American Boiler Manufacturers Association
8221 Old Courthouse Rd, Suite 202, Vienna, Virginia 22182
703-356-7172 • fax 703-356-4543 • homepage: http://www.abma.com

August 20, 2010

Via Facsimile and Electronic Mail
Environmental Protection Agency
EPA Docket Center (EPA/DC)
Mail code: 2822T
1200 Pennsylvania Avenue, NW
Washington, DC 20460
Docket ID No. EPA-HQ-OAR-2002-0058

Re: Comments of the American Boiler Manufacturers Association on the Proposed National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial and Institutional Boilers and Process Heaters

Dear Sir/Madam:

On behalf of its member companies, the American Boiler Manufacturers Association ("ABMA") herein provides comments to the Environmental Protection Agency ("EPA") regarding EPA's proposed maximum achievable control technology ("MACT") standards for boilers, set forth in the proposed National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial and Institutional Boilers and Process Heaters, 40 C.F.R. Part 63, Subpart DDDDD, published at 75 Fed. Reg. 32006-32073 (June 4, 2010) (the "Proposed Boiler MACT").

Description of the ABMA

The ABMA is a national nonprofit trade association of commercial, institutional, industrial and electricity-generating boiler system manufacturing companies. Founded in 1888, ABMA is dedicated to the advancement and growth of the boiler and combustion equipment industry. The organization provides a common ground for information sharing and communication among manufacturers, their customers, government and the public. With more than one hundred member companies, ABMA is the only association of boiler, combustion, heat recovery, environmental, controls and instrumentation equipment and systems (>400,000 Btu/hr heat input) manufacturers. ABMA's member companies design, fabricate, install, retrofit and maintain the highly fuel-flexible boiler technologies that generate the steam and hot water that powers and comforts America. ABMA is also allied with and counts as participating members industry suppliers and vendors, repair and after market shops, and boiler owners and operators committed to the design, fabrication, installation and operation of safe, clean, efficient and reliable steam and hot water systems. In light of its broad and diverse memberships and affiliations, ABMA's comments represent an industry-wide consensus rather than the perspective of a single company.

ABMA's member companies maintain a high level of technical expertise with respect to all aspects of boiler and boiler-related equipment design, performance, emissions and emissions control. ABMA has therefore reviewed the Proposed Boiler MACT from a technical perspective, to determine whether the emission limits, goals and objectives of the rule are technically achievable and appropriate. To the extent such limits are not achievable through combustion alone, ABMA has sought to determine whether changes in fuel, control equipment or system replacement would be required and whether such measures would be appropriate given current technical constraints. ABMA's comments are based on its members' broad base of experience and expertise with respect to these issues, and are offered to EPA to ensure that the Proposed Boiler MACT is consistent with currently available and effective equipment and technologies provided by ABMA's member companies.

General Comments

1. In establishing achievable MACT emission standards, EPA should consider current manufacturer-guaranteed emission levels. Section 112(d) of the Clean Air Act requires EPA to establish emission standards based on the *"maximum degree of reductions in emissions of the hazardous air pollutants . . . that the Administrator, taking into consideration the cost of achieving such emission reduction . . . determines is achievable for new or existing sources in the category or subcategory to which such emission standard applies . . ."* 42 U.S.C.A. §7412(d). In establishing "achievable" emission standards, section 112(d)(3) directs EPA to examine the emission control that is "achieved in practice" by top performers based on "emission information" available to the agency. ABMA acknowledges EPA's efforts to comply with the directives of Section 112 by evaluating stack testing and continuous emission monitoring system ("CEMS") data from boilers within the subcategories identified in the Proposed Boiler MACT. However, such testing and CEMS information may not be representative of the range of boiler design types within each subcategory, may not consider variable performance across the range of firing rates, and may not reflect practical operational constraints such as startup and shutdown periods, load swinging and other issues.

