not be the same, however the difference may contribute to failure of the CEMS to pass the RA test, thus they should be as close as possible without causing interference with one another. The equivalent duct diameter is calculated as per 40 CFR part 60, Appendix A, Method 1, Section 2.1. Selection of traverse measurement point locations should be made according to 40 CFR part 60, Appendix A, Method 1, Sections 2.2 and 2.3. If the RM traverse line interferes with or is interfered by the CEMS measurements, the line may be displaced up to 30 cm (or 5 percent of the equivalent diameter of the cross section, whichever is less) from the centroidal area.

4. Performance and Equipment Specifications

4.1 Data Recorder Scale. The CEMS data recorder response range must include zero and a high level value. The high level value must be equal to the span value. If a lower high level value is used, the CEMS must have the capability of providing multiple outputs with different high level values (one of which is equal to the span value) or be capable of automatically changing the high level value as required (up to the span value) such that the measured value does not exceed 95 percent of the high level value.

4.2 Relative Accuracy (RA). The RA of the CEMS must be no greater than 20 percent of the mean value of the RM test data in terms of units of the emission standard, or 10 percent of the applicable standard, whichever is greater.

4.3 Calibration Error. Calibration error is assessed using standards for Hg(0) and $HgCl_2$. The mean difference between the indicated CEMS concentration and the reference concentration value for each standard at all three test levels listed below shall be no greater than ±15 percent of the reference concentration at each level.

4.3.1 Zero Level. Zero to twenty (0–20) percent of the emission limit.

4.3.2 Mid-Level. Forty to sixty (40–60) percent of the emission limit.

4.3.3 High-Level. Eighty to one-hundred and twenty (80–120) percent of the emission limit.

4.4 Calibration Drift. The CEMS design must allow the determination of calibration drift of the pollutant analyzer at concentration levels commensurate with the applicable emission standard. The CEMS calibration may not drift or deviate from the reference value (RV) of the calibration standard by more than 10 percent of the emission limit. The calibration shall be performed at a level equal to 80 to 120 percent of the applicable emission standard. Calibration drift shall be evaluated for elemental mercury only.

4.5 Zero Drift. The CEMS design must allow the determination of calibration drift at the zero level (zero drift). The CEMS zero point shall not drift by more than 5 percent of the emission standard.

4.6 Sampling and Response Time. The CEMS shall sample the stack effluent continuously. Averaging time, the number of measurements in an average, and the averaging procedure for reporting and determining compliance shall conform with that specified in the applicable emission regulation.

4.6.1 Response Time. The response time of the CEMS should not exceed 2 minutes to achieve 95 percent of the final stable value. The response time shall be documented by the CEMS manufacturer.

4.6.2 Waiver from Response Time Requirement. A source owner or operator may receive a waiver from the response time requirement for instantaneous, continuous CEMS in section 4.5.1 from the Agency if no CEM is available which can meet this specification at the time of purchase of the CEMS.

4.6.3 Response Time for Batch CEMS. The response time requirement of Section 4.5.1 does not apply to batch CEMS. Instead it is required that the sampling time be no longer than one third of the averaging period for the applicable standard. In addition, the delay between the end of the sampling time and reporting of the sample analysis shall be no greater than one hour. Sampling is also required to be continuous except in that the pause in sampling when the sample collection media are changed should be no greater than five percent of the averaging period or five minutes, whichever is less.

4.7 CEMS Interference Response. While the CEMS is measuring the concentration of mercury in the high-level calibration sources used to conduct the CE test the gaseous components (in nitrogen) listed in Table I shall be introduced into the measurement system either separately or in combination. The interference test gases must be introduced in such a way as to cause no change in the mercury or mercuric chloride calibration concentration being delivered to the CEMS. The concentrations listed in the table are the target levels at the sampling interface of the CEMS based on the known cylinder gas concentrations and the extent of dilution (see Section 9). Interference is defined as the difference between the CEMS response with these components present and absent. The sum of the interferences must be less than 10 percent of the emission limit value. If this level of interference is exceeded, then corrective action to eliminate the interference(s) must be taken.

TABLE I.—INTERFERENCE TEST GAS CONCENTRATIONS IN NITROGEN

Gas	Concentration
Carbon Monoxide	500±50 ppm.
Carbon Dioxide	10±1 percent.
Oxygen	20.9±1 percent.
Sulfur Dioxide	500±50 ppm.
Nitrogen Dioxide	250±25 ppm.
Water Vapor	25±5 percent.
Hydrogen Chloride (HCl)	50±5 ppm.
Chlorine (Cl_2)	10±1 ppm.

4.8 Calibration Source Requirements for Assessment of Calibration Error. The calibration source must permit the introduction of known (NIST traceable) and repeatable concentrations of elemental mercury (Hg(0)) and mercuric chloride ($HgCl_2$) into the sampling system of the CEMS. The CEMS manufacturer shall document the performance of the calibration source, and submit this documentation and a calibration protocol to the administrator for approval. Determination of CEMS calibration error must then be made in using the approved calibration source and in accordance with the approved protocol.

4.8.1 Design Considerations. The calibration source must be designed so that the flowrate of calibration gas introduced to the CEMS is the same at all three calibration levels specified in Section 4.3 and at all times exceeds the flow requirements of the CEMS.

4.8.2 Calibration Precision. A series of three injections of the same calibration gas, at any dilution, shall produce results which do not vary by more than ±5 percent from the mean of the three injections. Failure to attain this level of precision is an indication of a problem in the calibration system or the CEMS. Any such problem must be identified and corrected before proceeding.

5. Performance Specification Test Procedure

5.1 Pretest Preparation. Install the CEMS and prepare the RM test site according to the specifications in Section 3, and prepare the CEMS for operation according to the manufacturer's written instructions.

5.2 Calibration and Zero Drift Test Period. While the affected facility is operating at more than 50 percent of normal load, or as specified in an applicable subpart, determine the magnitude of the calibration drift (CD) and zero drift (ZD) once each day (at 24-hour intervals) for 7 consecutive days according to the procedure given in Section 6. To meet the requirements of Sections 4.4 and 4.5 none of the CD's or ZD's may exceed the specification. All CD determinations must be made following a 24-hour period during which no unscheduled maintenance, repair, or manual adjustment of the CEMS took place.

5.3 CE Test Period. Conduct a CE test prior to the CD test period. Conduct the CE test according to the procedure given in Section 8.

5.4 CEMS Interference Response Test Period. Conduct an interference response test in conjunction with the CE test according to the procedure given in Section 9.

5.5 RA Test Period. Conduct a RA test following the CD test period. Conduct the RA test according to the procedure given in Section 7 while the affected facility is operating at more than 50 percent of normal load, or as specified in the applicable subpart.

6.0 The CEMS Calibration and Zero Drift Test Procedure

This performance specification is designed to allow calibration of the CEMS by use of standard solutions, filters, etc. that challenge the pollutant analyzer part of the CEMS (and as much of the whole system as possible), but which do not challenge the entire CEMS, including the sampling interface. Satisfactory response of the entire system is covered by the RA and CE requirements.

The CD measurement is to verify the ability of the CEMS to conform to the established CEMS calibration used for determining the emission concentration. Therefore, if periodic automatic or manual adjustments are made to the CEMS zero and calibration settings, conduct the CD test immediately before the adjustments, or conduct it in such a way that the CD and ZD can be determined.

Conduct the CD and ZD tests at the points specified in Sections 4.4 and 4.5. Record the CEMS response and calculate the CD according to:

$$\mathrm{CD} = \frac{\left(R_{CEM} - R_V\right)}{R_V} \times 100, \qquad (1)$$

Where CD denotes the calibration drift of the CEMS in percent, R_{CEM} is the CEMS response, and R_V is the reference value of the high level calibration standard. Calculate the ZD according to:

$$\mathrm{ZD} = \frac{\left(R_{CEM} - R_V\right)}{R_{EM}} \times 100, \qquad (2)$$

Where ZD denotes the zero drift of the CEMS in percent, R_{CEM} is the CEMS response, R_V is the reference value of the low level calibration standard, and R_{EM} is the emission limit value.

7. Relative Accuracy Test Procedure

7.1 Sampling Strategy for RA Tests. The RA tests are to verify the initial performance of the entire CEMS system, including the sampling interface, by comparison to RM measurements. Conduct the RM measurements in such a way that they will yield results representative of the emissions from the source and can be correlated to the CEMS data. Although it is preferable to conduct the diluent (if applicable), moisture (if needed), and pollutant measurements simultaneously, the diluent and moisture measurements that are taken within a 30 to 60-minute period, which includes the pollutant measurements, may be used to calculate dry pollutant concentration.

A measure of relative accuracy at a single level that is detectable by both the CEMS and the RM is required.

In order to correlate the CEMS and RM data properly, note the beginning and end of each RM test period of each run (including the exact time of day) in the CEMS data log.

7.2 Correlation of RM and CEMS Data. Correlate the CEMS and RM test data as to the time and duration by first determining from the CEMS final output (the one used for reporting) the integrated average pollutant concentration for each RM test period. Consider system response time, if important, and confirm that the pair of results are on a consistent moisture, temperature, and diluent concentration basis. Then compare each integrated CEMS value against the corresponding average RM value.

7.3 Number of tests. Obtain a minimum of three pairs of CEMS and RM measurements. If more than nine pairs of measurements are obtained, then up to three pairs of measurements may be rejected so long as the total number of measurement pairs used to determine the RA is greater than or equal to nine. However, all data, including the rejected data, must be reported.

7.4 Reference Methods. Unless otherwise specified in an applicable subpart of the regulations, Method 3B, or its approved alternative, is the reference method for diluent (O_2) concentration. Unless otherwise specified in an applicable subpart of the regulations, the manual method for multi-metals in 40 CFR part 266, Appendix IX, Section 3.1 (until superseded by SW–846), or its approved alternative, is the reference method for mercury.

7.5 Calculations. Summarize the results on a data sheet. An example is shown in Figure 2–2 of 40 CFR part 60, Appendix B, Performance Specification 2. Calculate the mean of the RM values. Calculate the arithmetic differences between the RM and CEMS output sets, and then calculate the mean of the differences. Calculate the standard deviation of each data set and CEMS RA using the equations in Section 10.

8. Calibration Error Test Procedure

8.1 Sampling Strategy. The CEMS calibration error shall be assessed using calibration sources of elemental mercury and mercuric chloride in turn (see Section 4.8 for calibration source requirements). Challenge the CEMS at the measurement levels specified in Section 4.3. During the test, operate the CEMS as nearly as possible in its normal operating mode. The calibration gases should be injected into the sampling system as close to the sampling probe outlet as practical and shall pass through all filters, scrubbers, conditioners, and other monitor components used during normal sampling.

8.2 Number of tests. Challenge the CEMS three non-consecutive times at each measurement point and record the responses. The duration of each challenge should be for a sufficient period of time to ensure that the CEMS surfaces are conditioned and a stable output obtained.

8.3 Calculations. Summarize the results on a data sheet. Calculate the mean difference between the CEMS response and the known reference concentration at each measurement point according to equations 5 and 6 of Section 10. The calibration error (CE) at each measurement point is then given by

$$\mathrm{CE} = \left| d / R_V \right| \times 100, \qquad (3)$$

Where R_V is the reference concentration value.

9. Interference Response Test Procedure

9.1 Test Strategy. Perform the interference response test while the CEMS is being challenged by the high level calibration source for mercury (after the CE determination has been made), and again while the CEMS is being challenged by the high level calibration source for mercuric chloride (after the CE determination has been made). The interference test gases should be injected into the sampling system as close to the sampling probe outlet as practical and shall pass through all filters, scrubbers, conditioners, and other monitor components used during normal sampling.

9.2 Number of tests. Introduce the interference test gas three times alternately with the high-level calibration gas and record the responses both with and without the interference test gas. The duration of each test should be for a sufficient period of time to ensure that the CEMS surfaces are conditioned and a stable output obtained.

9.3 Calculations. Summarize the results on a data sheet. Calculate the mean difference between the CEMS response with and without the interference test gas by taking the average of the CEMS responses with and without the interference test gas (see equation 5) and then taking the difference (d). The percent interference (I) is then given by:

$$I = \left| d / R_{HL} \right| \times 100, \qquad (4)$$

Where R_{HL} is the value of the high-level calibration standard. If the gaseous components of the interference test gas are introduced separately, then the total interference is the sum of the individual interferences.

10. Equations

10.1 Arithmetic Mean. Calculate the arithmetic mean of a data set as follows:

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i, \qquad (5)$$

Where n is equal to the number of data points.

10.1.1 Calculate the arithmetic mean of the difference, d, of a data set, using Equation 5 and substituting d for x. Then

$$d_i = x_i - y_i, \qquad (6)$$

Where x and y are paired data points from the CEMS and RM, respectively.

10.2 Standard Deviation. Calculate the standard deviation (SD) of a data set as follows:

$$SD = \sqrt{\frac{\sum_{i=1}^{n} x_i^2 - \frac{1}{n}\left(\sum_{i=1}^{n} x_i\right)^2}{n-1}}, \qquad (7)$$

10.3 Relative Accuracy (RA). Calculate the RA as follows:

$$RA = \frac{\bar{d} + \frac{t_{0.975}}{\sqrt{n}}(SD)}{\bar{R}_{RM}} \qquad (8)$$

Where $\bar{d}$ is equal to the arithmetic mean of the difference, d, of the paired CEMS and RM data set, calculated according to Equations 5 and 6, SD is the standard deviation calculated according to Equation 7, $\bar{R}_{RM}$ is equal to either the average of the RM data set, calculated according to Equation 5, or the value of the emission standard, as applicable (see Section 4.2), and $t_{0.975}$ is the t-value at 2.5 percent error confidence, see Table II.

TABLE II

[t-Values]

n^a	$t_{0.975}$	n_a	$t_{0.975}$	n^a	$t_{0.975}$
2	12.706	7	2.447	12	2.201
3	4.303	8	2.365	13	2.179
4	3.182	9	2.306	14	2.160
5	2.776	10	2.262	15	2.145
6	2.571	11	2.228	16	2.131

[a] The values in this table are already corrected for n-1 degrees of freedom. Use n equal to the number of individual values.

11. Reporting

At a minimum (check with the appropriate regional office, or State, or local agency for additional requirements, if any) summarize in tabular form the results of the CE, interference response, CD and RA tests. Include all data sheets, calculations, and records of CEMS response necessary to substantiate that the performance of the CEMS met the performance specifications.

The CEMS measurements shall be reported to the agency in units of μg/m³ on a dry basis, corrected to 20 °C and 7 percent O_2.

12. Bibliography

1. 40 CFR Part 60, Appendix B, ‘‘Performance Specification 2—Specifications and Test Procedures for SO_2 and NO_X Continuous Emission Monitoring Systems in Stationary Sources.’’

2. 40 CFR Part 60, Appendix B, ‘‘Performance Specification 1—Specification and Test Procedures for Opacity Continuous Emission Monitoring Systems in Stationary Sources.’’

3. 40 CFR Part 60, Appendix A, ‘‘Method 1—Sample and Velocity Traverses for Stationary Sources.’’

4. 40 CFR Part 266, Appendix IX, Section 2, ‘‘Performance Specifications for Continuous Emission Monitoring Systems.’’

5. Draft Method 29, ‘‘Determination of Metals Emissions from Stationary Sources,’’ Docket A–90–45, Item II–B–12, and EMTIC CTM–012.WPF.

6. ‘‘Continuous Emission Monitoring Technology Survey for Incinerators, Boilers, and Industrial Furnaces: Final Report for Metals CEM’s,’’ prepared for the Office of Solid Waste, U.S. EPA, Contract No. 68–D2–0164 (4/25/94).

7. 40 CFR Part 60, Appendix A, Method 16, ‘‘Semicontinuous Determination of Sulfur Emissions from Stationary Sources.’’

8. 40 CFR Part 266, Appendix IX, Performance Specification 2.2, ‘‘Performance Specifications for Continuous Emission Monitoring of Hydrocarbons for Incinerators, Boilers, and Industrial Furnaces Burning Hazardous Waste.’’

Performance Specification 13—Specifications and test procedures for hydrochloric acid continuous monitoring systems in stationary sources

1. Applicability and Principle

1.1 Applicability. This specification is to be used for evaluating the acceptability of hydrogen chloride (HCl) continuous emission monitoring systems (CEMS) at the time of or soon after installation and whenever specified in the pertinent regulations. Some source specific regulations require the simultaneous operation of diluent monitors. These may be O_2 or CO_2 monitors.

This specification does not evaluate the performance of installed CEMS over extended periods of time. The specification does not identify specific calibration techniques or other auxiliary procedures that will assess the CEMS performance. Section 114 of the Act authorizes the administrator to require the operator of the CEMS to conduct performance evaluations at times other than immediately following the initial installation.

This specification is only applicable to monitors that unequivocally measure the concentration of HCl in the gas phase. It is not applicable to CEMS that do not measure gas phase HCl, per se, or CEMS that may have significant interferences. The Administrator believes that HCl CEMS must measure the concentration of gaseous HCl thereby eliminating interferences from volatile inorganic and/or organic chlorinated compounds. CEMS that are based upon infrared measurement techniques, non-dispersive infrared (NDIR), gas filter correlation infrared (GFC–IR) and Fourier Transform infrared (FTIR) are examples of acceptable measurement techniques. Other measurement techniques that unequivocally measure the concentration of HCl in the gas phase may also be acceptable.

1.2 Principle. This specification includes installation and measurement location specifications, performance and equipment specifications, test procedures, and data reduction procedures. This specification also provides definitions of acceptable performance.

This specification stipulates that audit gas tests and calibration drift tests be used to assess the performance of the CEMS. The determination of the accuracy with which the CEMS measures HCl is measured by challenging the CEMS with audit gas of known concentration. There is no absolute determination of interference with the measurement of gas phase HCl with other constituents in the stack gases.

2. Definitions

2.1 Continuous Emission Monitoring System. The total equipment required for the determination of the concentration of a gas or its emission rate. The CEMS consist of the following subsystems:

2.1.1 Sample Interface. That portion of the CEMS used for one or more of the following: sample acquisition, sample transportation, sample conditioning, and 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 gas and generates an output that is proportional to the gas concentration.

2.1.3 Diluent Analyzer. That portion of the CEMS that senses the concentration of the diluent gas (e.g., CO_2 or O_2) and generates an output that is proportional to the concentration of the diluent.

2.1.4 Data Recorder. That portion of the CEMS that provides a permanent record of the analyzer output. The data recorder may include automatic data reduction capabilities.

2.2 Point CEMS. A CEMS that measures the gas concentration either at a single point or along a path equal to or less than 10 percent of the equivalent diameter of the stack or duct cross section. The equivalent diameter must be determined as specified in Appendix A, Method 1 of this Part.

2.3 Path CEMS. A CEMS that measures the gas concentration along a path greater than 10 percent of the equivalent diameter (Appendix A, Method 1) of the stack of duct cross section.

2.4 Span Value. The upper limit of a gas concentration measurement range specified for affected source categories in the applicable subpart of the regulations. The span value shall be documented by the CEMS manufacturer with laboratory data.

