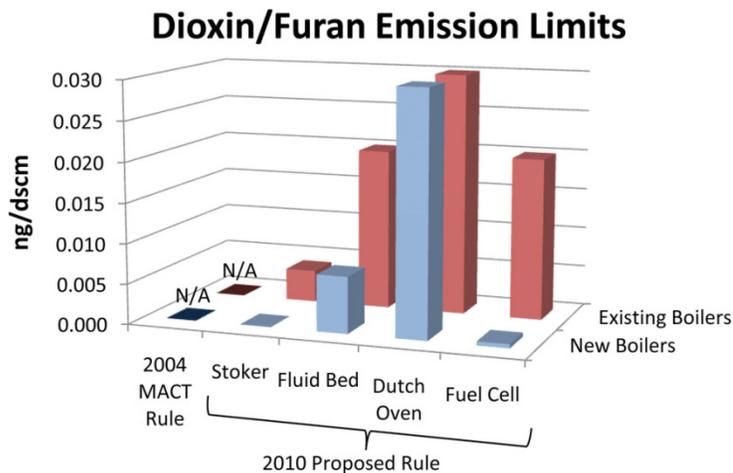
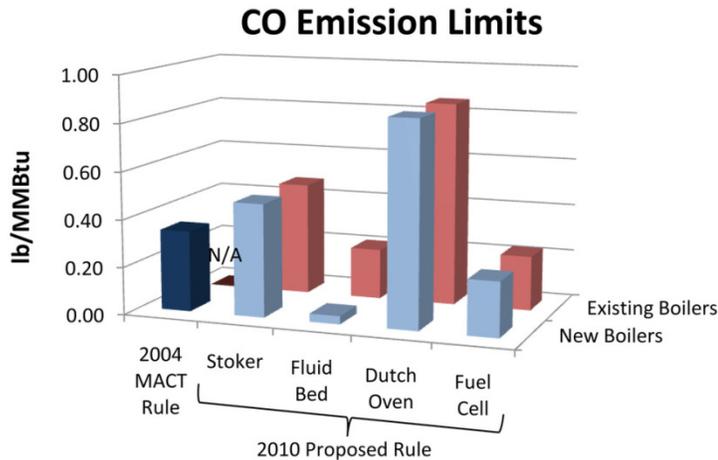


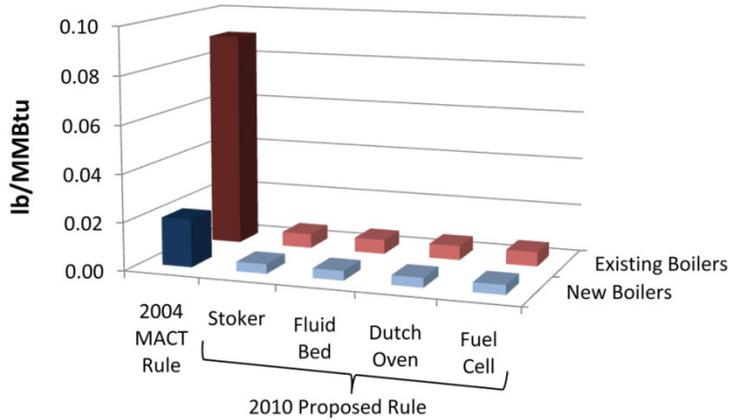
MACT for Biomass Boilers—Déjà Vu?

A proposed new Maximum Achievable Control Technology standard that would impose stricter hazardous air pollutant (HAP) emission limits and other requirements on biomass boilers and process heaters could lead to greater expenditures, and the financial

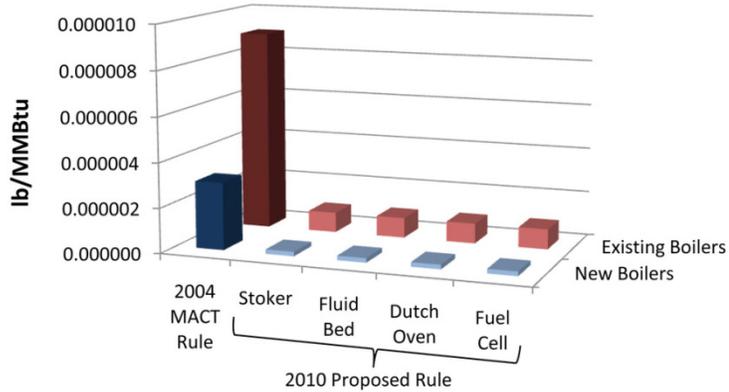
By Chad Darby and Danielle Lenzini | October 26, 2010