To evaluate these issues comprehensively, ABMA suggests that EPA should consider information that is available from boiler, burner, and emissions control equipment manufacturers, including currently available equipment design and guaranteed emission levels. Specifically, emission limits that are identified by EPA as "achieved in practice" should not be inconsistent with the most up-to-date equipment emission guarantees offered by equipment manufacturers. ABMA does not suggest that MACT emission levels should be equivalent in all cases with manufacturer guarantees. However, boiler, burner and control equipment manufacturers base guaranteed performance levels on a number of considerations that may be beyond the scope of EPA's data set. Therefore, emission levels set well below the range of guaranteed performance may not be "achievable" in practice for all purposes. Further, regardless of mandated emission standards, equipment manufacturers cannot provide commercial warranties or guarantee an emission level associated with any product or technology, where the emission standard cannot be achieved continuously over a defined period of time using currently available technology. In short, due to commercial liability considerations, no boiler, combustion equipment or emissions controls manufacturer will sell technology for which the manufacturer cannot provide guaranteed performance and, conversely, no owner/operator will buy technology for which a performance guarantee is not provided. Without such guarantees, boiler owners and operators maybe left in a difficult position, and without a clear path to compliance. For these reasons, and where appropriate, ABMA has offered herein information and considerations that may impact manufacturers' emission guarantee levels for various pollutants and boiler types as an additional source of "emissions information" that may be considered by EPA in setting standards pursuant to Section 112.

2. In establishing achievable MACT emission standards, EPA should consider the multiple rules and emission standards that affect the full range of boilers and combustion equipment. As EPA is aware, many existing and new boilers are subject to multiple federal and state rules and emissions standards which may be inconsistent and/or conflicting. The technical implications to piece-meal rulemaking, such as a failure to consider the operational impacts of multiple emission standards, may adversely affect overall boiler performance as well as the goals of the Clean Air Act, and may needlessly drive up the cost of compliance. As an example, the stringent emission limits for carbon monoxide ("CO") set forth in the Proposed Boiler MACT will affect sources' ability to meet low nitrogen oxides ("NOx") emissions because minimizing CO in the combustion system is a goal that is opposed to minimizing NOx in most boiler burners. Because boiler NOx emissions are generally regulated pursuant to control or emission standards implemented by state agencies, EPA may not have fully considered the impacts of such varying NOx control requirements on CO performance. Conversely, in some applications, such as in combustion turbine / heat recovery steam generation systems, CO control may adversely affect selective catalytic reduction for NOx control and particulate emissions due to the oxidation of NO to NO2 and SO2 to SO3 and/or SO4. Inconsistencies in requirements for NOx and CO may needlessly cause boiler owners and operators to incur control costs that outweigh the relative environmental benefits, and may affect boiler performance.

3. In establishing achievable MACT emission standards, EPA should address the anticipated startup, shutdown and malfunction conditions that may be experienced across the wide range of boiler designs and applications. To the extent that emission standards must apply during periods of startup, shutdown and malfunction, they must be set in a manner which adequately accounts for anticipated emissions during those conditions. ABMA is concerned that the data on which EPA has relied does not adequately represent considerations that may affect such emissions, such as boiler size, usage of flue gas recirculation ("FGR"), steam pressure and temperature. These issues are particularly relevant to startup conditions, which are reasonably anticipated and can be evaluated in the standard-setting process. For example, the following factors should be considered in relation to CO emissions during startup:

- During cold start, furnace temperature is low and higher CO emissions will result;

- High pressure boilers take longer to come up to temperature;

- Super heated steam applications take longer to reach their normal operating conditions;

- Low NOx, high FGR applications have very low air velocities at the burner during cold start, because FGR cannot be introduced to the burner before it reaches a certain temperature, thereby reducing volumetric flow and resulting in higher CO emissions;

- A typical cold start CO emission level that may range up to 400 ppm or higher on oil, and the following wide range of boiler warm-up periods based on boiler type may result in significantly higher average CO emissions than experienced at steady-state operation:[1]