2.5 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.

2.6 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.

2.7 Calibration Drift. (CD). The difference between the CEMS output and the concentration of the calibration gas after a stated period of operation during which no unscheduled maintenance, repair, or adjustment took place.

2.8 Centroidal Area. A concentric area that is geometrically similar to the stack or duct cross section is no greater than 1 percent of the stack or duct cross-sectional area.

2.9 Representative Results. Defined by the RM test procedure outlined in this specification.

3. Installation and Measurement Location Specifications

3.1 CEMS Installation and Measurement Locations. The CEMS shall 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. 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 shall be within the centroidal area of the stack or duct cross section.

3.1.1 Point CEMS. It is suggested that the measurement point be (1) no less than 1.0 meter from the stack or duct wall or (2) within or centrally located over the centroidal area of the stack or duct cross section.

3.1.2 Path CEMS. It is suggested that the effective measurement path (1) be totally within the inner area bounded by a line 1.0 meter from the stack or duct wall, or (2) have at least 70 percent of the path within the inner 50 percent of the stack or duct cross-sectional area.

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. Performance and Equipment Specifications

4.1 Data Recorder Scale. The CEMS data recorder response range must include zero and a high-level value. The high-level value is chosen by the source owner or operator and is defined as follows:

For a CEMS intended to measure an uncontrolled emission (e.g., at the inlet of a scrubber) the high-level value must be between 1.25 and 2.0 times the average potential emission concentration, unless another value is specified in an applicable subpart of the regulations. For a CEMS installed to measure controlled emissions or emissions that are in compliance with an applicable regulation, the high-level value must be between 1.5 times the HCl concentration corresponding to the emission standard level and the span value. If a lower high-level value is used, the operator must have the capability of requirements of the applicable regulations.

The data recorder output must be established so that the high-level value is read between 90 and 100 percent of the data recorder full scale. (This scale requirement may not be applicable to digital data recorders.) The calibration gas, optical filter or cell values used to establish the data recorder scale should produce the zero and high-level values. Alternatively, a calibration gas, optical filter, or cell value between 50 and 100 percent of the high-level value may be used in place of the high-level value, provided that the data recorder full-scale requirements as described above are met.

The CEMS design must also allow the determination of calibration drift at the zero and high-level values. If this is not possible or practicable, the design must allow these determinations to be conducted at a low-level value (zero to 20 percent of the high-level value) and at a value between 50 and 100 percent of the high-level value.

4.2 Calibration Drift. The CEMS calibration must not drift or deviate from the reference value of the gas cylinder, gas cell, or optical filter by more than 2.5 percent of the span value. If the span value of the CEMS is 20 ppm or less then the calibration drift must be less than 0.5 parts per million, for 6 out of 7 test days.

If the CEMS includes both HCl and diluent monitors, the calibration drift must be determined separately for each in terms of concentrations (see PS 3 for the diluent specifications).

4.3 Calibration Error (CE). Calibration error is assessed using EPA protocol 1 cylinder gases for HCl. The mean difference between the indicated CEMS concentration and the reference concentration value for each standard at all three test levels indicated below shall be no greater than 15 percent of the reference concentration at each level.

4.3.1 Zero Level. Zero to twenty (0–20) percent of the emission limit.

4.3.2 Mid Level. Forty to sixty (40–60) percent of the emission limit.

4.3.3 High Level. Eighty to one-hundred and twenty (80–120) percent of the emission limit.

4.4 CEMS Interference Response Test. Introduce the gaseous components listed in Table PS HCl–1 into the measurement system of the CEMS, while the measurement system is measuring the concentration of HCl in a calibration gas. These components may be introduced separately or as gas mixtures. Adjust the HCl calibration gas and gaseous component flow rates so as to maintain a constant concentration of HCl in the gas mixture being introduced into the measurement system. Record the change in the measurement system response to the HCl on a form similar to Figure PS HCl–1. If the sum of the interferences is greater than 2 percent of the applicable span concentration, take corrective action to eliminate the interference.

TABLE PS HCL–1.—INTERFERENCE TEST GASES CONCENTRATIONS

Gas	Concentration
Carbon Monoxide	500±50 ppm.
Carbon Dioxide	10±1 percent.
Oxygen	20.9±1 percent.
Sulfur Dioxide	500±50 ppm.
Water Vapor	25±5 percent.
Nitrogen Dioxide	250±25 ppm.

Figure PS HCl–1—Interference Response

Date of Test __________

Analyzer Type __________

Serial Number __________

HCl—CALIBRATION GAS CONCENTRATION

Test gas	Concentration	Analyzer response	Analyzer error	Percent of span

Conduct an interference response test of each analyzer prior to its initial use in the field. Thereafter, re-check the measurement system if changes are made in the instrumentation that could alter the interference response, e.g., changes in the type of gas detector.

4.5 Sampling and Response Time. The CEMS shall sample the stack effluent continuously. Averaging time, the number of measurements in an average, and the averaging procedure for reporting and determining compliance shall conform with that specified in the applicable emission regulation.

4.5.1 Response Time. The response time of the CEMS should not exceed 2 minutes to achieve 95 percent of the final stable value. The response time shall be documented by the CEMS manufacturer.

4.5.2 Waiver from Response Time Requirement. A source owner or operator may receive a waiver from the response time requirement for instantaneous, continuous CEMS in section 4.5.1 from the Agency if no CEM is available which can meet this specification at the time of purchase of the CEMS.

4.5.3 Response Time for Batch CEMS. The response time requirement of Section 4.5.1 does not apply to batch CEMS. Instead it is required that the sampling time be no longer than one third of the averaging period for the applicable standard. In addition, the delay between the end of the sampling time and reporting of the sample analysis shall be no greater than one hour. Sampling is also required to be continuous except in that the pause in sampling when the sample collection media are changed should be no greater than five percent of the averaging period or five minutes, whichever is less.

5. Performance Specification Test Procedure

5.1 Pretest Preparation. Install the CEMS, prepare the RM test site according to the specifications in Section 3, and prepare the CEMS for operation according to the manufacturer's written instructions.

5.2 Calibration Drift Test Period. While the affected facility is operating at more than 50 percent of normal load, or as specified in an applicable subpart, determine the magnitude of the calibration drift (CD) once each day (at 24-hour intervals) for 7 consecutive days, according to the procedure given in Section 6. The CD may not exceed the specification given in Section 4.2.

5.3 CE Test Period. Conduct a CE test prior to the CD test period. Conduct the CE test according to the procedure given in section 7.

6. The CEMS Calibration Drift Test Procedure

The CD measurement is to verify the ability of the CEMS to conform to the established CEMS calibration used for determining the emission concentration or emission rate. Therefore, if periodic automated 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.

Conduct the CD test at the two points specified in Section 4.1. Introduce the reference gases, gas cells or optical filters (these need not be certified) to the CEMS. Record the CEMS response and subtract this value from the reference value (see the example data sheet in Figure 2–1).

7. Calibration Error Test Procedure

7.1 Sampling Strategy. The CEMS calibration error shall be assessed using the calibration source specified in Section 4.3. Challenge the CEMS at the measurement levels specified in Section 4.3. During the test, operate the CEMS as nearly as possible in its normal operating mode. The calibration gases should be injected into the sampling system as close to the sampling probe outlet as practical and shall pass through all filters, scrubbers, conditioners, and other monitor components used during normal sampling.

7.2 Number of tests. Challenge the CEMS three non-consecutive times at each measurement point and record the responses. The duration of each challenge should be for a sufficient period of time to ensure that the CEMS surfaces are conditioned and a stable output obtained.

7.3 Calculations. Summarize the results on a data sheet. Calculate the mean difference between the CEMS response and the known reference concentration at each measurement point according to equations 1 and 2 of Section 8. The calibration error (CE) at each measurement point is then given by:

$$CE = \left| d / r_V \right| \times 100, \qquad (1)$$

Where R_V is the reference concentration value.

8. Equations

8.1 Arithmetic Mean. Calculate the arithmetic mean of the difference, d, of a data set as follows:

$$\bar{d} = \frac{1}{n} \sum_{i=1}^{n} d_i \qquad (2)$$

Where:
n=number of data points.

$$\sum_{i=1}^{n} d_i = \text{Algebraic sum of the individual differences } d_i$$

When the mean of the differences of pairs of data is calculated, be sure to correct the data for moisture, if applicable.

9. Reporting

At a minimum (check with the appropriate regional office, or State, or local agency for additional requirements, if any) summarize in tabular form the results of the CD tests and the relative accuracy tests or alternative RA procedure as appropriate. Include all data sheets, calculations, charts (records of CEMS responses), cylinder gas concentration certifications (if applicable), necessary to substantiate that the performance of the CEMS met the performance specifications.

Performance Specifications 14—Specifications and test procedures for chlorine continuous monitoring systems in stationary sources.

1. Applicability and Principle

1.1 Applicability. This specification is to be used for evaluating the acceptability of chlorine (Cl_2) continuous emission monitoring systems (CEMS) at the time of or soon after installation and whenever specified in the regulations. This performance specification applies only to those CEMS capable of directly measuring the gas phase concentration of the chlorine (Cl_2) molecule. The CEMS may include, for certain stationary sources, a) a diluent (O_2) monitor (which must meet its own performance specifications: 40 CFR part 60, Appendix B, Performance Specification 3), b) flow monitoring equipment to allow measurement of the dry volume of stack effluent sampled, and c) an automatic sampling system.

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 other times besides the initial test.

1.2 Principle. Installation and measurement location specifications, performance specifications, test procedures, and data reduction procedures are included in this specification. Calibration error tests, and calibration drift tests, and interferant tests are conducted to determine conformance of the CEMS with the specification. Calibration error is assessed with cylinder gas standards for chlorine. The ability of the CEMS to provide an accurate measure of chlorine concentration in the flue gas of the facility at which it is installed is demonstrated by comparison to manual reference method measurements.

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(s) and generates a proportional output.

2.1.3 Diluent Analyzer (if applicable). That portion of the CEMS that senses the diluent gas (O_2) 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 Point CEMS. A CEMS that measures the pollutant concentrations either at a single point or along a path equal to or less than 10 percent of the equivalent diameter of the stack or duct cross section.

2.3 Path CEMS. A CEMS that measures the pollutant concentrations along a path greater than 10 percent of the equivalent diameter of the stack or duct cross section.

2.4 Span Value. The upper limit of a pollutant concentration measurement range defined as twenty times the applicable emission limit. The span value shall be documented by the CEMS manufacturer with laboratory data.

2.5 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.

2.6 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.

2.7 Zero Drift (ZD). The difference in the CEMS output readings for zero input after a stated period of operation during which no unscheduled maintenance, repair, or adjustment took place.

2.8 Representative Results. Defined by the RA test procedure defined in this specification.

2.9 Response Time. The time interval between the start of a step change in the system input and the time when the pollutant analyzer output reaches 95 percent of the final value.

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.

2.11 Calibration Standard. Calibration standards consist of a known amount of pollutant that is presented to the pollutant analyzer portion of the CEMS in order to calibrate the drift or response of the analyzer. The calibration standard may be, for example, a gas sample containing known concentration.

2.12 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 CEMS Installation and Measurement Locations. The CEMS shall 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. 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 shall be within the centroidal area of the stack or duct cross section.

3.1.1 Point CEMS. It is suggested that the measurement point be (1) no less than 1.0 meter from the stack or duct wall or (2) within or centrally located over the centroidal area of the stack or duct cross section.

3.1.2 Path CEMS. It is suggested that the effective measurement path (1) be totally within the inner area bounded by a line 1.0 meter from the stack or duct wall, or (2) have at least 70 percent of the path within the inner 50 percent of the stack or duct cross-sectional area.

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. Performance and Equipment Specifications

4.1 Data Recorder Scale. The CEMS data recorder response range must include zero and a high level value. The high level value must be equal to the span value. If a lower high level value is used, the CEMS must have the capability of providing multiple outputs with different high level values (one of which is equal to the span value) or be capable of automatically changing the high level value as required (up to the span value) such that the measured value does not exceed 95 percent of the high level value.

4.2 Relative Accuracy (RA). The RA of the CEMS must be no greater than 20 percent of the mean value of the RM test data in terms of units of the emission standard, or 10 percent of the applicable standard, whichever is greater.

4.3 Calibration Error. Calibration error is assessed using certified NIST traceable cylinder gas standards for chlorine. The mean difference between the indicated CEMS concentration and the reference concentration shall be no greater than ±15 percent of the reference concentration. The reference concentration shall be the greater of 80 to 120 percent of the applicable emission standard or 50 ppm Cl_2, in nitrogen.

4.4 Calibration Drift. The CEMS design must allow the determination of calibration drift at concentration levels commensurate with the applicable emission standard. The CEMS calibration may not drift or deviate from the reference value (RV) of the calibration standard by more than 2 percent of the reference value. The calibration shall be performed at a level equal to 80 to 120 percent of the applicable emission standard.

4.5 Zero Drift. The CEMS design must allow the determination of calibration drift at the zero level (zero drift). The CEMS zero point shall not drift by more than 2 percent of the emission standard.

4.6 Sampling and Response Time. The CEMS shall sample the stack effluent continuously. Averaging time, the number of measurements in an average, and the averaging procedure for reporting and determining compliance shall conform with that specified in the applicable emission regulation.

4.6.1 Response Time. The response time of the CEMS should not exceed 2 minutes to achieve 95 percent of the final stable value. The response time shall be documented by the CEMS manufacturer.

4.7 CEMS Interference Response. While the CEMS is measuring the concentration of chlorine in the high-level calibration source used to conduct the CE test, the gaseous components (in nitrogen) listed in Table I shall be introduced into the measurement system either separately or in combination. The interference test gases must be introduced in such a way as to cause no change in the calibration concentration of chlorine being delivered to the CEMS. The concentrations listed in the table are the target levels at the sampling interface of the CEMS based on the known cylinder gas concentrations and the extent of dilution (see Section 9). Interference is defined as the difference between the CEMS response with these components present and absent. The sum of the interferences must be less than 2 percent of the emission limit value. If this level of interference is exceeded, then corrective action to eliminate the interference(s) must be taken.

TABLE I.—INTERFERENCE TEST GAS CONCENTRATIONS IN NITROGEN

Gas	Concentration
Carbon Monoxide	500 ± 50 ppm.
Carbon Dioxide	10 ± 1 percent.
Oxygen	20.9 ± 1 percent.
Sulfur Dioxide	500 ± 50 ppm.
Nitrogen Dioxide	250 ± 25 ppm.
Water Vapor	25 ± 5 percent.
Hydrogen Chloride (HCl) ...	50 ± 5 ppm.

5. Performance Specification Test Procedure

5.1 Pretest Preparation. Install the CEMS and prepare the RM test site according to the specifications in Section 3, and prepare the CEMS for operation according to the manufacturer's written instructions.

5.2 Calibration and Zero Drift Test Period. While the affected facility is operating at more than 50 percent of normal load, or as specified in an applicable subpart, determine the magnitude of the calibration drift (CD) and zero drift (ZD) once each day (at 24-hour intervals) for 7 consecutive days according to the procedure given in Section 6. To meet the requirements of Sections 4.4 and 4.5 none of the CD's or ZD's may exceed the specification. All CD determinations must be made following a 24-hour period during which no unscheduled maintenance, repair, or manual adjustment of the CEMS took place.

5.3 CE Test Period. Conduct a CE test prior to the CD test period. Conduct the CE test according to the procedure given in Section 8.

5.4 CEMS Interference Response Test Period. Conduct an interference response test in conjunction with the CE test according to the procedure given in Section 9.

6.0 The CEMS Calibration and Zero Drift Test Procedure

This performance specification is designed to allow calibration of the CEMS by use of gas samples, filters, etc, that challenge the pollutant analyzer part of the CEMS (and as much of the whole system as possible), but which do not challenge the entire CEMS, including the sampling interface. Satisfactory response of the entire system is covered by the RA and CE requirements.

The CD measurement is to verify the ability of the CEMS to conform to the established CEMS calibration used for determining the emission concentration. Therefore, if periodic automatic or manual adjustments are made to the CEMS zero and calibration settings, conduct the CD test immediately before the adjustments, or conduct it in such a way that the CD and ZD can be determined.

Conduct the CD and ZD tests at the points specified in Sections 4.4 and 4.5. Record the CEMS response and calculate the CD according to:

$$CD = \frac{\left(R_{CEM} - R_V\right)}{R_V} \times 100, \qquad (1)$$

Where CD denotes the calibration drift of the CEMS in percent, R_{CEM} is the CEMS response, and R_V is the reference value of the high level calibration standard. Calculate the ZD according to:

$$ZD = \frac{\left(R_{CEM} - R_V\right)}{R_{EM}} \times 100, \qquad (2)$$

Where ZD denotes the zero drift of the CEMS in percent, R_{CEM} is the CEMS response, R_V is the reference value of the low level calibration standard, and R_{EM} is the emission limit value.

7. Calibration Error Test Procedure

7.1 Sampling Strategy. The CEMS calibration error shall be assessed using the calibration source specified in Section 4.3. Challenge the CEMS at the measurement levels specified in Section 4.3. During the test, operate the CEMS as nearly as possible in its normal operating mode. The calibration gases should be injected into the sampling system as close to the sampling probe outlet as practical and shall pass through all filters, scrubbers, conditioners, and other monitor components used during normal sampling.

7.2 Number of tests. Challenge the CEMS three non-consecutive times at each measurement point and record the responses. The duration of each challenge should be for a sufficient period of time to ensure that the CEMS surfaces are conditioned and a stable output obtained.

7.3 Calculations. Summarize the results on a data sheet. Calculate the mean difference between the CEMS response and the known reference concentration at each measurement point according to equations 5 and 6 of Section 10. The calibration error (CE) at each measurement point is then given by:

$$CE = \left| d / R_V \right| \times 100, \qquad (3)$$

Where R_V is the reference concentration value.

8. Interference Response Test Procedure

8.1 Test Strategy. Perform the interference response test while the CEMS is being challenged by the high level calibration source (after the CE determination has been made). The interference test gases should be injected into the sampling system as close to the sampling probe outlet as practical and shall pass through all filters, scrubbers, conditioners, and other monitor components used during normal sampling.

8.2 Number of tests. Introduce the interference test gas three times alternately with the high-level calibration gas and record the responses both with and without the interference test gas. The duration of each test should be for a sufficient period of time to ensure that the CEMS surfaces are conditioned and a stable output obtained.

8.3 Calculations. Summarize the results on a data sheet. Calculate the mean difference between the CEMS response with and without the interference test gas by taking the average of the CEMS responses with and without the interference test gas (see equation 5) and then taking the difference (d). The percent interference (I) is then given by:

$$I = \left| d / R_{HL} \right| \times 100, \tag{4}$$

Where R_{HL} is the value of the high-level calibration standard. If the gaseous components of the interference test gas are introduced separately, then the total interference is the sum of the individual interferences.

