EPA
United States
Environmental Protection
Agency

Boiler MACT Update

34th Annual Meeting
Council of Industrial Boiler Owners (CIBO)
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Recent EPA Actions Affecting Boilers

- NESHAP for ICI Boilers and Process Heaters (Subpart DDDDD) ("Boiler MACT")
  - Boilers at large ("major") sources of HAP

- NESHAP for Area Sources: ICI Boilers (Subpart JJJJJJ) ("Boiler Area Source Rule")
    - Boilers at small ("area") sources of HAP

- NSPS and Emission Guidelines for Commercial and Industrial Solid Waste Incinerators (CISWI)
    - Boilers that burn solid waste

Timeline

- **Proposals published on June 4, 2010**
- **Finals published on March 21, 2011**
  - Effective Date: May 20, 2011
- **Notice announcing EPA's intent to reconsider was published on March 21, 2011**
  - Stay of Boiler MACT and CISWI issued on May 18, 2011
    - **Boiler Area Source Rule was NOT stayed**
  - Proposed reconsideration amendments on December 23, 2011
  - Court vacated stay on January 9, 2012
    - Boiler MACT and CISWI went into effect
- **EPA issued a NAA letter for Boiler MACT on February 7, 2012**
  - Covered Initial Notifications
- **EPA issued a NAA letter for Area Source Boilers on March 13, 2012**
  - Extended NAA period on July 18, 2012
    - Covered compliance date for tune-ups
    - Covered Initial Compliance Status Report
- **Final reconsideration amendments - ???**

Overview of Section 112 of CAA

- **Mandates that EPA develop MACT standards for all HAP for both major and area sources**

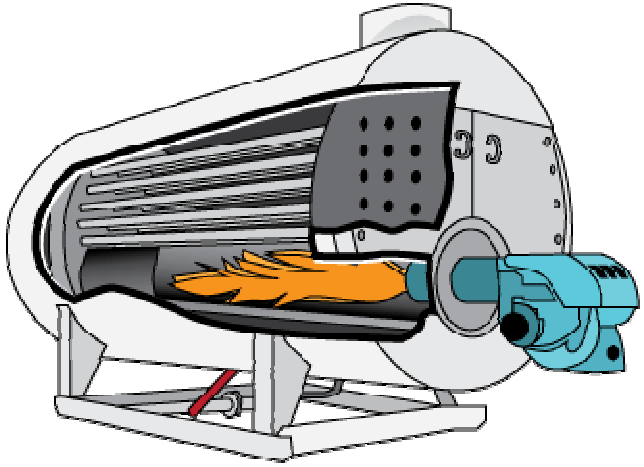
- **Definitions**
  - Major source: emits 10 tpy of a HAP or 25 tpy of total HAP
  - Area source: a facility that is not a major source

- **Sets a minimum (MACT Floor):**
  - For existing sources, at least as stringent as average emission limitation achieved by best performing 12% of sources in subcategory.
  - For new sources, at least as stringent as emission control level achieved by the best controlled similar source.

BOILER MACT
(Major Source Boiler Rule)

Boiler MACT Source Category

- **There are about 14,100 boilers and process heaters located at major sources in the United States. The following fuels are commonly combusted in boilers:**
  - **Natural gas and other gases (e.g. refinery gas, other process gas)**
    - **More than 80% are gas-fired**
  - **Liquid fuels (6%)**
  - **Coal (4.2%)**
  - **Biomass (3%)**
  - **Non-hazardous secondary materials (e.g., tire-derived fuel, wood residuals)**
  - **Combinations of fuels**



Definitions

- **Boiler means an enclosed device using controlled flame combustion in which water is heated to recover thermal energy in the form of steam or hot water. Waste heat boilers are excluded from this definition.**

- **Process heater means an enclosed device using controlled flame, and the unit's primary purpose is to transfer heat indirectly to a process material (liquid, gas, or solid) or to a heat transfer material for use in a process unit, instead of generating steam. Process heaters are devices in which the combustion gases do not come into direct contact with process materials.**

Are Any Boilers Not Subject to this Subpart?