  - Firetube boilers: 1-4 hours

  - Industrial watertube boilers (150 psig): 3-6 hours

  - Super heated industrial watertube package boiler: 4-8 hours

  - Super heated field erected boilers – 8 hours or more

EPA's preamble to the Proposed Boiler MACT does acknowledge an attempt to incorporate startup and shutdown emissions through its consideration of daily or monthly average CEMS data from the best performing units. However, EPA has not demonstrated that its data set adequately addresses the variability in startup length and associated emissions experienced in boilers of various design and load requirements. Therefore, ABMA believes that EPA should: (1) allow a period of time for startup, based on boiler type, during which emissions limits would not apply; (2) establish an alternative emission limit for startup periods based on boiler types within a subcategory and their load; or (3) review the data set and the anticipated startup conditions of various boiler types to ensure that the emission limits set for each subcategory are representative of multiple boiler designs and emission variability within the subcategory. The alternatives for defining reasonable emission standards for startup conditions should extend to startups occasioned by the range of circumstances, such as cold start after a period of scheduled non-operation, as well as startup occurring after a malfunction during which cold-start parameters often apply. Additionally, EPA should extend similar consideration to emissions variability during shutdown periods. During these periods, considerable volumetric

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[1] For example, assume a typical industrial water tube low NOx gas burner application mounted on a super heated steam boiler may achieve 15 ppm CO at steady state operation. Conservatively assuming a four hour warmup period during which 200 ppm is experienced for the first two hours of startup and 100 ppm for the second two hours, the 24 hour average emission would be 200 ppm x 2hr/24hr + 100ppm x 2hr/24hr + 15 ppm x 18hr/24hr = 36.25 ppm.

post- and pre-purge air change requirements serve to cool boilers down in an attempt to relieve the combustion chamber of unburned fuel and of flue gases prior to re-ignition sequence.

ABMA also supports a limited allowance for malfunction periods. The term "malfunction" should be more precisely defined to include the variabilities of malfunction. Malfunction can range from the need for immediate and complete shutdown to malfunctions like an interruption in fuel supply or an inoperative CEMs that will require only a short downtime. A plant should not be required to completely shutdown due to a malfunction of the boiler, burner or boiler-related equipment. Once defined, a malfunction should be regulated by alternative limits applied during the time it takes to complete corrective action and get the boiler back to normal operational mode.

4. In establishing achievable MACT emission standards, EPA should consider at least five sources in each subcategory. Pursuant to Section 112(d)(3) of the Clean Air Act, EPA is required to evaluate the average emission limit achieved by the best performing 12% of a category or subcategory with 30 or more sources, or the best performing 5 sources of a category or subcategory with fewer than 30 sources. In its preamble to the Proposed Boiler MACT, EPA noted that for certain subcategories with 30 or more sources, its data set was limited such that the best performing 12% was fewer than 5 sources. EPA has requested comment on whether it should interpret the Clean Air Act to allow consideration of 5 sources in those subcategories.

In light of the wide range of boiler design and operational considerations within each identified boiler subcategory, ABMA believes that EPA should interpret Section 112(d)(3) of the Clean Air Act to allow consideration of a minimum of 5 sources in each subcategory. Ensuring that an appropriate minimum data set has been evaluated in the standard setting process is consistent with the overall intent and purpose of Section 112 to identify and evaluate emission limits that are "achieved in practice" by the best performers, and will help to reflect the significant variabilities existing within each subcategory.

5. If properly designed to reflect the broad range of boiler designs and operational conditions, as well as manufacturers' emission guarantee levels, the Boiler MACT will stimulate the creation of jobs in the boiler and boiler-related equipment industry. To the extent that EPA develops a Boiler MACT rulemaking that is achievable in practice for boiler owners and operators**,** the proposal will create solid, well-paid, professional, skilled and unskilled manufacturing jobs attendant to the upgrade, optimization and replacement of existing boilers around the United States. In addition, service jobs associated with the installation and maintenance of these systems, as well as service jobs associated with required tune-ups and energy assessments will be created. These jobs will be significant contributions to our local, state and national economies – contributions that must not be overlooked or minimized.