9. Equations

9.1 Arithmetic Mean. Calculate the arithmetic mean of a data set as follows:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^{n} x_i, \tag{5}$$

Where n is equal to the number of data points.

9.1.1 Calculate the arithmetic mean of the difference, d, of a data set, using Equation 5 and substituting d for x. Then

$$d_i = x_i - y_i, \tag{6}$$

Where x and y are paired data points from the CEMS and RM, respectively.

10. Reporting

At a minimum (check with the appropriate regional office, or State, or local agency for additional requirements, if any) summarize in tabular form the results of the CE, interference response, CD and RA tests. Include all data sheets, calculations, and records of CEMS response necessary to substantiate that the performance of the CEMS met the performance specifications.

The CEMS measurements shall be reported to the agency in units of μg/m³ on a dry basis, corrected to 20 °C and 7 percent O_2.

11. Bibliography

1. 40 CFR Part 60, Appendix B, ‘‘Performance Specification 2—Specifications and Test Procedures for SO_2 and NO_X Continuous Emission Monitoring Systems in Stationary Sources.’’

2. 40 CFR Part 60, Appendix B, ‘‘Performance Specification 1—Specification and Test Procedures for Opacity Continuous Emission Monitoring Systems in Stationary Sources.’’

3. 40 CFR Part 60, Appendix A, ‘‘Method 1—Sample and Velocity Traverses for Stationary Sources.’’

4. 40 CFR Part 266, Appendix IX, Section 2, ‘‘Performance Specifications for Continuous Emission Monitoring Systems.’’

5. ‘‘Continuous Emission Monitoring Technology Survey for Incinerators, Boilers, and Industrial Furnaces: Final Report for Metals CEM's,’’ prepared for the Office of Solid Waste, U.S. EPA, Contract No. 68–D2–0164 (4/25/94).

PART 63—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR SOURCE CATEGORIES

II. In part 63:

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

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

2. Part 63 is revised by adding subpart EEE, to read as follows:

Subpart EEE—National Emission Standards for Hazardous Air Pollutants From Hazardous Waste Combustors

Sec.
63.1200 Applicability.
63.1201 Definitions.
63.1202 Construction and reconstruction.
63.1203 Standards for hazardous waste incinerators (HWIs).
63.1204 Standards for cement kilns (CKs) that burn hazardous waste.
63.1205 Standards for lightweight aggregate kilns (LWAKs) that burn hazardous waste.
63.1206 Initial compliance dates.
63.1207 Compliance with standards and general requirements.
63.1208 Performance testing requirements.
63.1209 Test methods.
63.1210 Monitoring requirements.
63.1211 Notification requirements.
63.1212 Recordkeeping and reporting requirements.

Appendix to Subpart EEE—Quality Assurance Procedures for Continuous Emissions Monitors Used for Hazardous Waste Combustors

§ 63.1200 Applicability.

(a) The provisions of this subpart apply to all hazardous waste combustors (HWCs): hazardous waste incinerators, cement kilns that burn hazardous waste, and lightweight aggregate kilns that burn hazardous waste.

(b) HWCs are subject to the provisions of part 63 as major sources irrespective of the quantity of hazardous air pollutants emitted.

(c) When a HWC continues to operate when hazardous waste is neither being fed nor remains in the combustion chamber, the source remains subject to this subpart until hazardous waste burning is terminated.

(1) A source has terminated hazardous waste burning if:

(i) It has stopped feeding hazardous waste and hazardous waste does not remain in the combustion chamber;

(ii) The owner or operator notifies the Administrator in writing within 5 calendar days after hazardous waste burning has ceased that hazardous waste burning has terminated.

(2) A source that has terminated hazardous waste burning may resume hazardous waste burning provided that:

(i) It complies with requirements in this subpart for new sources; and

(ii) The owner and operator submits a notification of compliance based on comprehensive performance testing after burning has been resumed. Hazardous waste cannot be burned for more than 720 hours prior to submittal of the notification of compliance, and may be burned only for purposes of emissions testing in preparation for performance testing or performance testing.

(d) HWCs are also subject to applicable requirements under parts 260–270 of this chapter.

(e) The more stringent of requirements of an operating permit issued under part 270 of this chapter or the requirements of this subpart (and part) apply. If requirements of the operating permit issued under part 270 of this chapter conflict with any requirements of this subpart (and part 63), the requirements of this subpart (and part 63) take precedence.

(f) If the only hazardous wastes that a HWC burns are those exempt from regulation under § 266.100(b) of this chapter, the HWC is not subject to the requirements of this subpart.

(g) Waiver of emission standards. (1) Nondetect levels of Hg, SVM, or LVM in feedstreams. If no feedstream to a HWC contains detectable levels of Hg, SVM, or LVM, the HWC is not subject to the emission standards and ancillary performance testing, monitoring, notification, and recordkeeping and reporting requirements for those standards provided in this subpart. To be eligible for this waiver, the owner and operator must also develop and implement a feedstream sampling and analysis plan to document that no feedstream contains detectable levels of the metals.

(2) Nondetect levels of chlorine in feedstreams. If no feedstream to a HWC contains detectable levels of chlorine, the HWC is not subject to the HCl/Cl_2 emission standard and ancillary performance testing, monitoring, notification, and recordkeeping and reporting requirements for that standard in this subpart. To be eligible for this waiver, the owner and operator must also develop and implement a

feedstream sampling and analysis plan to document that no feedstream contains detectable levels of the chlorine.

§ 63.1201 Definitions.

The terms used in this part 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 when any of the parameters to which the system is interlocked exceed the limits established in compliance with applicable standards, the operating permit, or safety considerations.

By-pass duct means a device which diverts a minimum of 10 percent of a cement kiln's off gas.

Cement kiln means a rotary kiln and any associated preheater or precalciner devices that produces clinker by heating limestone and other materials for subsequent production of cement for use in commerce, and that burns hazardous waste.

Combustion chamber means the area in which controlled flame combustion of hazardous waste occurs.

Compliance date means the date by which a hazardous waste combustor must submit a notification of compliance under this subpart.

Comprehensive performance test means the performance test during which a HWC demonstrates compliance with emission standard and establishes or re-establishes operating limits.

Confirmatory performance test means the performance test conducted under normal operating conditions to demonstrate compliance with the D/F emission standard.

Continuous monitor means a device which continuously samples the regulated parameter without interruption except during allowable periods of calibration, and except as defined otherwise by the CEM Performance Specifications in appendix B, part 60.

Dioxins and furans (D/F) means tetra-, penta-, hexa-, hepta-, and octa-chlorinated dibenzo dioxins and furans.

Feedstream means any material fed into a HWC, including, but not limited to, any pumpable or nonpumpable solid or gas.

Flowrate means the rate at which a feedstream is fed into a HWC.

Fugitive combustion emissions means particulate or gaseous matter generated by or resulting from the burning of hazardous waste that is not collected by a capture system and is released to the atmosphere prior to the exit of the stack.

Hazardous waste is defined in § 261.3 of this chapter.

Hazardous waste combustor (HWC) means a hazardous waste incinerator, or a cement kiln, or a lightweight aggregate kiln.

Hazardous waste incinerator means a device defined in 260.10 of this chapter that burns hazardous waste.

Initial comprehensive performance test means the comprehensive performance test that is used as the basis for initially demonstrating compliance with the standards.

Instantaneous monitoring means continuously sampling, detecting, and recording the regulated parameter without use of an averaging period.

Lightweight aggregate kiln means a rotary kiln that produces for commerce (or for manufacture of products for commerce) an aggregate with a density less than 2.5 g/cc by slowly heating organic-containing geologic materials such as shale and clay, and that burns hazardous waste.

Low volatility metals means arsenic, beryllium, chromium, and antimony, and their compounds.

New source means a HWC that first begins to burn hazardous waste, or the construction or reconstruction of which is commenced, after April 19, 1996.

Notification of compliance means a notification in which the owner and operator certify, after completion of performance evaluations and tests, that the HWC meets the emission standards, CMS, and other requirements of this subpart, and that the source is in compliance with operating limits.

One-minute average means the average of detector responses calculated at least every 60 seconds from responses obtained at least each 15 seconds.

Operating record means a documentation 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.

Reconstruction means the replacement or addition of components of a hazardous waste combustor to such an extent that:

(1) The fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable new source.

(2) Upon reconstruction, the combustor becomes subject to the standards for new sources, including compliance dates, irrespective of any change in emissions of hazardous air pollutants from that source.

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 an emissions test. Unless otherwise specified, a run may be either intermittent or continuous.

Semivolatile metals means cadmium and lead, and their compounds.

TEQ means the international method of expressing toxicity equivalents for dioxins and furans as defined in U.S. EPA, Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of Chlorinated Dibenzo-p-Dioxins and -Dibenzofurans (CDDs and CDFs) and 1989 Update, March 1989.

§ 63.1202 Construction and reconstruction.

The requirements of § 63.5 apply, except the following apply in lieu of §§ 63.5(d)(3)(v) and (vi) and (e)(1)(ii)(D), as follows:

(a) A discussion of any technical limitations the source may have in complying with relevant standards or other requirements after the proposed replacements. The discussion shall be sufficiently detailed to demonstrate to the Administrator's satisfaction that the technical limitations affect the source's ability to comply with the relevant standard and how they do so.

(b) If in the application for approval of reconstruction the owner or operator designates the affected source as a reconstructed source and declares that there are no technical limitations to prevent the source from complying with all relevant standards or other requirements, the owner or operator need not submit the information required in paragraphs (d)(3) (iii) through (v) of this section.

(c) Any technical limitations on compliance with relevant standards that are inherent in the proposed replacements.

§ 63.1203 Standards for hazardous waste incinerators (HWIs).

(a) Emission limits for existing sources. No owner or operator of an existing HWI shall discharge or cause combustion gases to be emitted into the atmosphere that contain:

(1) Dioxins and furans in excess of 0.20 ng/dscm (TEQ) corrected to 7 percent oxygen;

(2) Mercury in excess of 50 μg/dscm, over a 10-hour rolling average, and corrected to 7 percent oxygen;

(3) Lead and cadmium in excess of 270 μg/dscm, combined emissions, corrected to 7 percent oxygen, and measured over a 12-hour rolling average if compliance is based on a CEMS;

(4) Arsenic, beryllium, chromium, and antimony in excess of 210 μg/dscm, combined emissions, corrected to 7 percent oxygen and measured over a 10-hour rolling average if compliance is based on a CEMS;

(5) Carbon monoxide in excess of 100 parts per million by volume, over an hourly rolling average, dry basis and corrected to 7 percent oxygen;

(6) Hydrocarbons in excess of 12 parts per million by volume, over an hourly rolling average, dry basis, corrected to 7 percent oxygen, and reported as propane;

(7) Hydrochloric acid and chlorine gas in excess of 280 parts per million by volume, combined emissions, expressed as hydrochloric acid equivalents, dry basis and corrected to 7 percent oxygen, and measured over a hourly rolling average if compliance is based on a CEMS; and

(8) Particulate matter (PM) in excess of 69 mg/dscm, over a 2-hour rolling average and corrected to 7 percent oxygen.

(b) Emission limits for new sources. No owner or operator that commences construction or reconstruction of a HWI, or that first burns hazardous waste in an existing incinerator, after April 19, 1996, shall discharge or cause combustion gases to be emitted into the atmosphere that contain:

(1) Dioxins and furans in excess of 0.20 ng/dscm (TEQ), corrected to 7 percent oxygen;

(2) Mercury in excess of 50 μg/dscm, over a 10-hour rolling average, corrected to 7 percent oxygen;

(3) Lead and cadmium in excess of 62 μg/dscm, combined emissions, corrected to 7 percent oxygen and measured over a 10-hour rolling average;

(4) Arsenic, beryllium, chromium, and antimony in excess of 60 μg/dscm (or 80 μg/dscm if compliance is based on a CEMS), combined emissions, corrected to 7 percent oxygen and measured over a 10-hour rolling average if compliance is based on a CEM;

(5) Carbon monoxide in excess of 100 parts per million by volume, over an hourly rolling average, dry basis and corrected to 7 percent oxygen;

(6) Hydrocarbons in excess of 12 parts per million by volume, over an hourly rolling average, dry basis, corrected to 7 percent oxygen, and reported as propane;

(7) Hydrochloric acid and chlorine gas in excess of 67 parts per million by volume, combined emissions, expressed as hydrochloric acid equivalents, dry basis and corrected to 7 percent oxygen, and measured over a hourly rolling average if compliance is based on a CEM; and

(8) Particulate matter (PM) in excess of 69 mg/dscm, over a 2-hour rolling average and corrected to 7 percent oxygen.

(c) Significant figures. The emission limits provided by paragraphs (a) and (b) of this section shall be considered to have two significant figures. Emissions measurements may be rounded to two significant figures to demonstrate compliance.

(d) Air emission standards for equipment leaks, tanks, surface impoundments, and containers. Owners and operators of HWIs are subject to the air emission standards of Subparts BB and CC, part 264, of this chapter.

§ 63.1204 Standards for cement kilns (CKs) that burn hazardous waste.

(a) Emission limits for existing sources. No owner or operator of an existing CK shall discharge or cause combustion gases (resulting solely or partially from burning hazardous waste) to be emitted into the atmosphere that contain:

(1) Dioxins and furans in excess of 0.20 ng/dscm, TEQ, corrected to 7 percent oxygen;

(2) Mercury in excess of 50 μg/dscm, over a 10-hour rolling average, and corrected to 7 percent oxygen;

(3) Lead and cadmium in excess of 57 μg/dscm, combined emissions, corrected to 7 percent oxygen, and measured over a 10-hour rolling average if compliance is based on a CEMS;

(4) Arsenic, beryllium, chromium, and antimony in excess of 130 μg/dscm, combined emissions, corrected to 7 percent oxygen and measured over a 10-hour rolling average if compliance is based on a CEMS;

(5) Carbon Monoxide. For kilns equipped with a by-pass duct, either:

(i) Carbon monoxide in the by-pass duct in excess of 100 parts per million by volume, over an hourly rolling average, dry basis and corrected to 7 percent oxygen; or

(ii) Hydrocarbons in the by-pass duct in excess of 6.7 parts per million by volume, over an hourly rolling average, dry basis, corrected to 7 percent oxygen, and reported as propane.

(6) Hydrocarbons. Hydrocarbons in the main stack of kilns not equipped with a by-pass duct 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;

(7) Hydrochloric acid and chlorine gas in excess of 630 parts per million by volume, combined emissions, expressed as hydrochloric acid equivalents, dry basis, corrected to 7 percent oxygen, and measured over a hourly rolling average if compliance is based on a CEMS; and

(8) Particulate matter (PM) in excess of 69 mg/dscm over a 3-hour rolling average and corrected to 7 percent oxygen.

(b) Emission limits for new sources. No owner or operator that commences construction or reconstruction of a CK, or that first burns hazardous waste in an existing CK, after April 19, 1996, shall discharge or cause combustion gases to be emitted into the atmosphere that contain:

(1) Dioxins and furans in excess of 0.20 ng/dscm (TEQ) corrected to 7 percent oxygen;

(2) Mercury in excess of 50 μg/dscm, over a 10-hour rolling average, corrected to 7 percent oxygen;

(3) Lead and cadmium in excess of 55 μg/dscm, combined emissions, corrected to 7 percent oxygen, or if compliance is based on a CEMS, 60 μg/dscm, combined emissions, corrected to 7 percent oxygen and measured over a 10-hour rolling average;

(4) Arsenic, beryllium, chromium, and antimony in excess of 44 μg/dscm, combined emissions, corrected to 7 percent oxygen, or, if compliance is based on a CEM, 80 μg/dscm, combined emissions, corrected to 7 percent oxygen and measured over a 10-hour rolling average;

(5) Carbon Monoxide. For kilns equipped with a by-pass duct, either:

(i) Carbon monoxide in the by-pass duct in excess of 100 parts per million by volume, over an hourly rolling average, dry basis and corrected to 7 percent oxygen; or

(ii) Hydrocarbons in the by-pass duct in excess of 6.7 parts per million by volume, over an hourly rolling average, dry basis, corrected to 7 percent oxygen, and reported as propane.

(6) Hydrocarbons. Hydrocarbons in the main stack of kilns not equipped with a by-pass duct 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;

(7) Hydrochloric acid and chlorine gas in excess of 67 parts per million, combined emissions, expressed as hydrochloric acid equivalents, dry basis and corrected to 7 percent oxygen, and

measured over a hourly rolling average if compliance is based on a CEMS; and

(8) Particulate matter (PM) in excess of 69 mg/dscm over a 2-hour rolling average and corrected to 7 percent oxygen.

(c) Significant figures. The emission limits provided by paragraphs (a) and (b) of this section shall be considered to have two significant figures. Emissions measurements may be rounded to two significant figures to demonstrate compliance.

(d) Air emission standards for equipment leaks, tanks, surface impoundments, and containers. Owners and operators of CKs are subject to the air emission standards of subparts BB and CC, part 264, of this chapter.

§ 63.1205 Standards for lightweight aggregate kilns (LWAKs) that burn hazardous waste.

(a) Emission limits for existing sources. No owner or operator of an existing LWAK shall discharge or cause combustion gases to be emitted into the atmosphere that contain:

(1) Dioxins and furans in excess of 0.20 ng/dscm (TEQ), corrected to 7 percent oxygen;

(2) Mercury in excess of 72 µg/dscm, over a 10-hour rolling average, and corrected to 7 percent oxygen;

(3) Lead and cadmium in excess of 12 µg/dscm, combined emissions, corrected to 7 percent oxygen, or, if compliance is based on a CEMS, 60 µg/dscm, combined emissions, corrected to 7 percent oxygen and measured over a 10-hour rolling average;

(4) Arsenic, beryllium, chromium, and antimony in excess of 340 µg/dscm, combined emissions, corrected to 7 percent oxygen, and measured over a 10-hour rolling average if a CEMS is used for compliance;

(5) Carbon monoxide in excess of 100 parts per million by volume, over an hourly rolling average, dry basis and corrected to 7 percent oxygen;

(6) Hydrocarbons in excess of 14 parts per million by volume, over an hourly rolling average, dry basis, corrected to 7 percent oxygen, and reported as propane;

(7) Hydrochloric acid and chlorine gas in excess of 450 parts per million by volume, combined emissions, expressed as hydrochloric acid equivalents, dry basis and corrected to 7 percent oxygen, and measured over a hourly rolling average if compliance is based on a CEMS; and

(8) Particulate matter (PM) in excess of 69 mg/dscm over a 2-hour rolling average and corrected to 7 percent oxygen.