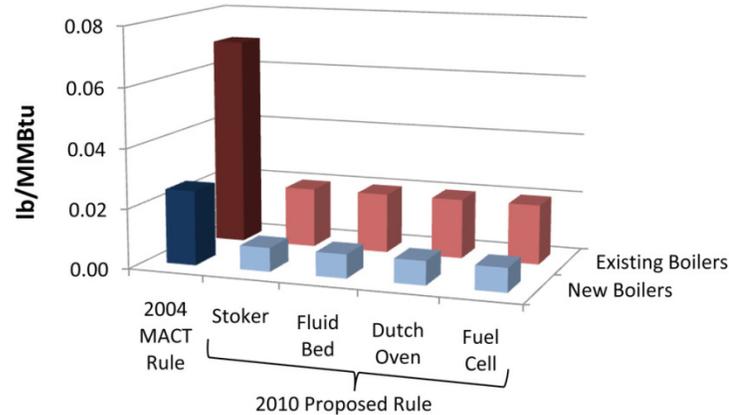
HCl Emission Limits



Hg Emission Limits



PM Emission Limits



On April 29, the U.S. EPA issued the proposed National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial and Institutional Boilers and Process Heaters, 40 CFR Subpart DDDDD, including requirements for both new and

existing sources. This rule is often referred to as Boiler MACT. The proposed rule replaces EPA's original 2004 rule, which was vacated by the U.S. Court of Appeals for the District of Columbia Circuit. In the original rule, there were requirements for single categories of new and existing biomass boilers. In the latest proposed rule, new and existing biomass boilers are each broken into four subcategories, which are based on boiler type: stoker, fluidized bed, suspension burner/Dutch oven and fuel cell.

Emission limits are proposed by subcategory for five air pollutants: particulate matter, hydrogen chloride, mercury, carbon monoxide and dioxin/furan. Figures 1-5 provide a comparison by pollutant of the original proposed 2004 MACT emission limits to the new proposed MACT emission limits, categorized by combustion technology, for biomass boilers. On each graph the red bars represent the emission limits that would be imposed on existing biomass boilers and the blue bars represent the limits proposed for new biomass boilers. For particulate matter, hydrogen chloride, and mercury, the graphs show that the proposed MACT limits are much smaller than the original MACT limits. For carbon monoxide and dioxin/furan, there is a wide range of proposed limits by combustion technology, which could influence the choice of combustion technology for facilities proposing to install new biomass combustion units.

Some technologies, such as fluidized bed designs, are recognized as being much more efficient at combustion and generally have lower carbon monoxide emissions than other technologies. However, this boiler type generally has a much higher capital equipment cost and now the proposed Boiler MACT imposes a much lower emission limit, potentially dis-incentivizing this choice of a lower-emitting boiler design for future projects.

One of the most significant complaints about the proposed Boiler MACT emission limits is that each limit was developed independently from the pool of boilers and process heaters for which EPA had available data. While existing boilers may meet some of the emission limits, industry groups are pointing out that no single boiler in the U.S. meets all of the standards. What this means is that every major source biomass boiler, to which the rule applies, would be required to install one or more control technologies to become compliant with all five of the pollutant categories. What concerns many biomass boiler owners is that the necessary controls may be prohibitively expensive. In the preamble of the proposed rule, EPA has stated: "We could not identify better HAP emissions reduction approaches that could achieve greater emission reduction of HAP than the control technology combination (fabric filter, carbon injection, scrubber and GCP (good combustion practices)) that we expect will be used to meet the MACT floor level of control."

In addition to expensive emission control systems, the proposed rule would also require that boilers rated at greater than 100 million Btu per hour (MMBtu/hr) heat input install a continuous emission monitoring (CEM) system for carbon monoxide to demonstrate compliance with limits. Biomass boilers with a heat input greater than 250 MMBtu/hr would be required to install a particulate CEM system.