Specific Comments

1. Comments Relating to Carbon Monoxide

ABMA is concerned that the emission limits identified in the Proposed Boiler MACT for CO are not achievable in practice, because they do not fully reflect the broad range of design and operational considerations that affect CO emissions. Further, although EPA appears to assume that Good Combustion Practices ("GCP") will be adequate for CO control, ABMA believes that add-on controls will be necessary to reduce CO within the range of proposed levels. ABMA offers the following specific comments for CO:

- EPA has not adequately identified its basis for using CO as a surrogate for polycyclic organic matter ("POM"). ABMA acknowledges a correlation between CO and organic HAPs; however, ABMA is not aware of any relevant testing data that correlates the relationship between HAPs and CO when operating at CO levels less than 100 ppm. By contrast, data from the Petroleum Environmental Research Forum Project 92-19 provides some of the most complete data examining the relationship between CO and HAPs during gas firing. While there is a fairly linear correlation between decreasing CO and decreasing HAPs at higher levels, once the CO values fall under 100 ppm, further reduction of CO did not provide any substantial correlating reduction of HAPs. Based on this data, it can be concluded that during gas firing the reduction of CO from 100 ppm to 1 ppm may not create any incremental benefit in terms of HAP reductions. Without any data to the contrary, this relationship between CO and HAPs should also be applied to oil-firing, where EPA has not demonstrated that a significant HAP reduction would occur at CO levels below 100 ppm.

- EPA did not adequately account for load variability in establishing the proposed CO limit of 1ppm for oil-fired units. As a general matter, stack testing data is not representative of load variability because stack tests are conducted at steady state loads where CO is minimized (i.e. 50-90%). By contrast, CO will increase at lower firing rates due to the decreased mixing energy of the flame and the reduced temperature in the furnace. (This is more pronounced in single-burner boilers, since the burner needs to cover the entire turndown range, than for multiple-burner boilers in which turndown can be achieved by taking burners out of service.) It is common for boiler burners to be required to operate across an 8:1 turndown range (down to 12.5% firing rate) on oil. CO may also increase at higher firing rates, when the flame fills the furnace and approaches the tube walls where temperatures become too cool to promote CO oxidation. CO may also vary dramatically when a boiler is modulating load to follow a steam demand. This results from metered control systems which allow air to lead fuel on increasing load, and fuel to lead air on decreasing load. Fuel-lean operation during transient load conditions reduces flame temperature and increases CO production. As a general matter, the faster a unit is required to change load, the greater the magnitude of CO increases.

- EPA's preamble notes its use of CEMS data in support of its conclusion that CO levels would not vary much when units are operated below design capacity: *"Therefore, even though ICI units, due to steam demand, may operate at these low load conditions, no additional variability due to operating load needs to be accounted for since the average CO emission levels that include these low load conditions are within the variability range determined by the statistical analysis of CO emissions from the best performing units."* (75 Fed. Reg. at 32024) ABMA disagrees with this statement based on the information above. Further, the CEMS data on which EPA relies is limited to six units, none of which are oil fired, and none of which were tested across a wide operational range. The only unit in EPA's load variability analysis with CO below 1 ppm (CA-Tesoro) was a gas-fired unit tested only at a turndown rage of 2:1. The lack of data on load variability while firing oil, covering the entire operating range of the boiler and taking into account load changes, prevents a complete evaluation of an achievable CO limit. The ability to comply with any emission limit will be highly dependent on boiler size and design, range of operation (turndown), number of burners and load following requirements. A limit based on data that does not account for these factors cannot be "achieved in practice" across the most common operational scenarios.

- ABMA believes that the Proposed Boiler MACT CO limit of 1 ppm @ 3% oxygen for existing (large) and new oil-fired and gas-fired boilers is not achievable using GCP. As noted above, minimizing CO in the combustion system is inconsistent with minimizing NOx emissions. Fuel staging and FGR technologies aim to lower the overall temperature of the flame, making it longer and wider. By contrast, minimization of CO requires the flame to be more concentrated to the center of the furnace. While burner companies are generally able to balance NOx and CO minimization goals by a combination of fuel staging and turbulence, a CO limit of 1 ppm cannot be achieved on this basis. This is especially true at low firing rate (i.e. <25%), because excess air cannot be regulated tightly at these firing rates. Excess air at low loads may "chill" the flame, causing incomplete combustion and increased CO emissions. For a CO limit to be achieved using GCP while firing oil, ABMA offers the following recommendation based on manufacturer guarantees of performance:

    - For boilers firing both fuel oil and natural gas regardless of capacity, a CO limit of 50 ppm.