(b) Emission limits for new sources. No owner or operator that commences construction or reconstruction of a LWAK, or that first burns hazardous waste in an existing LWAK, after April 19, 1996, shall discharge or cause combustion gases to be emitted into the atmosphere that contain:

(1) Dioxins and furans in excess of 0.20 ng/dscm (TEQ), corrected to 7 percent oxygen;

(2) Mercury in excess of 72 µg/dscm, over a 10-hour rolling average, corrected to 7 percent oxygen;

(3) Lead and cadmium in excess of 5.2 µg/dscm, combined emissions, corrected to 7 percent oxygen, or, if compliance is based on a CEMS, 60 µg/dscm, combined emissions, corrected to 7 percent oxygen and measured over a 10-hour rolling average;

(4) Arsenic, beryllium, chromium, and antimony in excess of 55 µg/dscm, combined emissions, corrected to 7 percent oxygen, or, if compliance is based on a CEMS, 80 µg/dscm, combined emissions, corrected to 7 percent oxygen and measured over a 10-hour rolling average;

(5) Carbon monoxide in excess of 100 parts per million by volume, over an hourly rolling average, dry basis and corrected to 7 percent oxygen;

(6) Hydrocarbons in excess of 14 parts per million by volume, over an hourly rolling average, dry basis, corrected to 7 percent oxygen, and reported as propane;

(7) Hydrochloric acid and chlorine gas in excess of 62 parts per million by volume, combined emissions, expressed as hydrochloric acid equivalents, dry basis and corrected to 7 percent oxygen, and measured over a hourly rolling average if compliance is based on a CEMS; and

(8) Particulate matter (PM) in excess of 69 mg/dscm over a 2-hour rolling average and corrected to 7 percent oxygen.

(c) Significant figures. The emission limits provided by paragraphs (a) and (b) shall be considered to have two significant figures. Emissions measurements may be rounded to two significant figures to demonstrate compliance.

(d) Air emission standards for equipment leaks, tanks, surface impoundments, and containers. Owners and operators of LWAKs are subject to the air emission standards subparts BB and CC, part 264, of this chapter.

§ 63.1206 Initial Compliance dates.

(a) Existing sources. (1) Compliance Date. Each owner or operator of an existing hazardous waste combustor (HWC) shall submit to the Administrator under § 63.1211 an initial notification of compliance certifying compliance with the requirements of this subpart no later than [date 36 months after publication of the final rule], unless an extension of time is granted under § 63.6(i).

(2) Failure to meet compliance date. (i) Termination of waste burning. If an owner or operator fails to submit the notification of compliance as specified in paragraph (a)(1) of this section, hazardous waste burning must terminate on the date that the owner or operator determine that the notification will not be submitted by the deadline, but not later than the date the notification should have been submitted.

(ii) Requirements for resuming waste burning. (A) If a source that fails to submit a timely initial notification of compliance has not been issued a RCRA operating permit under part 270 of this chapter for the HWC, the source may not resume burning hazardous waste until a RCRA permit is issued.

(B) If a source that fails to submit a timely initial notification of compliance has already been issued a RCRA operating permit under part 270 of this chapter for the HWC, the source may resume burning hazardous waste only for a total of 720 hours and only for purposes of pretesting or comprehensive performance testing prior to submitting an initial notification of compliance. If the owner and operator do not submit an initial notification of compliance within 90 days after the date it is due, they must begin closure procedures under the RCRA operating permit unless an extension of time is granted prior to that date in writing by the Administrator for good cause.

(C) The source must comply with the requirements for new sources under this subpart.

(b) New sources. (1) Sources that begin burning hazardous waste before the effective date but after the date of proposal. Each owner or operator of a new source that first burns hazardous waste prior to [date of publication of final rule] but after April 19, 1996 shall:

(i) For any requirements of this subpart (and part) that are not more stringent than the proposed requirement, submit to the Administrator a notification of compliance at the time specified in the operating permit issued under part 270 of this chapter;

(ii) For any requirements of this subpart (and part) that are more stringent than the proposed requirement:

(A) Submit to the Administrator a notification of compliance not later than [date 36 months after publication of the final rule], unless an extension of time is granted under § 63.6(i); and

(B) Comply with the standards as proposed in the interim until the notification of compliance is submitted.

(2) Sources that begin burning hazardous waste after the effective date. Each owner or operator of a new source that first burns hazardous waste after [date of publication of final rule] must submit the notification of compliance at the time specified in the operating permit issued under part 270 of this chapter.

Note to paragraph (b) of this section: 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.

§ 63.1207 Compliance with standards and general requirements.

(a) Compliance with standards. (1) Standards are in effect at all times. A hazardous waste combustor (HWC) shall not burn hazardous waste (that is, hazardous waste must not be fed and hazardous waste must not remain in the combustion chamber) except in compliance with the standards of this subpart, including periods of startup, shutdown, and malfunction. Therefore, the owner or operator of a HWC is not subject to the requirements of §§ 63.6(e) and (f)(1) (regarding operation and maintenance in conformance with a startup, shutdown, and malfunction plan) when burning hazardous waste.

(2) Automatic waste feed cutoff (AWFCO). During the initial comprehensive performance test required under § 63.1208, and upon submittal of the initial notification of compliance under § 63.1211, a HWC must be operated with a functioning system that immediately and automatically cuts off the hazardous waste feed when any of the following are exceeded: applicable operating limits specified under § 63.1210; the emission levels monitored by CEMS; the span value of any CMS detector, except a CEMS; the automatic waste feed cutoff system fails; or the allowable combustion chamber pressure.

(i) Ducting of combustion gases. During a AWFCO, combustion gases must continue to be ducted to the air pollution control system while hazardous waste remains in the combustion chamber;

(ii) Restarting waste feed. The operating parameters for which limits are established under § 63.1210 and the emissions required under that section to be monitored by a CEMS must continue to be monitored during the cutoff, and the hazardous waste feed shall not be restarted until the operating parameters and emission levels are within allowable levels;

(iii) Violations. If, after a AWFCO, a parameter required to be interlocked with the AWFCO system exceeds an allowable level while hazardous waste remains in the combustion chamber, the owner and operator have violated the emission standards of this subpart.

(iv) Corrective measures. After any AWFCO that results in a violation as defined in paragraph (a)(2)(iii) of this section, the owner or operator must investigate the cause of the AWFCO, take appropriate corrective measures to minimize future AWFCO violations, and record the findings and corrective measures in the operating record.

(v) Excessive AWFCO report. If a HWC experiences more than 10 AWFCOs in any 60-day period that result in an exceedance of any parameter required to be interlocked with the AWFCO system under this section, the owner or operator must submit a written report within 5 calendar days of the 10th AWFCO documenting the results of the investigation and corrective measures taken.

(vi) Limit on AWFCOs. The Administrator may limit the number of cutoffs per an operating period on a case-by-case basis.

(vii) Testing. The AWFCO system and associated alarms must be tested at least weekly to verify operability, unless the owner and operator 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, operational testing must be conducted at least monthly.

(3) ESV Openings. (i) Violation. If an emergency safety vent opens when hazardous waste is fed or remains in the combustion chamber, 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 operating during the performance test), it is a violation of the emission standards of this subpart.

(ii) ESV Operating Plan. The ESV Operating Plan shall explain detailed procedures for rapidly stopping waste feed, shutting down the combustor, maintaining temperature in the combustion chamber until all waste exits the combustor, and controlling emissions in the event of equipment malfunction or activation of any ESV or other bypass system including calculations demonstrating that emissions will be controlled during such an event (sufficient oxygen for combustion and maintaining negative pressure), and the procedures for executing the plan whenever the ESV is used, thus causing an emergency release of emissions.

(iii) Corrective measures. After any ESV opening that results in a violation as defined in paragraph (b)(1) of this section, the owner or operator must investigate the cause of the ESV opening, take appropriate corrective measures to minimize future ESV violations, and record the findings and corrective measures in the operating record.

(iv) Reporting requirement. The owner or operator must submit a written report within 5 days of a ESV opening violation documenting the result of the investigation and corrective measures taken.

(b) Fugitive emissions. (1) Fugitive emissions must be controlled by:

(i) Keeping the combustion zone totally sealed against fugitive emissions; or

(ii) Maintaining the maximum combustion zone pressure lower than ambient pressure using an instantaneous monitor; or

(iii) Upon prior written approval of the Administrator, an alternative means of control to provide fugitive emissions control equivalent to maintenance of combustion zone pressure lower than ambient pressure;

(2) The owner or operator must specify in the operating record the method used for fugitive emissions control.

(c) Finding of compliance. The procedures of determining compliance and finding of compliance provided by § 63.6(f)(2) and (3) are applicable to HWCs, except that paragraph (f)(2)(iii)(B) (testing is to be conducted under representative operating conditions) is superseded by the requirements for performance testing under § 63.1208.

(d) Use of an alternative nonopacity emission standard. The provisions of § 63.6(g) are applicable to HWCs.

(e) Extension of compliance with emission standards. The provisions of § 63.6(i) are applicable to HWCs.

(f) Changes in design, operation, or maintenance. If the design, operation, or maintenance of the source is changed in a manner that may affect compliance with any emission standard that is not monitored with a CEMS, the source shall:

(1) Conduct a comprehensive performance test to re-establish

operating limits on the parameters specified in § 63.1210; and

(2) Burn hazardous waste after such change for no more than a total of 720 hours and only for purposes of pretesting or comprehensive performance testing (including demonstrating compliance with CMS requirements).

§ 63.1208 Performance testing requirements.

(a) Types of performance tests. (1) Comprehensive performance test. The purpose of the comprehensive performance test is to demonstrate compliance with the emission standards provided by §§ 63.1203, 63.1204, and 63.1205, establish limits for the applicable operating parameters provided by § 63.1210, and demonstrate compliance with the performance specifications for CMS.

(2) Confirmatory performance test. The purpose of the confirmatory performance test is to demonstrate compliance with the D/F emission standard when the source operates under normal operating conditions.

(b) Frequency of testing. Testing shall be conducted periodically as prescribed in this paragraph (b). The date of commencement of the initial comprehensive performance test shall be the basis for establishing the anniversary date of commencement of subsequent performance testing. A source may conduct comprehensive performance testing at any time prior to the required date. If so, the anniversary date for subsequent testing is advanced accordingly. Except as provided by paragraph (c) of this section, testing shall be conducted as follows:

(1) Comprehensive performance testing. (i) Large or off-site sources. HWCs that receive hazardous waste from off-site and HWCs with a gas flow rate exceeding 23,127 acfm at any time that hazardous waste is burned or remains in the combustion chamber shall commence testing within 35–37 months of the anniversary date of the initial comprehensive performance test, and within every 35–37 months of that anniversary date thereafter.

(ii) Small, on-site sources. HWCs that burn hazardous waste generated on site only and that have a gas flow rate of 23,127 acfm or less shall commence testing within 59–61 months of the anniversary date of the initial comprehensive performance test, and within every 59–61 months of that anniversary date thereafter. However, the Administrator may determine on a case-specific basis that such a source may pose the same potential to exceed the standards of this part as a large or off-site source. If so, the Administrator may require such a source to comply with the testing frequency applicable to large and off-site sources. Factors that the Administrator may consider include: type and volume of hazardous wastes burned, concentration of toxic constituents in the hazardous waste, and compliance history.

(2) Confirmatory performance testing. (i) Large or off-site sources shall commence confirmatory performance testing within 17–19 months after the anniversary date of each comprehensive performance test.

(ii) Small, on-site sources shall conduct confirmatory performance testing within 29–31 months after the anniversary date of each comprehensive performance test.

(3) Duration of testing. Performance testing shall be completed within 30 days after the date of commencement.

(c) Time extension for subsequent performance tests. After the initial performance test, a HWC may request under procedures provided by § 63.6(i) up to a 1-year time extension for conducting a performance test in order to consolidate performance testing with trial burn testing required under part 270 of this chapter, or for other reasons deemed acceptable by the Administrator. If a time extension is granted, a new anniversary date for subsequent testing is established as the date that the delayed testing commences.

(d) Operating conditions during testing. (1) Comprehensive performance testing. (i) The source must operate under representative conditions (or conditions that will result in higher than normal emissions) for the following parameters to ensure that emissions are representative (or higher than) of normal operating conditions:

(A) When demonstrating compliance with the D/F emission standard, types of organic compounds in the waste (e.g., aromatics, aliphatics, nitrogen content, halogen/carbon ratio, oxygen/carbon ratio), and feedrate of chlorine; and

(B) When demonstrating compliance with the SVM or LVM emission standard when using manual stack sampling (i.e., rather than a CEMS) and the D/F emission standard, normal feedrates of ash and normal cleaning cycle of the PM control device.

(ii) Given that limits will be established for the applicable operating parameters specified in § 63.1210, a source may conduct testing under two or more operating modes to provide operating flexibility. If so, the source must note in the operating record under which mode it is operating at all times.

(2) Confirmatory performance testing. Confirmatory performance testing for D/F shall be conducted under normal operating conditions defined as follows:

(i) The CO, HC, and PM CEM emission levels must be within the range of the average value to the maximum (or minimum) value allowed. The average value is defined as the sum of all one-minute averages, divided by the number of one-minute averages over the previous 18 months (30 months for small, on-site facilities defined in § 63.1208(b)(1)(ii));

(ii) Each operating limit established to maintain compliance with the D/F emission standard must be held within the range of the average value over the previous 18 months (30 months for small, on-site facilities defined in § 63.1208(b)(1)(ii)) and the maximum or minimum, as appropriate, that is allowed; and

(iii) The source must feed representative types (or types that may result in higher emissions than normal) of organic compounds in the waste (e.g., aromatics, aliphatics, nitrogen content, halogen/carbon ratio, oxygen/carbon ratio), and chlorine must be fed at normal feedrates or greater.

(e) Notification of performance test and approval of test plan. The provisions of § 63.7 (b) and (c) apply. Notwithstanding the Administrator's approval or disapproval, or failure to approve or disapprove the test plan, the owner or operator must comply with all applicable requirements of this part, including deadlines for submitting the initial and subsequent notifications of compliance.

(f) Performance testing facilities. The provisions of § 63.7(d) apply.

(g) Notification of compliance. Within 90 days of completion of the performance test, the owner or operator must postmark a notification of compliance documenting compliance with the emission standards and CMS requirements, and identifying applicable operating limits. See § 63.7(g) for additional requirements.

(h) Failure to submit a timely notification of compliance. If an owner or operator determines (based on CEM recordings, results of analyses of stack samples, or results of CMS performance evaluations) that the source has failed any emission standard during the performance test for a mode of operation, it is a violation of the standard and hazardous waste burning must cease immediately under that mode of operation. Hazardous waste burning could not be resumed under that mode of operation, except for purposes of pretesting or comprehensive performance testing and for a maximum of 720 hours, until a notification of compliance is submitted subsequent to a new comprehensive performance test.

(i) Waiver of performance test. The following waiver provision applies in lieu of § 63.7(h). Performance tests are not required to document compliance with the following standards under the conditions specified and provided that the required information is submitted to the Administrator for review and approval with the site-specific test plan as required by paragraph (e) of this section:

(1) Mercury. The owner or operator is deemed to be in compliance with the mercury emission standard (and monitoring Hg emissions with a CEMS is not required) if the maximum possible emission concentration determined as specified below does not exceed the emission standard:

(i) Establish a maximum feedrate of mercury from all feedstreams, and monitor and record the feedrate according to § 63.1210(c);

(ii) Establish a minimum stack gas flow rate, or surrogate for gas flow rate, monitor the parameter with a CMS and record the data, and interlock the limit on the parameter with the automatic waste feed cutoff system;

(iii) Calculate a maximum possible emission concentration assuming all mercury from all feedstreams is emitted.

(2) SVM (semivolatile metals). The owner or operator is deemed to be in compliance with the SVM (cadmium and lead, combined) emission standard if the maximum possible emission concentration determined as specified below does not exceed the emission standard:

(i) Establish a maximum feedrate of cadmium and lead, combined, from all feedstreams, and monitor and record the feedrate according to § 63.1210(c);

(ii) Establish a minimum stack gas flow rate, or surrogate for gas flow rate, monitor the parameter with a CMS and record the data, and interlock the limit on the parameter with the automatic waste feed cutoff system;

(iii) Calculate a maximum possible emission concentration assuming all cadmium and lead from all feedstreams is emitted.

(3) LVM (low volatility metals). The owner or operator is deemed to be in compliance with the LVM (arsenic, beryllium, chromium, and antimony, combined) emission standard if the maximum possible emission concentration determined as specified below does not exceed the emission standard:

(i) Establish a maximum feedrate of arsenic, beryllium, chromium, and antimony, combined, from all feedstreams, and monitor and record the feedrate according to § 63.1210(c);

(ii) Establish a minimum stack gas flow rate, or surrogate for gas flow rate, monitor the parameter with a CMS and record the data, and interlock the limit on the parameter with the automatic waste feed cutoff system;

(iii) Calculate a maximum possible emission concentration assuming all LVM from all feedstreams is emitted.

(4) HCl/Cl_2. The owner or operator is deemed to be in compliance with the HCl/Cl_2 emission standard if the maximum possible emission concentration determined as specified below does not exceed the emission standard:

(i) Establish a maximum feedrate of total chlorine and chloride from all feedstreams, and monitor and record the feedrate according to § 63.1210(c);

(ii) Establish a minimum stack gas flow rate, or surrogate for gas flow rate, monitor the parameter with a CMS and record the data, and interlock the limit on the parameter with the automatic waste feed cutoff system;

(iii) Calculate a maximum possible emission concentration assuming all total chlorine and chloride from all feedstreams is emitted.

§ 63.1209 Test methods.

(a) Dioxins and furans. (1) Method 0023A, provided by SW–846 (incorporated by reference in § 260.11 of this chapter), shall be used to determine compliance with the emission standard for dioxin and furans;

(2) If the sampling period for each run is six hours or greater, nondetects shall be assumed to be present at zero concentration. If the sampling period for any run is less than six hours, nondetects shall be assumed to be present at the level of detection for all runs.

(b) Mercury. Method 0060, provided by SW–846 (incorporated by reference in § 260.11 of this chapter), shall be used to evaluate the mercury CEMS as required by § 63.1210.

(c) Cadmium and lead. Method 0060, provided by SW–846 (incorporated by reference in § 260.11 of this chapter), shall be used to determine compliance with the emission standard for cadmium and lead or to calibrate and/or evaluate a CEMS as provided by § 63.1210.

(d) Arsenic, beryllium, chromium, and antimony. Method 0060, provided by SW–846 (incorporated by reference in § 260.11 of this chapter), shall be used to determine compliance with the emission standard for arsenic, beryllium, chromium, and antimony or to calibrate and/or evaluate a CEMS as provided by § 63.1210.

(e) HCl and chlorine gas. Methods 0050, 0051, and 9057, provided by SW–846 (incorporated by reference in § 260.11 of this chapter), shall be used to determine compliance with the emission standard for HCl and Cl_2 (combined) or to calibrate and/or evaluate the HCl and chlorine gas CEMS as provided by § 63.1210.

(f) Particulate Matter. Method 5 in appendix A of part 60 shall be used to calibrate and/or evaluate a PM CEMS as provided by § 63.1210.

(g) Feedstream Analytical methods. Analytical methods used to determine feedstream concentrations of metals, halogens, and other constituents shall be those provided by SW–846 (incorporated by reference in § 260.11 of this chapter.)

Alternate methods may be used if approved in advance by the Director.

§ 63.1210 Monitoring requirements.