Compliance with other emission limits could be demonstrated through fuel analysis, performance tests and parametric monitoring. All existing boilers will be required to conduct an energy assessment to identify energy conservation measures, implement recordkeeping, and conduct reporting of compliance. Fortunately, small boilers (those under 10 MMBtu/hr) will not have emission limits, and will only be subject to work practice standards which include a periodic tune-up of the boiler.

Meeting Proposed Limits

Golder Associates evaluated 16 biomass boilers at major source facilities to evaluate compliance with the proposed Boiler MACT. The boilers ranged from 31 to 450 MMBtu/hr of biomass heat input. Each was evaluated pollutant by pollutant using specific facility source test data, where available.

Filterable Particulate Matter: Five of the 16 boilers would meet the particulate matter limit with existing control devices, three would have to modify their control devices and eight would have to install a dry or wet electrostatic precipitator.

Hydrogen Chloride: Six of the 16 boilers would be in compliance with the proposed limits and nine boilers had no data so the status is unknown. One boiler burns wood fuel previously in contact with saltwater and would need a 75 percent reduction in emissions by an added control device. Based on the data available, it appears that the hydrogen chloride limit could be met by most boilers, except for those with elevated chloride in the fuel from saltwater exposure or composite panel resin.

Mercury: Four of the 16 boilers would be able to meet the proposed limit with existing controls and eight boilers do not have data so the status could not be determined. Four boilers would need an added control device to meet the proposed limit. It appears from the data that most boilers would be able to meet the proposed emission limit, unless the fuel contains elevated mercury content. If mercury emissions need to be reduced greater than 90 percent to meet the proposed limit, then changes to the fuel stream would be required because it is unlikely that add-on control devices or carbon injection would be sufficient.

Carbon Monoxide: Four of the 16 boilers would be in compliance with the proposed limits, and 12 boilers would need to reduce carbon monoxide emissions to comply. Many boilers have nitrogen dioxide limits, and have been tuned to achieve lower nitrogen dioxide emissions, which can cause the boiler to emit carbon monoxide at a higher rate. It was assumed that up to a 30 percent reduction could be achieved through a combination of fuel handling improvements and combustion improvements; otherwise a control device would need to be installed. For most of the boilers Golder Associates reviewed, add-on controls would be necessary.

Dioxin/Furan: Fifteen of the 16 boilers did not have any data and the compliance status was not known. The one boiler that did have emission data would need an 80 percent reduction in dioxins/furans to meet the proposed limit. Some solid waste was being added to the hogged fuel, which can contribute to high dioxin/furan emissions. Given the scarcity of data, it is unknown whether most boilers will need to install control equipment to meet the proposed limit. According to the EPA, rapid cooling of the boilers exhaust before a particulate control device, to less than 400 degrees Fahrenheit, can effectively control dioxin/furan emissions, but this may not be easy for existing boilers to achieve.

What's Next?

Based on Golder Associates' review it was obvious that many biomass boilers have not been tested for all of the pollutants that will be the subject of emission limits in the Boiler MACT. A successful compliance strategy will be contingent on understanding a boiler's emissions and to what degree they would need to be reduced in order to meet the MACT standards. Facilities that have not already conducted emissions testing should consider doing it now, before the final rule is promulgated. Source test companies and pollution control vendors may be stretched beyond capacity once the rule is finalized. Being prepared early may be critical.

By court order, EPA was required to promulgate the final major source Boiler MACT rule by Dec. 16. EPA has received a one-month postponement until Jan. 16. According to a letter from EPA Administrator Lisa Jackson to Sen. Mary Landrieu, D-La., "the final standards will most assuredly differ from the proposed ones." This is in response to the significant number of comments EPA has received. When the rule is finally promulgated, existing biomass boilers will have three years in which to attain compliance with mandated requirements.

Authors: Chad Darby
Senior Consultant, Golder Associates Inc.
(503) 607-1820
Chad_Darby@golder.com
Danielle Lenzini
Senior Project Specialist, Golder Associates Inc.
(503) 607-1820
Danielle_Lenzini@golder.com