- The considerations set forth above for oil firing CO limits are equally applicable to the types of fuels identified as "Gas 2." While they may meet low CO levels during steady state testing, these fuels are interruptible and can increase or decrease rapidly, requiring units to be set at a higher excess air level than would typically be required for steady state operation. For a CO limit to be achieved using GCP while firing "Gas 2" fuels, ABMA offers the following recommendations based on manufacturer guarantees of performance:

    - For industrial watertube and firetube applications, firing clean gaseous fuels with a molecular weight less than 42 lb/mol at a 4:1 turndown ratio, a CO limit of 50 ppm for all capacities.

- As noted above, ABMA believes that the Proposed Boiler MACT CO limits for oil and "Gas 2" firing cannot be met using GCP, and therefore would require the use of an add-on control such as an oxidation catalyst. There is nothing in the preamble to the Proposed Boiler MACT or readily available in the rulemaking docket to suggest the EPA considered the costs or technical feasibility of installing and operating such controls. Further, ABMA notes that the CO limit for gaseous fuels, especially in combustion turbine / heat recovery steam generator applications, should be referenced to 15% oxygen, rather than 3% oxygen.[2]

- Operation of oxidation catalyst for CO control would be subject to several design constraints. As an initial matter, oxidation catalyst performs optimally at temperatures of 600ºF and above. Small boilers operating at turndown ratios may not be able to meet these temperatures. In particular, package boilers operating at low pressure and low load may experience low flue gas temperatures.[3] While an increase in volume and pressure drop may compensate for lower temperature, capital costs and operating expenses may increase. For example, a typical boiler producing 80,000 pounds of saturated steam is assumed to use a fan (at sea level) that moves 18,000 cfm at 14 inches of water column, and its energy consumption is 39.4 kw. The addition of a CO oxidation catalyst will add an estimated 2 inches water column to the draft losses of the system. This figure is based on typical design criteria, plus the need to compensate for low flue gas temperature. To the extent that the air moving equipment is capable of overcoming the added draft losses, the static pressure increase would result in a new energy usage of 45 kw, or 14% increase. Other costs associated with the use of oxidation catalyst include the need for a near perfect flow distribution, which require flow straightening material or large amounts of catalyst material. The formation of sulfates is also a concern, because they may bond to the substrate of the oxidizing catalyst and create a potential for a sulfuric plume of SO_3, which may condense to form sulfuric acid. Further, in some field erected units, the installation of oxidation catalyst can reduce boiler heat exchange surface for lack of an adequate "window" for placement. Based on all of the above, oxidation catalysts may present technical and economic constraints that were not adequately evaluated by EPA. Further, even at optimal temperatures, use of an oxidation catalyst may not be sufficient to meet a 1 ppm emission level for CO. As an alternative, ABMA recommends a CO limit in the 5 ppm range where oxidation catalyst is used at optimal flue gas temperatures (>600ºF).

- The Proposed Boiler MACT identifies a CO limit of 50 ppm for existing stokers designed to burn coal. While 50 ppm may be achievable on an instantaneous basis, the variability of fuel quality and the operational variability in coal-fired units may render this limit too stringent. For example, differences in low ranked lignite, as compared to bituminous, and fuel particle sizes have been clearly demonstrated to affect CO emissions. With costs of good grade bituminous steadily increasing, many industrial users have needed to switch to "run of

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[2] As an example, a recent installation has an exhaust flow rate of 4,000,000 lb/hr with an exhaust composition of 8.23% volume O2, 12.66% volume H2O and a CO emission rate of 10 ppmvd at 15% O2. For a stack outlet of 1 ppmvd at 15% O2, a CO oxidation catalyst would be required, and an efficiency of 90% must be achieved. When corrected to 3% O2, the oxidation catalyst must achieve 97% control to reach 1 ppmvd. At 3% O2, a CO limit of 1 ppmvd is equivalent to 0.3 ppmvd@15%O2, a level which is not currently achievable or measurable.