(a) Continuous emissions monitors (CEMS). (1) HWCs shall be equipped with CEMS for PM, Hg, CO, HC, and O_2 for compliance monitoring, except as provided by paragraph (a)(3). Owners and operators may elect to use CEMS for compliance monitoring for SVM, LVM, HCl, and Cl_2.

(2) At all times that hazardous waste is fed into the HWC or remains in the combustion chamber, the CEMS must be operated in compliance with the appendix to this subpart.

(3) Waiver of CEMS requirement for mercury. The following waiver provision applies in lieu of § 63.7(h). A mercury CEMS is not required to document compliance with the mercury standard under the conditions specified and provided that the required information is submitted to the Administrator for review and approval with the site-specific test plan as required by § 63.1209(e). The owner or operator is deemed to be in compliance with the mercury emission standard if the maximum possible emission concentration determined as specified below does not exceed the emission standard:

(i) Establish a maximum feedrate of mercury, combined, from all feedstreams, and monitor and record the feedrate according to § 63.1210(c);

(ii) Establish a minimum stack gas flow rate, or surrogate for gas flow rate, monitor the parameter with a CMS and record the data, and interlock the limit on the parameter with the automatic waste feed cutoff system;

(iii) Calculate a maximum possible emission concentration assuming all mercury from all feedstreams is emitted.

(b) Other continuous monitoring systems. (1) CMS other than CEMS (e.g., thermocouples, pressure transducers, flow meters) must be used to document compliance with the applicable operating limits provided by this section.

(2) Non-CEMS CMS must be installed and operated in conformance with § 63.8(c)(3) requiring the owner and operator, at a minimum, to comply with the manufacturer's written specifications or recommendations for installation, operation, and calibration of the system.

(3) Non-CEMS 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 detector must not be exceeded. Span limits shall be interlocked into the automatic waste feed cutoff system required by § 63.1207(a)(2).

(c) Analysis of feedstreams. (1) General. The owner or operator must obtain an analysis of each feedstream prior to feeding the material that is sufficient to document compliance with the applicable feedrate limits provided by this section.

(2) Feedstream analysis plan. The owner or operator 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 each feedstream will be analyzed to ensure compliance with the operating limits of this section;

(ii) Whether the owner or operator 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 the analysis will be used to document compliance with applicable feedrate limits (e.g., if hazardous wastes are blended and analyses are obtained of the wastes prior to blending but not of the blended, as-fired, waste, the plan must describe how the owner and operator will determine the pertinent parameters of the blended waste);

(iv) The test methods which will be used to obtain the analyses;

(v) The sampling method which will be used to obtain a representative sample of each feedstream to be analyzed using sampling methods described in appendix I, part 261, of this chapter, or an equivalent method; and

(vi) The frequency with which the initial analysis of the feedstream will be reviewed or repeated to ensure that the analysis is accurate and up to date.

(3) Review and approval of analysis plan. The owner and operator 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, feedrates must be monitored and recorded 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 flowrate of a feedstream is determined by volume, the density of the feedstream shall be determined by sampling and analysis and shall be recorded (unless the constituent concentration is reported in units of weight per unit volume (e.g., mg/l));

(iii) Calculate and record the mass feedrate of the parameter per unit time.

(d) Performance evaluations. (1) The requirements of § 63.8(d) (Quality control program) and (e) (Performance evaluation of continuous monitoring systems) apply, except that performance evaluations of components of the CMS shall be conducted under the frequency and procedures (for example, submittal of performance evaluation test plan for review and approval) applicable to performance tests as provided by § 63.1208.

(2) Performance specifications and evaluations of CEMS are 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) are superseded by this section, except that paragraphs (c)(2), (c)(3), and (c)(6) are applicable.

(g) [Reserved]

(h) Use of an alternative monitoring method. The provisions of § 63.8(f) apply.

(i) Reduction of monitoring data. The provisions of § 63.8(g) apply, except for paragraphs (g)(2) and (g)(5).

(j) Dioxins and furans. To remain in compliance with the emission standard for dioxins and furans, the owner or operator shall establish operating limits for the following parameters and comply with those limits at all times that hazardous waste is fed or that hazardous waste remains in the combustion chamber:

(1) Maximum temperature at the dry PM control device. If a source is equipped with an electrostatic precipitator, fabric filter, or other dry emissions control device where particulate matter is collected and retained in contact with combustion gas, the maximum allowable temperature at the inlet to the first such control device in the air pollution control system must be established and complied with as follows:

(i) A 10-minute rolling average shall be established as the average over all runs of the highest 10-minute rolling average for each run;

(ii) An hourly rolling average shall be established as the average level over all runs.

(2) Minimum combustion chamber temperature. (i) The temperature of each combustion chamber shall be measured at a location as close to, and as representative of, each combustion chamber as practicable;

(ii) A 10-minute rolling average shall be established as the average over all runs of the minimum 10-minute rolling average for each run; and

(iii) An hourly rolling average shall be established as the average level over all runs.

(3) Maximum flue gas flowrate or production rate. As an indicator of gas residence time in the combustion chamber, the maximum flue gas flowrate, or a parameter that the owner or operator documents in the site-specific test plan is an appropriate surrogate, shall be established as the average over all runs of the maximum hourly rolling average for each run, and complied with on a hourly rolling average basis.

(4) Maximum hazardous waste feedrate. The maximum hazardous waste feedrate shall be established as the average over all runs of the maximum hourly rolling average for each run, and complied with on a hourly rolling average basis. A maximum waste feedrate shall be established for each waste feed point.

(5) Batch size, feeding frequency, and minimum oxygen. (i) Except as provided below, HWCs that feed a feedstream in a batch (e.g., ram fed systems) or container must comply with the following:

(A) The maximum batch size shall be the mass of that batch with the lowest mass fed during the comprehensive performance test;

(B) The minimum batch feeding frequency (i.e., the minimum period of time between batch or container feedings) shall be the longest interval of time between batch or container feedings during the comprehensive performance test; and

(C) The minimum combustion zone oxygen content at the time of firing the batch or container shall be the highest instantaneous oxygen level observed at the time any batch or container was fed during the comprehensive performance test.

(ii) Cement kilns that fire containers of material into the hot, clinker discharge end of the kiln are exempt from the requirements of this paragraph provided the owner or operator documents in the operating record:

(A) The volume of each container does not exceed 1 gallon; and

(B) The frequency of firing the containers does not exceed the rate occurring during the comprehensive performance test.

(6) PM limit. (i) PM shall be limited to the level achieved during the comprehensive performance test;

(ii) During the comprehensive performance test the owner and operator shall demonstrate compliance with the PM standards in §§ 63.1203, 63.1204, and 63.1205, corrected to 7 percent oxygen, based on a 2-hour rolling average, and monitored with a CEMS;

(A) The owner or operator shall install, calibrate, maintain, and continuously operate a CEMS that measures particulate matter at all times that hazardous waste is fed or that hazardous waste remains in the combustion chamber.

(B) The PM CEMS shall meet the requirements provided in the appendix to this subpart.

(iii) The site-specific PM limit shall be determined from the performance test as follows:

(A) A 10-minute rolling average shall be established as the average over all runs of the maximum 10-minute rolling average for each run;

(B) An hourly rolling average shall be established as the average of all one minute averages over all runs.

(7) Carbon injection parameters. If carbon injection is used:

(i) Injection rate. Minimum carbon injection rates shall be established as:

(A) A 10-minute rolling average established as the average over all runs of the minimum 10-minute rolling average for each run; and

(B) An hourly rolling average established as the average level over all runs.

(ii) Carrier fluid. Minimum carrier fluid (gas or liquid) flowrate or pressure drop shall be established as a 10-minute rolling average based on the carbon injection system manufacturer's specifications.

(iii) Carbon specification. (A) The brand (i.e., manufacturer) and type of carbon used during the comprehensive performance test must be used until a subsequent comprehensive performance test is conducted, unless the owner or operator document in the site-specific performance test plan required under § 63.1208 key parameters that affect adsorption and establish limits on those parameters based on the carbon used in the performance test.

(B) The owner or operator may request approval from the Administrator at any time to substitute a different brand or type of carbon without having to conduct a comprehensive performance test. The Administrator may grant such approval if he or she determines that the owner or operator has sufficiently documented that the substitute carbon will provide the same level of dioxin and furan control as the original carbon.

(8) Carbon bed. If a carbon bed is used, a carbon replacement rate must be established as follows:

(i) Testing Requirements. Testing of carbon beds shall be done in the following manner:

(A) Initial comprehensive performance test. For the initial comprehensive performance test, the carbon bed shall be used in accordance with manufacturer's specifications. No aging of the carbon is required.

(B) Confirmatory tests prior to subsequent comprehensive tests. For confirmatory tests after the initial but prior to subsequent comprehensive tests, the facility shall follow the normal change-out schedule specified by the carbon bed manufacturer.

(C) Subsequent comprehensive tests. The age of the carbon in the carbon bed shall be determined as the length of time since carbon was most recently added and the amount of time the carbon that has been in the bed the longest.

(ii) Determination of maximum allowable carbon age. (A) Prior to subsequent comprehensive performance tests, the manufacturer shall follow the manufacturer's suggested change-out interval for replacing used carbon with unused carbon.

(B) After the second comprehensive test the maximum allowable age of a carbon bed shall be the amount of time since carbon has most recently been added and the amount of time that the carbon the has been in the bed the longest, based on what those two time intervals were during the comprehensive performance test.

(iii) Carbon specification. (A) The brand (i.e., manufacturer) and type of carbon used during the comprehensive performance test must be used until a subsequent comprehensive performance test is conducted, unless the owner or operator document in the site-specific performance test plan required under § 63.1208 key parameters that affect adsorption and establish limits on those parameters based on the carbon used in the performance test.

(B) The owner or operator may request approval from the Administrator at any time to substitute a different brand or type of carbon without having to conduct a comprehensive performance test. The Administrator may grant such approval if he or she determines that the owner or operator has sufficiently documented that the substitute carbon will provide the same level of dioxin and furan control as the original carbon.

(7) Catalytic oxidizer. If a catalytic oxidizer is used, the following parameters shall be established:

(i) Minimum flue gas temperature at the entrance of the catalyst. A minimum flue gas temperature at the entrance of the catalyst shall be established as follows:

(A) A 10-minute average shall be established as the average over all runs of the minimum temperature 10-minute rolling average for each run;

(B) An hourly average shall be established as the average level over all runs.

(ii) Maximum time in-use. A catalytic oxidizer shall be replaced with a new catalytic oxidizer when it has reached the maximum service time specified by the manufacturer.

(iii) Catalyst replacement specifications. When a catalyst is replaced with a new one, the new catalyst shall be identical to the one used during the previous comprehensive test, including:

(A) Catalytic metal loading for each metal;

(B) Space time, expressed in the units s^{-1}, the maximum rated volumetric flow of the catalyst divided by the volume of the catalyst;

(C) Substrate construction, including materials of construction, washcoat type, and pore density.

(iv) Maximum flue gas temperature. Maximum flue gas temperature at the entrance of the catalyst shall be established as a 10-minute rolling average, based on manufacturer's specifications.

(8) Inhibitor feedrate. If a dioxin inhibitor is fed into the unit, the following parameters shall be established:

(i) Minimum inhibitor feedrate. Minimum inhibitor feedrate shall be established as:

(A) A 10-minute rolling average shall be established as the average over all runs of the minimum 10-minute rolling average for each run;

(B) An hourly average shall be established as the average level over all runs.

(ii) Inhibitor specifications. (A) The brand (i.e., manufacturer) and type of inhibitor used during the comprehensive performance test must be used until a subsequent comprehensive performance test is conducted, unless the owner or operator document in the site-specific performance test plan required under § 63.1208 key parameters that affect the effectiveness of a D/F inhibitor and establish limits on those parameters based on the inhibitor used in the performance test.

(B) The owner or operator may request approval from the Administrator at any time to substitute a different brand or type of inhibitor without having to conduct a comprehensive performance test. The Administrator may grant such approval if he or she determines that the owner or operator has sufficiently documented that the substitute inhibitor will provide the same level of dioxin and furan control as the original inhibitor.

(k) Mercury CEMS. (1) The owner or operator shall install, calibrate, maintain, and continuously operate a CEMS for mercury at all times that hazardous waste is fed or that hazardous waste remains in the combustion chamber.

(2) The mercury CEMS shall meet Performance Specification 10, if the CEM measures other metals as well as mercury, or Performance Specification 12, if the CEM measures only mercury. Both performance specifications are provided in the appendix to this subpart.

(3) The owner and operator shall comply with the quality assurance procedures provided in the appendix to this subpart.

(l) Semivolatile metals (SVM). The owner or operator shall demonstrate compliance with the SVM (cadmium and lead) emission standard by either:

(1) CEMS. (i) Installing, calibrating, maintaining, and continuously operating a CEMS that measures multiple metals at all times that hazardous waste is fed or remains in the combustion chamber.

(ii) The multi-metal CEMS shall meet the requirements provided in the appendix to this subpart; or

(2) Operating limits. Establishing and complying with the following operating limits, except that cement kilns and lightweight aggregate kilns must comply with alternative requirements provided by paragraph (f) of this section:

(i) PM limit. (A) PM shall be limited to the level achieved during the comprehensive performance test;

(B) During the comprehensive performance test the owner and operator shall demonstrate compliance with the applicable PM standard in §§ 63.1203, 63.1204, and 63.1205, corrected to 7 percent oxygen, based on a 2-hour rolling average, and monitored with a CEMS;

(*1*) The owner or operator shall install, calibrate, maintain, and continuously operate a CEMS that measures particulate matter at all times that hazardous waste is fed or that hazardous waste remains in the combustion chamber.

(*2*) The PM CEMS shall meet the requirements provided in the appendix to this subpart.

(C) The site-specific PM limit shall be determined from the performance test as follows:

(*1*) A 10-minute rolling average shall be established as the average over all runs of the maximum 10-minute rolling average for each run;

(*2*) An hourly rolling average shall be established as the average of all one minute averages over all runs.

(ii) Maximum feedrate of Cd and Pb. A 12-hour rolling average limit for the feedrate of Cd and Pb, combined, in all feedstreams shall be established as the average feedrate over all runs.

(iii) Maximum total chlorine and chloride feedrate. A 12-hour rolling average limit for the feedrate of total chlorine and chloride in all feedstreams shall be established as the average feedrate over all runs.

(iv) Minimum gas flowrate. An hourly rolling average limit for gas flowrate, or a surrogate parameter, shall be established as the average over all runs of the lowest hourly rolling average for each run.

(m) Low volatility metals (LVM). The owner or operator shall demonstrate compliance with the LVM (arsenic, beryllium, chromium, and antimony) emission standard by either:

(1) CEMS. (i) Installing, calibrating, maintaining, and continuously operating a CEMS that measures multiple metals at all times that hazardous waste is fed or remains in the combustion chamber.

(ii) The multi-metals CEMS shall meet the requirements provided in the appendix to this subpart; or

(2) Operating limits. Establishing and complying with the following operating limits, except that cement kilns and lightweight aggregate kilns must comply with alternative requirements provided by paragraph (f) of this section:

(i) PM limit. (A) PM shall be limited to the level achieved during the comprehensive performance test;

(B) During the comprehensive performance test the owner and operator shall demonstrate compliance with the applicable PM standard in §§ 63.1203, 63.1204, or 63.1205, corrected to 7 percent oxygen, based on a 2-hour rolling average, and monitored with a CEMS;

(*1*) The owner or operator shall install, calibrate, maintain, and continuously operate a CEMS that measures particulate matter at all times that hazardous waste is fed or that hazardous waste remains in the combustion chamber.

(*2*) The PM CEMS shall meet the requirements provided in the appendix to this subpart.

(C) The site-specific PM limit shall be determined from the performance test as follows:

(*1*) A 10-minute rolling average shall be established as the average over all runs of the maximum 10-minute rolling average for each run;

(*2*) An hourly rolling average shall be established as the average of all one minute averages over all runs.

(ii) Maximum feedrate of As, Be, Cr, and Sb. (A) A 12-hour rolling average limit for the feedrate of As, Be, Cr, and Sb, combined, in all feedstreams shall be established as the average feedrate over all runs.

(B) A 12-hour rolling average limit for the feedrate of As, Be, Cr, and Sb, combined, in all pumpable feedstreams shall be established as the average feedrate in pumpable feedstreams over all runs.

(iii) Maximum chlorine and chloride feedrate. A 12-hour rolling average limit for the feedrate of total chlorine and chloride in all feedstreams shall be established as the average feedrate over all runs.

(iv) Minimum gas flowrate. An hourly rolling average limit for gas flowrate, or a surrogate parameter, shall be established as the average over all runs of the lowest hourly rolling average for each run.

(n) Special requirements for CKs and LWAKs for compliance with metals standards. Owners and operators of cement kilns and lightweight aggregate kilns that recycle collected particulate matter back into the kiln must comply with one of the following alternative approaches to demonstrate compliance with the emission standards for SVM, combined (cadmium and lead), and for LVM, combined (arsenic, beryllium, chromium and antimony):

(1) Feedstream monitoring. The requirements of paragraphs (d) and (e) of this section only after the kiln system has been conditioned to enable it to reach equilibrium with respect to metals fed into the system and metals emissions. During conditioning, hazardous waste and raw materials having the same metals content as will be fed during the performance test must

be fed at the feedrates that will be fed during the performance test; or

(2) Monitor recycled PM. The special testing requirements prescribed in ‘‘Alternative Method for Implementing Metals Controls’’ in appendix IX, part 266, of this chapter; or

(3) Semicontinuous emissions testing. Stack emissions testing for a minimum of 6 hours each day while hazardous waste is burned. The testing must be conducted when burning normal hazardous waste for that day at normal feedrates for that day and when the air pollution control system is operated under normal conditions. Although limits on metals in feedstreams are not established under this option, the owner or operator must analyze each feedstream for metals content sufficiently to determine if changes in metals content may affect the ability of the facility to meet the metal emissions standards under §§ 63.1204 and 63.1205.

(o) HCl and chlorine gas. The owner or operator shall demonstrate compliance with the HCl/Cl_2 emission standard by either:

(1) CEMS. (i) Installing, calibrating, maintaining, and continuously operating a CEMS for HCl and Cl_2 at all times that hazardous waste is fed or that hazardous waste remains in the combustion chamber.

(ii) The HCl and Cl_2 CEMS shall meet the requirements provided in the appendix to this subpart; or

(2) Operating limits. Establishing and complying with the following operating limits:

(i) Feedrate of total chlorine and chloride. A 12-hour rolling average limit for the total feedrate of total chlorine and chloride in all feedstreams shall be established as the average feedrate over all runs.

(ii) Maximum flue gas flowrate or production rate. As an indicator of gas residence time in the control device, the maximum flue gas flowrate, or a parameter that the owner or operator documents in the site-specific test plan is an appropriate surrogate, shall be established as the average over all runs of the maximum hourly rolling average for each run, and complied with on a hourly rolling average basis.

(iii) Wet Scrubber. If a wet scrubber is used, the following operating parameter limits shall be established.