[3] The following represent typical outlet flue gas temperatures for package boilers:

	25% MCR	100% MCR
125 psig 3 pass FT	380F	460F
125 psig 4 pass FT	365F	400F
300 psig saturated IWT	454F	628F
750 psig 730F superheated IWT	559F	807F

mine" fuel, which likely increases the amount of finer fuel particle sizes. Increases in CO and NOx values result with finer fuels, and such increase cannot be completely addressed by upgrades to staged combustion air systems and better fuel distribution equipment.

- Consistent with comments above relating to oil and gas firing, requirements to minimize NOx in coal-fired sources will adversely impact CO emissions. In particular, to our knowledge, the CO level of 50 ppm @3% oxygen has not been maintained in units equipped with NOx control technologies, or operating at conditions of low load firing, high excess air, or during startup, shutdown or malfunction. An achievable CO level can be maintained in the range of 50-150 ppm @7% oxygen, depending on thermal input, grate design (mass v. spreader), boiler construction (tube and tile v. membrane), steam conditions (superheated, saturated or hot water generators) and pre-heated combustion air temperatures.[4]

- For the same reasons as cited above, the Proposed Boiler MACT CO limit of 7 ppm @3% oxygen for new coal-fired stoker units would not be achievable. ABMA is not aware of any manufacturer that would guarantee CO emissions at that level. To the extent that the limit is based on an assumption that a new unit would be equipped with oxidation catalyst (which is not readily reflected in the preamble or docket), the assumption has not been verified. We are not aware of any full-scale, operational demonstration of a coal-fired spreader grate system with catalytic oxidation. For the same reasons discussed above in relation to oil and gas fired units, such systems are subject to technical constraints such as low pressure or flue gas temperature. Greater constraints exist with coal firing, including high mineral and carbon content in fly ash, which would be a potential catalyst poison. Although pulverized coal units may be equipped with hot side electrostatic precipitators (that can clean flue gas and maintain optimal temperature), we are not aware of a high temperature particulate control applied to grate technology.

- Good combustion is the result of the three T's: time, temperature and turbulence. CO emissions from biomass-fired boilers and energy systems will vary due to the wide range in the moisture content of the biomass fuels being fired and the design of the furnace and combustions systems. An increase in the moisture content of the biomass fuel results in a lower adiabatic flame temperature and therefore increased CO. Advances in equipment design in stoker units, including water-cooled grates that allow for increase pre-heated air temperature, has helped to decrease CO and advanced overfire/secondary air systems provide turbulence and oxygen in strategic areas of the furnace to improve combustion and subsequently reduce CO. The CO emissions from existing facilities routinely vary between 450-700 ppm @ 3% oxygen under the best of operating conditions. Interruption in fuel feed can increase CO emissions to levels above 1000 ppm. Even with upgrades to combustion controls and overfire/secondary air systems, there are no guarantees that the proposed CO limit of 560 ppmvd @ 3% oxygen would be obtainable for a large population of older boilers due to specific operating requirements and existing combustion system and furnace design limitations.

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[4] ABMA notes that a CO limit corrected to 3% oxygen is a common value for gas and liquid boilers, but a 7% oxygen value or a lb/MMBtu value would be more appropriate for coal-fired units.