(A) Minimum pressure drop across the scrubber. Minimum pressure drop across a wet scrubber shall be established.

(*1*) A 10-minute rolling average shall be established as the average over all runs of the minimum 10-minute rolling averages for each run.

(*2*) An hourly rolling average shall be established as the average level over all runs.

(B) Minimum liquid feed pressure. Minimum liquid feed pressure shall be established as a ten minute average, based on manufacturer’s specifications.

(C) Minimum liquid pH. Minimum liquid pH shall be established.

(*1*) A 10-minute rolling average shall be established as the average over all runs of the minimum 10-minute rolling averages for each run.

(*2*) An hourly rolling average shall be established as the average level over all runs.

(D) Minimum liquid to gas flow ratio. Minimum liquid to gas flow ratio shall be established.

(*1*) A 10-minute rolling average shall be established as the average over all runs of the minimum 10-minute rolling averages for each run.

(*2*) An hourly rolling average shall be established as the average level over all runs.

(iv) Ionizing Wet Scrubber. If an ionizing wet scrubber is used, the following operating parameter limits shall be established.

(A) Minimum pressure drop across the scrubber. Minimum pressure drop across an ionizing wet scrubber shall be established on both a ten minute and hourly rolling average.

(*1*) A 10-minute rolling average shall be established as the average over all runs of the minimum 10-minute rolling averages for each run.

(*2*) An hourly rolling average shall be established as the average level over all runs.

(B) Minimum liquid feed pressure. Minimum liquid feed pressure shall be established as a ten minute average, based on manufacturer’s specifications.

(C) Minimum liquid to gas flow ratio. Minimum liquid to gas flow ratio shall be established on both a ten minute and hourly rolling average.

(*1*) A 10-minute rolling average shall be established as the average over all runs of the minimum 10-minute rolling averages for each run.

(*2*) An hourly rolling average shall be established as the average level over all runs.

(v) Dry scrubber. If a dry scrubber is used, the following operating parameter limits shall be established.

(A) Minimum sorbent feedrate. Minimum sorbent feedrate shall be established on both a ten minute and hourly rolling average.

(*1*) A 10-minute rolling average shall be established as the average over all runs of the minimum 10-minute rolling averages for each run.

(*2*) An hourly rolling average shall be established as the average level over all runs.

(B) Minimum carrier fluid flowrate or nozzle pressure drop. Minimum carrier fluid (gas or liquid) flowrate or nozzle pressure drop shall be established as a ten minute average, based on manufacturer’s specifications.

(C) Sorbent specifications. (*1*) The brand (i.e., manufacturer) and type of sorbent used during the comprehensive performance test must be used until a subsequent comprehensive performance test is conducted, unless the owner or operator document in the site-specific performance test plan required under § 63.1208 key parameters that affect the effectiveness of a sorbent and establish limits on those parameters based on the inhibitor used in the performance test.

(*2*) The owner or operator may request approval from the Administrator at any time to substitute a different brand or type of inhibitor without having to conduct a comprehensive performance test. The Administrator may grant such approval if he or she determines that the owner or operator has sufficiently documented that the substitute sorbent will provide the same level of HCl and Cl2 control as the original sorbent.

(p) Carbon monoxide CEMS. (1) The owner or operator shall install, calibrate, maintain, and continuously operate a CEMS for carbon monoxide at all times that hazardous waste is fed or that hazardous waste remains in the combustion chamber.

(2) The carbon monoxide CEMS shall meet the requirements provided in the appendix to this subpart.

(q) Hydrocarbon CEMS. (1) The owner or operator shall install, calibrate, maintain, and continuously operate a CEMS for hydrocarbons at all times that hazardous waste is fed or that hazardous waste remains in the combustion chamber.

(2) The hydrocarbon CEMS shall meet the requirements provided in the appendix to this subpart.

(r) Oxygen CEMS. (1) The owner or operator shall install, calibrate, maintain, and continuously operate a CEMS for oxygen at all times that hazardous waste is fed or remains in the combustion chamber.

(2) The oxygen CEMS shall meet the requirements provided in the appendix to this subpart.

(s) Maximum combustion chamber pressure. If a source complies with the fugitive emissions requirements of § 63.1207(b) by maintaining the maximum combustion chamber zone pressure lower than ambient pressure, the source must monitor the pressure instantaneously and the automatic waste feed cutoff system must be engaged when negative pressure is not maintained at any time.

(t) Waiver of operating limits. The owner or operator may request in writing a waiver from any of the operating limits provided by this section. The waiver must include documentation that other operating parameters or methods to establish operating limits are more appropriate to ensure compliance with the emission standards. The waiver must also include recommended averaging periods and the basis for establishing operating limits.

§ 63.1211 Notification requirements.

(a) Notifications. HWCs shall submit the following notifications as applicable:

(1) Initial notification. HWCs shall comply with the initial notification requirements of § 63.9(b).

(2) Notification of performance test and CMS evaluation. The notification of performance test requirements of § 63.9(c) apply to all performance tests and CMS evaluations required by § 63.1208, except that all notifications shall be submitted for review and approval at the times specified in that section.

(3) Notification of compliance. 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), as defined in § 63.1200;

(ii) The notification is required for each performance test;

(iii) The requirements of § 63.9(h)(2)(i)(D) and (E) pertaining to major source determinations do not apply; and

(iv) Under § 63.9(h)(2)(ii), the notification shall be sent before the close of business on the 90th day following the completion of relevant compliance demonstration activity specified in this subpart.

(4) Request for extension of time to submit a notification of compliance. HWCs that elect to request a time extension of up to one year to submit an initial notification of compliance under § 63.9(c) or a subsequent notification of compliance under § 63.1208(c) must submit a written request and justification as required by those sections.

(b) Applicability of § 63.9 (Notification requirements). The following provisions of § 63.9 are applicable to HWCs:

(1) Paragraphs (a), (b), (c), (d), (e), (g), (i), and (j); and

(2) Paragraph (h), except as provided in paragraphs (a)(3) (iii) and (iv) of this section.

§ 63.1212 Recordkeeping and reporting requirements.

(a) The following provisions of § 63.10 are applicable to HWCs:

(1) Paragraph (a) (Applicability and general information), except (a)(2);

(2) Paragraph (b) (General recordkeeping requirements), except (b)(2) (iv) through (vi), and (b)(3); and

(3) Paragraph (c) (Additional recordkeeping requirements for sources with CMS), except (c)(6) through (8), (c)(13), and (c)(15).

(4) Paragraph (d) (General reporting requirements) applies as follows:

(i) Paragraphs (d)(1), (d)(4) apply; and

(ii) Paragraph (d)(2) applies, except that the report may be submitted up to 90 days after completion of the test; and

(5) In paragraph (e) (Additional reporting requirements for sources with CMS), paragraphs (e)(1) (General) and (e)(2) (Reporting results of CMS performance evaluations) apply.

(b) Additional reporting requirements. HWCs are also subject to the reporting requirements for excessive automatic waste feed cutoffs under § 63.1207(a)(2) and emergency safety vent openings under § 63.1207(a)(3).

(c) Additional recordkeeping requirements. HWCs must also retain the feedstream analysis plan required under § 63.1210(c) in the operating record.

Appendix to Subpart EEE—Quality Assurance Procedures for Continuous Emissions Monitors Used for Hazardous Waste Combustors

1. Applicability and Principle

1.1 Applicability. 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, part 63, of this chapter. Owners and operators must meet these minimum requirements and are encouraged to develop and implement a more extensive QA program. These requirements supersede those found in Part 60, Appendix F of this chapter. Appendix F does not apply to hazardous waste-burning devices.

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 CEM performance evaluations required by Section 5 in conjunction with an emissions performance test are to be submitted to the Director as provided by § 63.8(e)(5) of this chapter. 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.

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. 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.

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 (O_2) 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 Tolerance Interval. The interval with upper and lower limits within which are contained a specified percentage of the population with a given level of confidence.

2.6 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.

2.7 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.

2.8 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.

2.9 Response Calibration Audit (RCA). For PM CEMS only, a check of stability of the calibration relationship determined by comparison of CEMS response to manual gravimetric measurements.

2.10 Fuel Type. For the purposes of PM CEMs, fuel type is defined as the physical state of the fuel: gas, liquid, or solid.

2.11 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.

3. QA/QC Requirements

3.1 QC Requirements. 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.

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 shall revise or update the QA plan, if necessary.

4. 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 buring 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

5.1 Multi-Metals CEMS. The CEMS must be audited at least once each calendar year. In years when a performance test is also required under § 63.1208 of this chapter to document compliance with emission standards, the performance evaluation (i.e., audit) shall coincide with the performance test. Successive yearly audits shall be at least 9 months apart. The audits shall be conducted as follows.

5.1.1 Relative Accuracy Test Audit (RATA). The RATA must be conducted at least once every three years (five years for small on-site facilities defined in § 63.1208(b)(1)(ii)). 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 (i.e., SW–846 method 0060).

5.1.2 Absolute Calibration Audit (ACA). The ACA must be conducted at least once each year except when a RATA is conducted instead. Conduct an ACA using NIST traceable calibration standards at three levels for each metal that is being monitored for compliance purposes. The levels must correspond to 0 to 20, 40 to 60, and 80 to 120 percent of the applicable emission limit for each metal. (For the SVM and LVM standards where the standard applies to combined emissions of several metals, the average annual emission concentration for each individual metal in a group for which a standard applies should be assumed by projecting emissions based on feedrate estimates determined from the waste management plan required under § 63.1210(c)(2) of this chapter. The estimated average annual emission concentration should be used as a surrogate metal emission limit for purposes of the ACA.) At each level and for each metal, make nine determinations of the RA as defined in Section 8 of the applicable Performance Specifications using the value of the calibration standard in the denominator of Equation (6).

5.1.3 Reference method. The reference method is SW–846 method 0060.

5.1.4 Excessive Audit Inaccuracy. If the RA using the RATA or ACA exceeds the criteria in Section 4.2 of the Performance Specifications, hazardous waste burning must immediately cease. Before hazardous waste burning can resume, the owner or operator must take necessary corrective action to eliminate the problem, and must audit the CEMS with a RATA to document that the CEMS is operating within the specifications.

5.2 Particulate Matter CEMS. The CEMS must be audited at least once each quarter (three calendar months.) A response calibration audit (RCA) shall be conducted every 18 months. An absolute calibration audit (ACA) shall be conducted quarterly, except when an RCA is conducted instead. The audits shall be conducted as follows.

5.2.1 Response Calibration Audit (RCA). The RCA must be conducted at least every 18 months (30 months for small on-site facilities defined in § 63.1208(b)(1)(ii)). Conduct the RCA as described in the CEMS Response Calibration Procedure described in the applicable Performance Specifications (Sections 5 and 7). A minimum of nine tests are required at three particulate levels. The three particulate levels should be at the high-end, low-end, and midpoint of the particulate range spanned by the current calibration of the CEMS.

5.2.2 Absolute Calibration Audit (ACA). The ACA must be conducted at least quarterly, except when an RCA is conducted instead. Conduct an ACA using NIST traceable calibration standards, making three measurements at three levels (nine measurements total). The levels must correspond to 10 to 50 percent, 80 to 120 percent, and 200 to 300 percent of the emission limit. At each level make a determination of the instrument response and compare it to the nominal response by calculating the calibration error CE:

Where:

R_{CEM} is the CEMS response;

R_N is the nominal response generated by the calibration standard, and

R_{EM} is the emission limit value.

5.2.3 Excessive Audit Inaccuracy.

5.2.3.1 RCA. If less than 75 percent percent of the test results from the RCA fall within the tolerance interval established for the current calibration (see Sections 7 and 8 of the Performance Specifications), then a new calibration relation is required. Hazardous waste burning must cease immediately, and may not be resumed until a new calibration relation is calculated from the RCA data according to the procedures specified in Section 8 of the Performance Specifications.

5.2.3.2 ACA. If the calibration error is greater than 2 percent of the emission limit for any of the calibration levels, hazardous waste burning must cease immediately. If adjustments to the instrument reduce the calibration error to less than 2 percent of the emission limit at all three levels, then hazardous waste burning can resume. If not, the instrument must be repaired and must pass a complete ACA before hazardous waste burning can resume.

5.2.4 Calibrating for Fuel Type. The owner or operator shall derive a sufficient number of calibration curves to use for all fuel type and mixtures of fuel type.

5.2.5 Reference Method. The reference method is Method 5 found in 40 CFR Part 60, Appendix A.

5.3 Total Mercury CEMS. An Absolute Calibration Audit (ACA) must be conducted quarterly, and a Relative Accuracy Test Audit (RATA) must be conducted every three years (five years for small on-site facilities defined in § 63.1208(b)(1)(ii)). An Interference Response Tests shall be performed whenever an ACA or a RATA is conducted. In years when a performance test is also required under § 63.1208 of this chapter to document compliance with emission standards, the RATA shall coincide with the performance test. The audits shall be conducted as follows.

5.3.1 Relative Accuracy Test Audit (RATA). The RATA must be conducted at least every three years (five years for small on-site facilities defined in § 63.1208(b)(1)(ii)). 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.

5.3.2 Absolute Calibration Audit (ACA). The ACA must be conducted at least quarterly except in a quarter when a RATA is conducted instead. Conduct an ACA as described in the calibration error (CE) test procedure described in the applicable Performance Specifications.

5.3.3 Interference Response Test. The interference response test shall be conducted whenever an ACA or RATA is conducted. Conduct an interference response test as described in the applicable Performance Specifications.

5.3.4 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 take corrective measures and audit the CEMS with a RATA to document that the CEMS is operating within the specifications.

5.3.5 Reference Methods. The reference method for mercury is SW–846 method 0060.

5.4 Hydrogen Chloride (HCl), Chlorine (Cl_2), 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 5.4.1 and 5.4.2) must be conducted yearly. An Interference Response Tests shall be performed whenever an ACA or a RATA is conducted. In years when a performance test is also required under § 63.1208 of this chapter to document compliance with emission standards, the RATA shall coincide with the performance test. The audits shall be conducted as follows.

5.4.1 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.

5.4.2 Absolute Calibration Audit (ACA). This requirements applies to all CEMS listed in 5.4. The ACA must be conducted at least quarterly except in a quarter when a RATA (if applicable, see section 5.4.1) is conducted instead. Conduct an ACA as described in the calibration error (CE) test procedure described in the applicable Performance Specifications.

5.4.3 Interference Response Test. The interference response test shall be conducted whenever an ACA or RATA is conducted. Conduct an interference response test as described in the applicable Performance Specifications.

5.4.4 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 take 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:

TABLE I.—PERFORMANCE SPECIFICATIONS FOR CEMS

CEMS	Performance specification
Carbon monoxide	4B
Oxygen	4B
Total hydrocarbons	8A
Mercury, semivolatile metals, and low volatile metals.	10
Particulate matter	11
Mercury	12
Hydrochloric acid (hydrogen chloride).	13
Chlorine gas (diatomic chlorine)	14

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 shall have twenty minutes to calibrate all the CEMS. If CEMS are calibrated individually, the facility shall have twenty minutes to calibrate each CEMS. If the CEMS are calibrated individually, other CEMS shall be operational while the individual CEMS is being calibrated.

6.3 Span of the CEMS.

6.3.1 Multi-metals, Particulate Matter, Mercury, Hydrochloric Acid, and Chlorine Gas CEMS. The span shall be at least 20 times the emission limit at an oxygen correction factor of 1.

6.3.2 CO CEMS. The CO CEM shall 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.

6.3.3 O_2 CEMS. The O_2 CEM shall 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.

6.3.4 HC CEMS. The HC CEM shall have a span of 100 ppmv, expressed as propane, at an oxygen correction factor of 1.

6.3.5 CEMS Span Values When the Oxygen Correction Factor is Greater than 2. When a 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 shall install a CEM with a lower span(s), proportionate to the larger oxygen correction factor, than those specified above.

6.3.6 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 Director. In considering approval of alternative spans and ranges, the Director will consider that measurements beyond the span will be recorded as values at the maximum span for purposes of calculating rolling averages.

6.3.7 Documentation of Span Values. The span value shall be documented by the CEMS manufacturer with laboratory data.

6.4.1 Oxygen Correction Factor. Measured pollutant levels shall 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;
P_m=measured concentration of the pollutant;
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:

$OCF = 14/(E-Y)$

6.4.2 Moisture Correction. Method 4 of appendix A of this Part shall be used to determine moisture content of the stack gasses.

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. One-minute averages are the arithmetic average of the four most recent 15-second observations and shall be calculated using the following equation:

$$\bar{c} = \sum_{i=1}^{4} \frac{c}{4}$$

Where:

$\bar{c}$=the one minute average
c_i=a fifteen-second observation from the CEM

Fifteen second observations shall 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 shall not be rounded, smoothed, or disregarded.

6.5.2 Ten Minute Rolling Average Equation. The ten minute rolling average shall 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 n-Hourly Rolling Average Equation. The rolling average, based on a specific number integer of hours, shall be calculated using the following equation:

$$C_{RA} = \sum_{i=1}^{60*N} \frac{\bar{c}_i}{60*N}$$

Where:

C_{RA}=The concentration of the standard, expressed as a rolling average
N=The number of hours of the rolling average
$\bar{c}_i$=a one minute average

6.5.4 New rolling averages. When a rolling average begins due to the provisions of § 6.5.4.2 of this appendix or when no previous one-minute average have been recorded, the rolling average shall be the average all one-minute averages since the rolling average commenced. Then when sufficient time has passed such that there are enough one-minute averages to calculate a rolling average specified in § 6.5.2 or 6.5.3 of this appendix, i.e., when the period of time since the rolling average was started is equal to or greater than the averaging period, the average shall be calculated using the equation specified there.

6.5.4.1 Short term interruption of a rolling average. When rolling averages which are interrupted (such as for a calibration or failure of the CEMS), the rolling average shall be restarted with the one-minute averages prior to the interruption being the i=1 to (60*N−1) values and the i=60*N value being the one minute average immediately after the interruption. A short term interruption is one with a duration of less than the averaging period for the given standard or parameter.

6.5.4.2 Long term interruptions of the rolling average. When ten minute rolling averages are interrupted for periods greater than ten minutes, the rolling average shall be restarted as provided in § 6.5.4 of this appendix. When rolling averages with averaging periods in excess of the averaging period for the given standard or parameter, the rolling average shall be restarted as provided in § 6.5.4 of this appendix.

6.6 Units of the Standards for the Purposes of Recording and Reporting Emissions. Emissions shall be recorded and reported expressed after correcting for oxygen, temperature, and moisture. Emissions shall 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 shall be rounded to two significant figures using ASTM procedure E–29–90 or its successor. Rounding shall 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''.

PART 260—HAZARDOUS WASTE MANAGEMENT SYSTEM: GENERAL

III. In part 260:

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.

2. Subpart B of part 260 is amended by revising the definition of ''industrial furnace'' and adding the following definitions to read as follows:

§ 260.10 Definitions.

When used in parts 260 through 270 of this chapter, the following terms have the meanings given below:

* * * * *

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 when any of the parameters to which the system is interlocked exceed the limits established in compliance with applicable standards, the operating permit, or safety considerations.