- In the past decade, CO permit limits have decreased. In order to achieve these lower CO limits, new stoker units are designed with (1) larger furnaces which result in increased retention time; (2) increased grate areas which result in lower upward furnace velocity; (3) advanced water-cooled grate designs which enable higher combustion air temperatures for improved combustion of high moisture content biomass fuels; and (4) advanced overfire/secondary air systems which reduce the formation of CO and NOx. Therefore, the proposed value of CO of 560 ppm @3% oxygen would appear to be obtainable for a limited range of new and existing biomass fuels and combustion systems. However, proposed limits for volatile organic compounds ("VOC") and dioxins/furons ("D/F") may not be obtainable with a CO value of 560 ppm. (Proposed Boiler MACT D/F limits are discussed in more detail below.) Unlike coal-fired grate systems, ABMA is aware of CO reduction catalysts installed on at least two (2) biomass facilities. The results have been reported to be successful. However, these particular units both fire a consistent chipped wood and bark fuel with moisture contents between 45-50%, <3% ash with low percentages of alkali constituents in the ash and uniform fuel particle size distribution sizing on an annual basis. Also, because they serve electrical generating facilities, steam conditions and output are relatively consistent. It is unknown how these facilities would perform given the fluctuations in operating conditions that are inherent with most industrial boilers.

2. Comments Regarding Particulate Matter

- ABMA notes that the particulate matter ("PM") levels identified in the Proposed Boiler MACT will be achievable only with the burning of specific grades of Ultra-Low Sulfur Diesel. Due to sulfur and ash contents, heavy fuel oils, residual fuel oils, and even typical light oils and diesel fuels cannot meet the proposed PM requirements without add-on equipment. Please consider the following:

  - Field results show that the conversion rate of sulfur in fuel oil to particulate (SO_3) is 3.7%. This is solely a function of chemistry, partial pressures and temperature rather than a result of combustion process. Therefore, a typical fuel oil with 0.25% Sulphur, 0.01% Ash and a Higher Heating Value (HHV) of 19200 btu/lb can expect to emit:
    - 1,000,000 btu/hr / 19200 btu/lb x 0.25/100 x 3.7/100 x 80 lb/mole (SO3)/ 32 lb/mole (S) = 0.0120 lb/MMBtu in sulphate particulate.
  - Ash is also unaffected by the combustion process:
    - 1,000,000 btu/hr / 19200 btu/lb x 0.01/100 = 0.005 lb/MMBtu in ash particulate.
  - Total fuel-quality-related particulate = 0.0120 lb/MMBtu + 0.005 lb/MMBtu = 0.017 lb/MMBtu. Residual fuel and heavy fuel quality related particulate would be expected to be much higher.

- To meet the required emissions for PM:
  - 0.004 lb/MMBtu PM on oil will require Ultra Low Sulfur Diesel with max 0.05% sulfur and 0.005% ash;
  - 0.002 lb/MMBtu PM on oil will require Ultra Low Sulfur Diesel with max 0.03% sulfur and 0.002% ash;
  - Alternatively, a multi-cyclone/ESP/filter would be required to comply.

3. Comments Relating to Dioxins/Furans

- ABMA believes that the limits set forth in the Proposed Boiler MACT for D/F are too stringent. According to five differing tests conducted by an ABMA member company while firing biomass, the D/F level being required for biomass at new stoker units - at 0.00005 ng/meter cubed at 7% O2 – is unattainable with any current technology.

- Two tests were conducted at operating wood-fired plants; three were small-scale tests on agricultural residues. In each case the fuel was tested for chlorine in advance and then samples of the flue gas were extracted during combustion per ASTM standards, transported per ASTM standards, and tested for D/F in qualified labs.

- The lowest average emission of dioxins and furans reported in the tests or for which there was data as Toxic Equivalent (TEQ) to 2.3.7.8 Tetra (para) dioxin was 0.170 ng/standard cubic meters at 7% O2. The highest was about 0.6. Even with activated carbon injection, that under ideal conditions can remove up to 99% of D/F (as well as mercury), the new proposed limit could not be reached. Further, we are not aware of any manufacturer that would guarantee meeting the proposed limit with carbon injection, and there are few in the industry who believe that removal rates at that level can be attained consistently.