* * * * *

Cement kiln means a rotary kiln and any associated preheater or precalciner devices that produces clinker by heating limestone and other materials for subsequent production of cement for use in commerce.

* * * * *

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 without interruption except during allowable periods of calibration, and, for CEMS, except as defined otherwise by the applicable performance specification.

* * * * *

Dioxins and furans (D/F) means tetra, penta, hexa, hepta, and octa-chlorinated dibenzo dioxins and furans.

* * * * *

Feedstream means any material fed into a HWC, including, but not limited to, any pumpable or nonpumpable solid or gas.

* * * * *

Flowrate means the rate at which a feedstream is fed into a HWC.

* * * * *

Fugitive combustion emissions means particulate or gaseous matter generated by or resulting from the burning of hazardous waste that is not collected by a capture system and is released to the atmosphere prior to the exit of the stack.

* * * * *

Industrial furnace means any of the following enclosed devices that are integral components of manufacturing processes and that use thermal treatment to accomplish recovery of materials or energy:

(1) Cement kilns

(2) Lime kilns

(3) Lightweight aggregate kilns

* * * * *

Lightweight aggregate kiln means a rotary kiln that produces for commerce (or for manufacture of products for commerce) an aggregate with a density less than 2.5 g/cc by slowly heating organic-containing geologic materials such as shale and clay.

* * * * *

One-minute average means the average of detector responses calculated at least every 60 seconds from responses obtained at least each 15 seconds.

* * * * *

Operating record means 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.

* * * * *

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 an emissions test. Unless otherwise specified, a run may be either intermittent or continuous.

* * * * *

Synthesis gas fuel means a gaseous fuel produced by the thermal treatment of hazardous waste and which meets the specification provided by § 261.4(a)(12)(ii).

* * * * *

TEQ means the international method of expressing toxicity equivalents for dioxins and furans as defined in U.S. EPA, Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of Chlorinated Dibenzo-p-Dioxins and -Dibenzofurans (CDDs and CDFs) and 1989 Update, March 1989.

* * * * *

PART 261—IDENTIFICATION AND LISTING OF HAZARDOUS WASTE

IV. In part 261:

1. The authority citation for part 261 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6921, 6922, and 6938.

2. Section 261.4 is amended by adding paragraph (a)(13) to read as follows:

§ 261.4 Exclusions.

(a) * * *

(13) Wastes that meet the following comparable fuel specifications, under the conditions of paragraph (a)(13)(iv):

(i) Generic comparable fuel specification. (A) Constituent specifications. For compounds listed below, the specification levels and, where non-detect is the specification, maximum allowable detection limits are: [values to be determined].

(B) Physical specifications. (1) Heating value. The heating value must exceed 11,500 J/g (5,000 BTU/lbm).

(2) Flash point. The flash point must not be less than [value to be determined].

(3) Viscosity. The viscosity must not exceed [value to be determined]

(ii) Synthesis gas fuel specification.

(A) Synthesis gas (syngas) which is generated from hazardous waste and which:

(*1*) Has a minimum Btu value of 11,500 J/g (5,000 Btu/lb);

(*2*) Contains less than 1 ppmv of each hazardous constituent listed in Appendix VIII of this part that could reasonably be expected to be in the gas, except the limit for hydrogen sulfide (H_2S) is 10 ppmv; and

(*3*) Which contains less than 1 ppmv each of total chlorine and total nitrogen other than diatomic nitrogen (N_2).

(B) Measurements of concentrations of constituents specified in paragraph (a)(13)(ii)(A) are to be taken at the temperature and pressure of the gas at the point that the exclusion is first claimed.

(iii) Implementation. Waste that meets the comparable fuel specifications provided by paragraphs (a)(13)(i) or (ii) of this section is excluded from the definition of solid waste provided that:

(A) The person who generates the waste or produces the syngas must claim the exclusion. For purposes of this paragraph, that person is called the waste-derived fuel producer;

(B) (*1*) The producer must submit a one-time notice to the Director claiming the exclusion and certifying compliance with the conditions of the exclusion.

(*2*) If the producer is a company which produces comparable fuel at more than one facility, the producer shall specify at which sites the comparable fuel will be produced and each specified site must be in compliance with the conditions of the exclusion at each point of production;

(C) Sampling and analysis. (*1*) The producer must obtain information by sampling and analysis as often as necessary to document that fuel claimed to be excluded meets the comparable fuel specification provided by paragraphs (a)(13)(i) or (ii) of this section. At a minimum, the producer must sample and analyze the fuel for all constituents for which specifications are established when the exclusion is first claimed, and at least annually thereafter, for all constituents that, using the results of the initial test and process knowledge, the producer reasonably expects to be found in the comparable fuel.

(*2*) The producer must develop and implement a comparable fuel sampling and analysis plan, using the same protocols used to develop waste analysis plans, to document that the comparable fuel meets the specifications.

(*3*) Analytical methods provided by SW–846 must be used unless prior written approval is obtained from the Director to use an equivalent method;

(*4*) If a waste-derived fuel is blended in order to meet the flash point and kinematic viscosity specifications, the producer shall analyze the fuel as produced to ensure that it meets the constituent and heating value specifications and then analyze the fuel again after blending to ensure that it meets all specifications.

(*5*) If not blended, the comparable fuel shall be analyzed as produced.

(D) (*1*) Comparable fuel shall be burned on-site or shipped directly to a person who burns the waste.

(*2*) No person other than the producer and the burner shall manage a comparable fuel other than incidental transportation related handling.

(E) Treatment to meet the specification. (*1*) Bona fide treatment of hazardous waste to remove or destroy constituents listed in the specifications or to raise the heating value by removing constituents or materials can be used to meet the specification.

(*2*) Owners and operators of RCRA permitted hazardous waste treatment facilities qualify as producers of waste-derived fuel eligible for the exclusion provided that the newly generated waste results from bona fide treatment to remove or destroy constituents listed in the specifications or to increase the heating value.

(*3*) Residuals resulting from the treatment of a hazardous waste listed in subpart D of this part to generate a comparable fuel remain a hazardous waste.

(*4*) Treatment by incidental settling during storage or blending operations is not bona fide treatment for purposes of this exclusion; and

(F) Blending to meet the specification. Blending a waste containing, as generated, higher concentration(s) of hazardous constituent(s) than allowed in the comparable fuel specifications with materials with lower concentrations of such constituents to meet the specifications is prohibited. (An excluded comparable fuel, however, may be blended with other materials without restriction.)

(G) Speculative Accumulation. Producers and burners are subject to the speculative accumulation test under § 261.2(c)(4).

(H) Recordkeeping. Producers claiming the exclusion must keep records of:

(*1*) One-time notification to the Director required by paragraph (a)(13)(ii)(B) of this section;

(*2*) Sampling and analysis or other information documenting that the fuel meets the comparable fuel specification;

(*3*) The comparable fuel sampling and analysis plan; and

(*4*) For waste that is treated before meeting particular constituent limits of the comparable fuel specification, documentation that the treatment resulted in removal or destruction of those constituents to meet the specification.

(I) Records Retention. Records must be retained for three years. The sampling and analysis plan and all revisions to the plan shall be retained for as long as the producer claims the exclusion, plus three years.

PART 264—STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

V. In part 264:

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) Incorporation of MACT standards. (1) The requirements applicable to hazardous waste incinerators under subpart EEE, part 63, of this chapter are incorporated by reference.

(2) When an owner and operator begin compliance (i.e., submit a notification of compliance) with the requirements of subpart EEE, part 63, of this chapter:

(i) The applicability provisions of § 264.340(b) and (c) no longer apply;

(ii) The performance standards provided by § 264.343(b) and (c) are superseded (i.e., replaced) by the subpart EEE, part 63, standards such that an operating permit issued or reissued under part 270 of this chapter must ensure compliance with the subpart EEE, part 63, standards as well as the DRE performance standard under § 264.343;

(iii) The operating requirements of § 264.345(b)(1) through (4) and the monitoring requirements of § 264.347(a)(1) and (2) are superseded (i.e., replaced) by the operating and monitoring requirements of § 63.1210 of this chapter such that an operating permit issued or reissued under part 270 of this chapter must ensure compliance with the subpart EEE, part 63, standards as well as the remaining standards under §§ 264.345 and 264.347; and

(iv) The operating requirements of § 264.345(d)(1)–(3) and § 264.345(e) are superseded (i.e., replaced) by the operating and monitoring requirements of § 63.1207 of this chapter such that an operating permit issued or reissued under part 270 of this chapter must ensure compliance with the subpart EEE, part 63, standards as well as the remaining applicable standards under § 264.345.

* * * * *

3. Section 264.345 is amended by revising paragraph (a) and adding paragraph (g) to read as follows:

§ 264.345 Operating Requirements

(a) An incinerator must be operated in accordance with operating requirements specified in the permit and meet the applicable emissions standards at all times that hazardous waste remains in the combustion chamber. These will be specified on a case-by-case basis as those demonstrated (in a trial burn or in alternative data as specified in § 264.344(b) and included with part B of the facility's permit application) to be sufficient to comply with the performance standards of § 264.343.

* * * * *

(g) ESV Openings. (1) Violation. If an emergency safety vent opens when hazardous waste is fed or remains in the combustion chamber, such that combustion gases are not treated as during the most recent performance test, it is a violation of the emission standards of this subpart.

(2) ESV Operating Plan. The ESV Operating Plan shall explain detailed procedures for rapidly stopping waste feed, shutting down the combustor, maintaining temperature in the combustion chamber until all waste exits the combustor, and controlling emissions in the event of equipment malfunction or activation of any ESV or other bypass system including calculations demonstrating that emissions will be controlled during such an event (sufficient oxygen for combustion and maintaining negative pressure), and the procedures for executing the plan whenever the ESV is used, thus causing an emergency release of emissions.

(3) Corrective measures. After any ESV opening that results in a violation, the owner or operator must investigate the cause of the ESV opening, take appropriate corrective measures to minimize future ESV violations, and record the findings and corrective measures in the operating record.

(4) Reporting requirement. The owner or operator must submit a written report within 5 days of a ESV opening violation documenting the result of the investigation and corrective measures taken.

4. Section 264.347 is amended by adding paragraphs (e), (f), and (g).

§ 264.347 Monitoring and inspections.

* * * * *

(e) Fugitive emissions. (1) Fugitive emissions must be controlled by:

(i) Keeping the combustion zone totally sealed against fugitive emissions; or

(ii) Maintaining the maximum combustion zone pressure lower than ambient pressure using an instantaneous monitor; or

(iii) Upon prior written approval of the Administrator, an alternative means of control to provide fugitive emissions control equivalent to maintenance of combustion zone pressure lower than ambient pressure;

(2) The owner or operator must specify in the operating record the method used for fugitive emissions control.

(f) Continuous emissions monitors (CEMS). (1) Hazardous waste incinerators shall be equipped with CEMS for compliance monitoring.

(2) At all times that hazardous waste is fed into the hazardous waste incinerator or remains in the combustion chamber, CEMS must be operated in compliance with the requirements of the appendix to subpart EEE, part 63, of this chapter.

(g) Other continuous monitoring systems. (1) CMS other than CEMS (e.g., thermocouples, pressure transducers, flow meters) must be used to document compliance with the applicable operating limits.

(2) Non-CEM CMS must be installed and operated in conformance with § 63.8(c)(3) of this chapter requiring the owner and operator, at a minimum, to comply with the manufacturer's written specifications or recommendations for installation, operation, and calibration of the system.

(3) Non-CEM 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 detector must not be exceeded. Span limits shall be interlocked into the automatic waste feed cutoff system.

PART 265—INTERIM STATUS STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

VI. In part 265:

1. The authority citation for part 265 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6924, 6925, 6935, and 6936, unless otherwise noted.

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) Incorporation of MACT standards. (1) The requirements applicable to hazardous waste incinerators under subpart EEE, part 63, of this chapter are incorporated by reference.

(2) When an owner and operator begin to comply (i.e., submit a notification of compliance) with the requirements of subpart EEE, part 63, of this chapter, those requirements apply in addition to those of this subpart, and the provisions of § 265.340(b) no longer apply.

* * * * *

3. Section 265.347 is amended by adding paragraphs (c), (d), and (e), to read as follows:

§ 265.347 Monitoring and inspections.

* * * * *

(c) Fugitive emissions. (1) Fugitive emissions must be controlled by:

(i) Keeping the combustion zone totally sealed against fugitive emissions; or

(ii) Maintaining the maximum combustion zone pressure lower than ambient pressure using an instantaneous monitor; or

(iii) Upon prior written approval of the Administrator, an alternative means of control to provide fugitive emissions control equivalent to maintenance of combustion zone pressure lower than ambient pressure;

(2) The owner or operator must specify in the operating record the method used for fugitive emissions control.

(d) Continuous emissions monitoring systems (CEMS). (1) Hazardous waste incinerators shall be equipped with CEMS for compliance monitoring.

(2) At all times that hazardous waste is fed into the hazardous waste incinerator or remains in the combustion chamber, CEMS must be operated in compliance with the requirements of the appendix to subpart EEE, part 63, of this chapter.

(e) Other continuous monitoring systems. (1) CMS other than CEMS (e.g., thermocouples, pressure transducers, flow meters) must be used to document compliance with the applicable operating limits.

(2) Non-CEM CMS must be installed and operated in conformance with § 63.8(c)(3) of this chapter requiring the owner and operator, at a minimum, to comply with the manufacturer's written specifications or recommendations for installation, operation, and calibration of the system.

(3) Non-CEMS 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 detector must not be exceeded. Span limits shall be interlocked into the automatic waste feed cutoff system.

PART 266—STANDARDS FOR THE MANAGEMENT OF SPECIFIC HAZARDOUS WASTES AND SPECIFIC TYPES OF HAZARDOUS WASTE MANAGEMENT FACILITIES

VII. In part 266:

1. The authority citation for part 266 continues to read as follows:

Authority: Secs. 1006, 2002(a), 3004, and 3014 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. 6905, 6912(a), 6924, and 6934).

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 paragraph (d)(1), revising paragraphs (d)(2) (i) and (ii), revising the introductory text to paragraph (d)(3), revising paragraphs (d)(3)(i)(B) and (d)(3)(ii), and adding paragraph (h), to read as follows:

§ 266.100 Applicability.

* * * * *

(b) Incorporation of MACT standards. (1) The requirements applicable to cement kilns and lightweight aggregate kilns under subpart EEE, part 63, of this chapter are incorporated by reference.

(2) When an owner and operator begin to comply (i.e., submit a notification of compliance) with the requirements of subpart EEE, part 63, of this chapter, those requirements apply in addition to those of this subpart.

* * * * *

(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.

* * * * *

(2) * * *

(i) The hazardous waste has a total concentration of nonmetal compounds listed in part 261, appendix VIII, of this chapter exceeding 500 ppm by weight, as fired, and so is considered to be burned for destruction. The concentration of nonmetal compounds in a waste as generated may be reduced to the 500 ppm limit by bona fide treatment that removes or destroys nonmetal constituents. Blending for dilution to meet the 500 ppm limit is prohibited and documentation that the waste has not been impermissibly diluted must be retained in the records required by paragraph (d)(1)(iii) of this section; or

(ii) The hazardous waste has a heating value of 5,000 Btu/lb or more, as fired, and so is considered to be burned as fuel. The heating value of a waste as generated may be reduced to below the 5,000 Btu/lb limit by bona fide treatment that removes or destroys nonmetal constituents. Blending for dilution to meet the 5,000 Btu/lb limit is prohibited and documentation that the waste has not been impermissibly diluted must be retained in the records required by paragraph (d)(1)(iii) 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, * * *

(i) * * *

(B) The waste does not exhibit the Toxicity Characteristic of § 261.24 of this chapter for a nonmetal constituent; and

* * * * *

(ii) The Director may decide on a case-by-case basis that the toxic nonmetal constituents in a material listed in appendix XI or XII of this part that contains a total concentration of more than 500 ppm toxic nonmetal compounds listed in appendix VIII, part 261, of this chapter, may pose a hazard to human health and the environment when burned in a metal recovery furnace exempt from the requirements of this subpart. In that situation, after adequate notice and opportunity for comment, the metal recovery furnace will become subject to the requirements of this subpart when burning that material. In making the hazard determination, the Director will consider the following factors;

(A) The concentration and toxicity on nonmetal constituents in the material; and

(B) The level of destruction of toxic nonmetal constituents provided by the furnace; and

(C) Whether the acceptable ambient levels established in appendices IV or V of this part may be exceeded for any toxic nonmetal compound that may be emitted based on dispersion modeling to predict the maximum annual average off-site ground level concentration.

* * * * *

(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, 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.)

* * * * *

4. Section 266.102 is amended by redesignating paragraph (a)(2) as (a)(3), adding paragraph (a)(2), revising the introductory text to paragraph (d)(4), adding paragraph (d)(5), revising paragraphs (e)(4)(i) (A) and (C), (e)(5)(i) (A) and (C), (e)(6)(i) (A), (B), and (C), and (e)(6)(iii), revising the introductory text to (e)(7)(i), and revising paragraphs (e)(7)(i)(C), (e)(8)(i) (A) and (C), and (e)(10), to read as follows:

§ 266.102 Permit standards for burners.

(a) Applicability. (1) * * *

(2) Applicability of MACT standards to cement and lightweight aggregate kilns. When an owner and operator of a cement or lightweight aggregate kiln that burns hazardous waste begin to comply (i.e., submit a notification of compliance) with the requirements of subpart EEE, part 63, of this chapter:

(i) The emission standards provided by §§ 266.104 through 266.107 are superseded (i.e., replaced) by the standards under subpart EEE, part 63, except that the DRE requirement provided by § 266.104(a) and the enforcement provisions of those sections (i.e., §§ 266.104(i), 266.105(c), 266.106(i), and 266.107(h)) continue to apply;

(ii) The specific operating requirements (and associated monitoring requirements) provided by paragraphs (e)(2)(ii), (e)(3), (e)(4), and (e)(5) of this section are superseded by the standards under subpart EEE, part 63, except that the provisions of paragraphs (e)(2)(i)(G), (e)(3)(i)(E), (e)(4)(ii)(J), (e)(4)(iii)(J), and (e)(5)(i)(G) of this section continue to apply to enable the permitting authority to establish such other operating requirements as are necessary to ensure compliance with the standards of subpart EEE, Part 63.;

(iii) An operating permit that is issued or reissued under part 270 of this chapter must ensure compliance with the subpart EEE, part 63, standards as well as those § 266.102 standards that continue to apply.

* * * * *

(d) * * *

(4) Except as provided by paragraph (d)(5) of this section, * * *

(5) When a cement or lightweight aggregate kiln becomes subject to the standards of subpart EEE, Part 63, of this chapter, the provisions of paragraph (d)(4) of this section continue to apply, except that the operating requirements established under that paragraph will be those sufficient to ensure compliance with the emission standards of subpart EEE and the DRE requirement of § 266.104(a).