4. Comments Relating to Monitoring and Continuous Emission Monitoring Systems Requirements

- ABMA believes that the monitoring and CEMS requirements of the Proposed Boiler MACT should be clarified. As an initial matter, ABMA recommends that EPA evaluate the technical feasibility of in-situ measurements at the very low emission levels identified in the proposed rule. To the extent that EPA has not done any such evaluation, ABMA recommends that EPA contact CEMS manufacturers to ensure that CEMS will provide an accurate and feasible tool for compliance.

5. Comments Related to Boiler Tune-up Requirements

- ABMA acknowledges the proposed requirements for boiler tune-ups set forth in proposed 40 C.F.R. §63.7540(a)(10). While maintenance, repair and tune-up of boilers and combustion equipment in the >400,000 Btu/hr sector do have characteristics in common, ABMA notes that every boiler system is different depending on overall design, operational characteristics and use. Each boiler system in this sector is designed to a specific application; "cookie-cutter" designs do not apply to the non-residential boiler sector. Given such variability in design and operation, and the very real issue of safety as it pertains to (1) doing work with highly technical combustion systems and (2) operating those systems post-tune-up, it is important for tune-ups to be conducted by companies and personnel with the highest standards of technical training and practical expertise in addressing issues of maintenance, repair and optimization of boiler systems. The manufacturers of boilers, burners, or boiler components are a logical source of expertise, as are representatives and boiler repair companies that have documented arrangements with manufacturers. Further, tune-ups should be conducted in accordance with manufacturer guidelines and recommendations in order to preserve technical warranties and guarantees.

6. Comments Related to Energy Assessment Requirements

- EPA has requested comment on its requirement for existing boilers located at major source facilities to undergo an energy assessment to identify cost-effective energy measures. ABMA supports EPA's proposal that such assessment would be conducted by professionals and/or engineers that have relevant expertise, such as those who have successfully completed the Department of Energy Qualified Specialist Program, or a professional engineer certified as a Certified Energy Manager by the Association of Energy Engineers. ABMA suggests that such qualified personnel may also include other persons who are equally knowledgeable about the equipment and processes that are the subject of the assessment.

- ABMA requests that EPA clarify the scope of the required energy assessment. As set forth in Table 3 of the Proposed Boiler MACT, the scope of the energy assessment could be interpreted to extend beyond the affected boiler. For example, the energy assessment would be required to include a "facility energy management program." Although not defined, this requirement would seem broader than the affected boiler or process heater and may include other systems or processes that are beyond the scope of this rulemaking. ABMA recommends that the scope of the energy assessment should be limited to the boiler and directly associated components such as the feed water system, combustion air system, fuel system (including burners), blow down system, combustion control system and heat recovery of the combustion fuel gas. The publication of a standard procedure would ensure uniform and comparable results for all plant energy assessments. It is also of utmost concern that the boiler owner/operator have full faith that the qualifications of any provider of assessment services have been sufficiently vetted to assure that fly-by-nighters, scammers or those out to make a quick buck as a result of mandated federal requirements be quickly identifiable and avoidable. Toward that end, ABMA would recommend that providers of energy assessment services should have no financial interest in any company that might profit from the assessment's findings – in other words, conflicts of interest should be avoided wherever possible.

In conclusion, establishing HAP emissions limits for industrial, commercial and institutional boilers is not a simple exercise. Not only are there vastly differing design concepts within each boiler type, there are significant variables associated with each design's specific application, operation and fuel – singly and in concert with other boilers. Although design can anticipate many of those variables, the hourly operation of a boiler is subject to many unanticipated occurrences. While ABMA understands the importance of uniformity – e.g. its CO emissions limit proposal on oil- and natural-gas-fired boilers -- it is important that EPA understand the diversity of the equipment and systems it is attempting to regulate and the role and importance of performance guarantees in addressing that diversity of design and operation. As the sole trade association representing the interests of its membership in the >400,000 Btuh (heat input) boiler manufacturing industry, ABMA has tried to shed a light on that design and operational diversity and this industry's ability to achieve the emissions levels proposed. ABMA appreciates EPA's consideration of these comments, and would be willing to provide additional information as may be appropriate at EPA's request.

Very truly yours,

W. Randall Rawson
President/Chief Executive Officer