(e) * * *

(4) * * *

(i) * * *

(A) Total feedrate of each metal in every feedstream measured and specified under provisions of paragraph (e)(6) of this section;

* * * * *

(C) A sampling and metals analysis program for every feedstream;

* * * * *

(5) * * *

(i) * * *

(A) Feedrate of total chloride and chlorine in every feedstream measured and specified as prescribed in paragraph (e)(6) of this section;

* * * * *

(C) A sampling and analysis program for total chloride and chlorine for every feedstream:

* * * * *

(6) * * *

(i) * * *

(A) One-minute average. The limit for a parameter shall be established and continuously monitored on a one-minute average basis, and the permit limit specified as the time-weighted average during all valid runs of the trial burn of the one-minute averages.

(B) Hourly rolling average. The limit for a parameter shall be established and continuously monitored on an hourly rolling average basis. The permit limit for the parameter shall be established based on trial burn data as the average over all valid test runs of the highest (or lowest, as appropriate) hourly rolling average value for each run.

(C) Instantaneous limit for combustion chamber pressure. Combustion chamber pressure shall be continuously sampled, detected, and recorded without use of an averaging period.

(ii) * * *

(iii) Feedrate limits for metals, total chloride and chlorine, and ash. Feedrate limits for metals, total chlorine and chloride, and ash are established and monitored by knowing the concentration of the substance (i.e., metals, chloride/chlorine, and ash) in each feedstream and the flow rate of the feedstreams. To monitor the feedrate of these substances, the flowrate of each feedstream must be monitored under the monitoring requirements of paragraphs (e)(6) (i) and (ii) of this section.

* * * * *

(7) * * *

(i) Fugitive emissions. Fugitive emissions must be controlled by the following and it must specify in the operating record the method used for fugitive emissions control:

* * * * *

(C) Upon prior written approval of the Administrator, an alternative means of control to provide fugitive emissions control equivalent to maintenance of combustion zone pressure lower than ambient pressure.

* * * * *

(8) * * *

(i) * * *

(A) If specified by the permit, feedrates and composition of every feedstream and feedrates of ash, metals, and total chloride and chlorine;

* * * * *

(C) Upon the request of the Director, sampling and analysis of any feedstream, residues, and exhaust emissions must be conducted to verify that the operating requirements established in the permit achieve the applicable standards of §§ 266.105, 266.106, 266.107, and 266.108.

* * * * *

(10) Recordkeeping. The owner or operator shall maintain files of all information (including all reports and notifications) required by this section recorded in a form suitable and readily available for expeditious inspection and review. The files shall be retained for at least 5 years following the date of each occurrence, measurement, maintenance, report, or record. At a minimum, the most recent 2 years of data shall be retained on site. The remaining 3 years of data may be maintained on microfilm, on a computer, on computer floppy disks, on magnetic tape disks, or on microfiche.

* * * * *

6. Section 266.103 is amended by redesignating paragraphs (a)(2) through (a)(7) as paragraphs (a)(3) through (a)(8), adding paragraph (a)(2), revising the introductory text to paragraph (b)(2)(ii), revising paragraphs (b)(2)(ii)(A), (b)(2)(iii), and (b)(5)(i) and (iii), revising the introductory text to paragraphs (c) and (c)(4), revising paragraphs (c)(4)(iv)(A) through (D), revising the introductory text to paragraph (c)(7), adding a sentence at the end of paragraph (d), revising the introductory text to paragraph (h), revising paragraphs (h)(3) and (i), revising the introductory text to paragraph (j)(1), and revising paragraphs (j)(1)(i) and (iii), and (k), to read as follows:

§ 266.103 Interim status standards for burners.

(a) * * *

(2) Compliance with subpart EEE, part 63. When an owner and operator begin to comply (i.e., submit a notification of compliance) with the requirements of subpart EEE, part 63, of this chapter (and that are incorporated by reference), those requirements apply in lieu of the requirements of paragraphs (b) through (k) of this section.

* * * * *

(b) * * *

(2) * * *

(ii) Except for facilities complying with the Tier I or Adjusted Tier I feedrate screening limits for metals or total chlorine and chloride provided by §§ 266.106(b) or (e) and 266.107(b)(1) or (e), respectively, the estimated uncontrolled (at the inlet to the air pollution control system) emissions of particulate matter, each metal controlled by § 266.106, and hydrochloric acid and chlorine, and the following information supporting such determinations:

(A) The feedrate (lb/hr) of ash, chlorine, antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, silver, and thallium in each feedstream;

* * * * *

(iii) For facilities complying with the Tier I or Adjusted Tier I feedrate screening limits for metals or total chlorine and chloride provided by §§ 266.106(b) or (e) and 266.107(b)(1) or (e), the feedrate (lb/hr) of total chloride and chlorine, antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, silver, and thallium in each feedstream.

* * * * *

(5) * * *

(i) General requirements. Limits on each of the parameters specified in paragraph (b)(3) of this section (except for limits on metals concentrations in collected particulate matter (PM) for industrial furnaces that recycle collected PM) shall be established and monitored under either of the following methods:

(A) One-minute average. The limit for a parameter shall be established and continuously monitored on a one-minute average basis, and the permit limit specified as the time-weighted average during all valid runs of the trial burn of the one-minute averages.

(B) Hourly rolling average. The limit for a parameter shall be established and continuously monitored on an hourly rolling average basis. The permit limit for the parameter shall be established based on trial burn data as the average over all valid test runs of the highest (or lowest, as appropriate) hourly rolling average value for each run.

(C) Instantaneous limit for combustion chamber pressure. Combustion chamber pressure shall be continuously sampled, detected, and recorded without use of an averaging period.

* * * * *

(iii) Feedrate limits for metals, total chloride and chlorine, and ash. Feedrate limits for metals, total chlorine and chloride, and ash are established and monitored by knowing the concentration of the substance (i.e., metals, chloride/chlorine, and ash) in each feedstream and the flow rate of the feedstream. To monitor the feedrate of these substances, the flowrate of each feedstream must be monitored under the monitoring requirements of paragraphs (b)(5)(i) and (ii) of this section.

* * * * *

(c) Certification of Compliance. The owner or operator shall conduct emissions testing to document compliance with the emissions standards of §§ 266.104(b) through (e), 266.105, 266.106, 266.107 and paragraph (a)(5)(i)(D) of this section, under the procedures prescribed by this paragraph, except under extensions of time provided by paragraph (c)(7). Based on the compliance test, the owner or operator shall submit to the Director on or before August 21, 1992, a complete and accurate ‘‘certification of compliance’’ (under paragraph (c)(4) of this section) with those emission standards establishing limits on the operating parameters specified in paragraph (c)(1).

* * * * *

(4) Certification of compliance. Within 90 days of completing compliance testing, the owner or operator must certify to the Director compliance with the emission standards of §§ 266.104(b), (c), and (e), 266.105, 266.106, 266.107 and paragraph (a)(5)(i)(D) of this section. The certification of compliance must include the following information:

* * * * *

(iv) * * *

(A) One-minute average. The limit for a parameter shall be established and continuously monitored on a one-minute average basis, and the permit limit specified as the time-weighted average during all valid runs of the trial burn of the one-minute averages.

(B) Hourly rolling average. The limit for a parameter shall be established and continuously monitored on an hourly rolling average basis. The permit limit for the parameter shall be established based on trial burn data as the average over all valid test runs of the highest (or lowest, as appropriate) hourly rolling average value for each run.

(C) Instantaneous limit for combustion chamber pressure. Combustion chamber pressure shall be continuously sampled, detected, and recorded without use of an averaging period.

(D) Feedrate limits for metals, total chloride and chlorine, and ash. Feedrate limits for metals, total chlorine and chloride, and ash are established and monitored by knowing the concentration of the substance (i.e., metals, chloride/chlorine, and ash) in each feedstream and the flow rate of the feedstream. To monitor the feedrate of these substances, the flow rate of each feedstream must be monitored under the monitoring requirements of paragraphs (c)(4)(iv)(A) through (C) of this section.

* * * * *

(7) Extensions of time. If the owner or operator does not submit a complete certification of compliance for all of the applicable emission standards of § 266.104, 266.105, 266.106, and 266.107 as specified in § 266.103(C)(1), or as required pursuant to § 266.103(d), he/she must either:

* * * * *

(d) * * *. The extensions of time provisions of paragraph (c)(7) of this section apply to recertifications.

* * * * *

(h) Fugitive emissions. Fugitive emissions must be controlled by one of the following methods. The operator must specify in the operating record the method selected.

* * * * *

(3) Upon prior written approval of the Administrator, an alternative means of control to provide fugitive emissions control equivalent to maintenance of combustion zone pressure lower than ambient pressure.

(i) Changes. A boiler or industrial furnace must cease burning hazardous waste when changes in combustion properties, or feedrates of any feedstream, or changes in the boiler or industrial furnace design or operating conditions deviate from the limits specified in the certification of compliance.

(j) Monitoring and Inspections. (1) The owner or operator must monitor and record the following, at a minimum, while burning hazardous waste. All monitoring and recording shall be in units corresponding to the units on the operating limits established in the certification of precompliance and certification of compliance.

(i) Applicable operating parameters of paragraphs (b) and (c) of this section shall be monitored and recorded under the requirements of paragraphs (b)(5) (i) and (ii) of this section;

* * * * *

(iii) Upon request of the Director, sampling and analysis of any feedstream and the stack gas emissions must be conducted to verify that the operating conditions established in the certification of precompliance or certification of compliance achieve the applicable standards of §§ 266.104, 266.105, 266.106, and 266.107.

(k) Recordkeeping. The owner or operator shall maintain files of all information (including all reports and notifications) required by this section recorded in a form suitable and readily available for expeditious inspection and review. The files shall be retained for at least 5 years following the date of each occurrence, measurement, maintenance, report, or record. At a minimum, the most recent 2 years of data shall be retained on site. The remaining 3 years of data may be maintained on microfilm, on a computer, on computer floppy disks, on magnetic tape disks, or on microfiche.

* * * * *

7. Section 266.104 is amended by removing paragraph (f), and redesignating paragraphs (g) and (h) as paragraphs (f) and (g), respectively.

8. Section 266.105 is amended by revising paragraph (b), redesignating paragraph (c) as paragraph (d) and adding paragraph (c), to read as follows:

§ 266.105 Standards to control particulate matter.

* * * * *

(b) An owner or operator meeting the requirements of § 266.109(b) for the low risk exemption is exempt from the particulate matter standard. Owners and operators of cement or lightweight aggregate kilns are not eligible for this exemption, however, upon compliance with the emission standards of subpart EEE, Part 63, of this chapter.

(c) Oxygen correction. (1) Measured pollutant levels shall 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 shall be based on correcting to 7 percent oxygen using this procedure.

* * * * *

9. Section 266.108 is amended by revising paragraph (a)(2), to read as follows:

§ 266.108 Small quantity on-site burner exemption.

(a) * * *

(2) The quantity of hazardous waste burned in a device for a calendar month does not exceed 27 gallons.

* * * * *

10. Section 266.109 is amended by revising the introductory text to paragraph (b) and adding paragraph (b)(3), to read as follows:

§ 266.109 Low risk waste exemption.

* * * * *

(b) Waiver of particulate matter standard. Except as provided in paragraph (b)(3) of this section, the particulate matter standard of § 266.105 does not apply if:

* * * * *

(3) When the owner and operator of a cement or lightweight aggregate kiln become subject to the standards of subpart EEE, part 63, of this chapter (i.e., upon submittal of the initial notification of compliance), the source is no longer eligible for waiver of the PM standard provided by this paragraph. At that time, the source is subject to the PM standard provided by subpart EEE, part 63.

11. Section 266.112 is amended by adding a sentence at the end of the introductory text to paragraph (b)(1), adding a sentence at the beginning of paragraph (b)(1)(ii), adding a sentence before the last sentence of paragraph (b)(2)(i), revising the first sentence of paragraph (b)(2)(iii), redesignating paragraph (c) as paragraph (d), and adding paragraph (c), to read as follows:

§ 266.112 Regulation of residues.

* * * * *

(b) * * *

(1) * * * For polychlorinated dibenzo-p-dioxins and polychlorinated dibenzo-furans, specific congeners and homologues must be measured and converted to 2,3,7,8–TCDD equivalent values using the calculation procedure specified in appendix IX, section 4.0 of this part.

(ii) Waste-derived residue. Waste-derived residue shall be sampled and analyzed as required by this paragraph and paragraph (c) of this section to determine whether the residue generated during each 24 hour period has concentrations of toxic constituents that are higher than the concentrations established for the normal residue under paragraph (b)(1)(i) of this section. * * *

(2) * * *

(i) * * * In complying with the alternative levels for polychlorinated dibenzo-p-dioxins and polychlorinated dibenzo-furans, only the tetra-, penta-, and hexa- homologues need to be measured. * * *

* * * * *

(iii) Sampling and analysis. Waste-derived residue shall be sampled and analyzed as required by this paragraph and paragraph (c) of this section to determine whether the residue generated during each 24-hour period has concentrations of toxic constituents that are higher than the health-based levels. * * *

(c) Sampling and analysis frequency. (1) The owner or operator must sample and analyze residues at least once each 24-hour period when burning hazardous waste, unless written, advance approval is obtained from the Regional Administrator under paragraph (c)(2) of this section for less frequent sampling and analysis.

(2) Requests for approval for less frequent sampling and analysis (that is, less than once each 24-hour period) must be based on and justified by a statistical analysis.

(i) The Regional Administrator shall not grant approval for a sampling and analysis frequency of less than once each month.

(ii) At a minimum, the following information to support the request for reduced sampling and analysis frequency must be submitted to the Regional Administrator and must be contained in the facility's waste analysis plan for residue sampling:

(A) The statistical methodology selected, reason for selection, and the statistical procedures for calculating the sampling frequency;

(B) Analytical results used to generate the statistical database; and

(C) A description of how the statistical database is to be maintained and updated.

* * * * *

12. Appendix VIII to part 266 is revised to read as follows:

Appendix VIII to Part 266—Organic Compounds for Which Residues Must Be Analyzed for Bevill Determinations

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.
	Polychlorinated dibenzo-furans.

13. In Appendix IX to Part 266, Section 2.0 of the Table of Contents and the Appendix is revised to read as follows:

Appendix IX to Part 266—Methods Manual for Compliance With the BIF Regulations

Table of Contents

* * * * *

2.0 Performance Specifications and Quality Assurance Requirements for Continuous Monitoring Systems
2.1 Continuous emissions monitors (CEMS).
2.2 Other continuous monitoring systems.

* * * * *

Section 2.0 Performance Specifications and Quality Assurance Requirements for Continuous Monitoring Systems

2.1 Continuous emissions monitors (CEMS).

2.1.1 BIFs shall be equipped with CEMS for compliance monitoring.

2.1.2 At all times that hazardous waste is fed into the BIF or remains in the combustion chamber, CEMS must be operated in compliance with the requirements of the appendix to subpart EEE, part 63, of this chapter.

2.2 Other continuous monitoring systems.

2.2.1 CMS other than CEMS (e.g., thermocouples, pressure transducers, flow meters) must be used to document compliance with the applicable operating limits provided by this section.

2.2.2 Non-CEM CMS must be installed and operated in conformance with § 63.8(c)(3) of this chapter requiring the owner and operator, at a minimum, to comply with the manufacturer's written specifications or recommendations for installation, operation, and calibration of the system.

2.2.3 Non-CEM 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.

2.2.4 The span of the detector must not be exceeded. Span limits shall be interlocked into the automatic waste feed cutoff system.

* * * * *

PART 270—EPA ADMINISTERED PERMIT PROGRAMS: THE HAZARDOUS WASTE PERMIT PROGRAM

VIII. In part 270:

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 adding a sentence at the end of the introductory text to the section.

§ 270.19 Specific part B information requirements for incinerators

* * * When an owner and operator begin to comply (i.e., submit a notification of compliance) with the requirements of subpart EEE, part 63, of this chapter, specific requirements of §§ 264.343, 264.345, and 264.347 are superseded by the subpart EEE standards as provided by § 264.340(b).

* * * * *

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 and operator of a cement or lightweight aggregate kiln begin to comply (i.e., submit a notification of compliance) with the requirements of subpart EEE, part 63, of this chapter, specific requirements of §§ 266.104 through 266.107 are superseded by the subpart EEE standards as provided by § 266.102(a)(2).

* * * * *

4. In Appendix I to § 270.42, an entry is added to section L.

Appendix I to § 270.42—Classification of Permit Modification

* * * * *

Modification	Class
* * * * *	
L. Incinerators, Boilers, and Industrial Furnaces	
* * * * *	
9.[2] Initial Technology Changes Needed to Meet Standards under 40 CFR Part 63 (Subpart EEE—National Emission Standards for Hazardous Air Pollutants From Hazardous Waste Combustors)"	[1]1
* * * * *	

[1] Class 1 modifications requiring prior Agency approval.

[2] Denotes that this section will be dropped from Appendix I 4 years following promulgation of this rule.

5. Section 270.62 is amended by adding introductory text and revising paragraph (b)(2)(vii), to read as follows:

§ 270.62 Hazardous waste incinerator permits.

When an owner and operator begin to comply (i.e., submit a notification of compliance) with the requirements of subpart EEE, part 63, of this chapter, specific requirements of §§ 264.343, 264.345, and 264.347 are superseded by the subpart EEE standards as provided by § 264.340(b).

* * * * *

(b) * * *

(2) * * *

(vii) Procedures for rapidly stopping waste feed, shutting down the combustor, maintaining temperature in the combustion chamber until all waste exits the combustor, and controlling emissions in the event of equipment malfunction or activation of any ESV or other bypass system including calculations demonstrating that emissions will be controlled during such an event (sufficient oxygen for combustion and maintaining negative pressure), and the procedures for executing the ''Contingency Plan'' whenever the ESV is used, thus causing an emergency release of emissions.

* * * * *

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 and operator of a cement or lightweight aggregate kiln begin to comply (i.e., submit a notification of compliance) with the requirements of subpart EEE, part 63 of this chapter, specific requirements of § 266.104 through 266.107 are superseded by the subpart EEE standards as provided by § 266.102(a)(2).

* * * * *

7. Section 270.72 is amended by adding paragraph (b)(8) to read as follows:

§ 270.72 Changes during interim status.

(b) * * *

(8) Changes necessary to comply with standards under subpart EEE, part 63, of this chapter (National Emission Standards for Hazardous Air Pollutants From Hazardous Waste Combustors).

* * * * *

PART 271—REQUIREMENTS FOR AUTHORIZATION OF STATE HAZARDOUS WASTE PROGRAMS

IX. In part 271:

1. The authority citation for part 271 continues to read as follows:

Authority: 42 U.S.C. 9602; 33 U.S.C. 1321 and 1361.

Subpart A—Requirements for Final Authorization

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
* *	*	* *	* *
[*Insert date of publication of final rule in the Federal Register (FR)*]..	Revised Standards for Hazardous Waste Combustion Facilities.	[*Insert FR page numbers*].	[*Insert date of publication of final rule*].
* *	*	* *	* *

* * * * *

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