- **Boilers and process heaters listed in § 63.7491 are not subject to Boiler MACT**
  - An electric utility steam generating unit (EGU)
  - Recovery boiler or furnace covered by subpart MM
  - Boiler or process heater that is used specifically for research and development. This does not include units that provide heat or steam to a process at a research and development facility
  - A hot water heater as defined in this subpart.
    - ***Hot water heater*** means a closed vessel with a capacity of no more than 120 U.S. gallons in which water is heated by combustion of gaseous or liquid fuel … water temperatures not exceeding 210^{o}F
  - Any boiler or process heater that is part of the affected source subject to another subpart of this part
  - Any boiler or process heater that is used as a control device, provided that at least 50 percent of the heat input to the boiler is provided by the gas stream that is regulated.
  - Temporary boilers as defined in this subpart
    - ***Temporary boiler*** means any gaseous or liquid fuel boiler that does not remain at a location for more than 12 consecutive months
  - Blast furnace gas fuel-fired boilers and process heaters
  - Any boiler specifically listed as an affected source in any standard(s) established under CAA section 129
  - A boiler required to have a permit under section 3005 of the Solid Waste Disposal Act or covered by subpart EEE of this part (e.g., hazardous waste boiler)

Boiler MACT – Subcategories

- **Fifteen subcategories based on design type:**
  - Solid fuel
    - Pulverized coal units
    - Coal-fired stokers
    - Coal-fired fluidized bed combustion units
    - Biomass-fired stokers
    - Biomass-fired fluidized bed combustion units
    - Biomass-fired Dutch Ovens/Suspension burners
    - Biomass-fired fuel cells
    - Biomass-fired hybrid suspension/grate units
  - Liquid fuel-fired units
    - Heavy oil-fired units
    - Light oil-fired units
  - Liquid fuel-fired units located in non-continental States and territories
  - Gas 1 (Natural gas/refinery gas)
  - Gas 2 (other gases)
  - Metal processing furnaces (natural gas-fired)
  - Limited Use

Boiler MACT: Compliance Requirements

- **Existing large boilers (>=10mm/BTU)**
  - **Clean gas *(natural gas, refinery gas, or process gas as clean as natural gas)***
    - **Annual tune-up**
    - **No numeric emission limits**
    - **1-time energy assessment**
  - **Solid fuel (coal or biomass), Oil, Process gas that is not "clean" gas**
    - **Numeric emission limits for 5 pollutants *mercury, dioxin, particulate matter (PM), hydrogen chloride (HCl), carbon monoxide (CO)***
    - **1-time energy assessment**
  - **Limited Use**
    - **Tune-up every other year**
    - **1-time energy assessment**
    - **No numeric emission limits**

- **Existing small boilers (<10mm/BTU)**
  - **Gas, solid fuel, oil, or limited use**
    - **Tune-up every other year**
    - **1-time energy assessment**
    - **No numeric emission limits**

Boiler MACT: Compliance Requirements (cont.)

- **New large boilers (>=10mm/BTU)**
  - **Clean gas *(natural gas, refinery gas, or process gas as clean as natural gas)***
    - **Annual tune-up**
    - **No numeric emission limits**
  - **Solid fuel (coal or biomass), Oil, Process gas that is not "clean" gas**
    - **Numeric emission limits for 5 pollutants *mercury, dioxin, particulate matter (PM), hydrogen chloride (HCl), carbon monoxide (CO)***
  - **Limited Use**
    - **Tune-up every other year**
    - **No numeric emission limits**

- **New small boilers (<10mm/BTU)**
  - **Gas, solid fuel, oil, or limited use**
    - **Tune-up every other year**
    - **No numeric emission limits**

Breakdown of Major Source Boilers

Major Source Boilers

About 14,100 covered units

12%
must
meet
emission
limits

88% (about 12,300) would need to follow work practice standards, such as annual tune ups, to minimize toxics.

12% (about 1,750) would need to meet numeric emission limits to minimize toxics.

Monitoring Requirements

- **Oxygen monitoring for units subject to a CO limit**
- **PM CEMS for units greater than 250 MMBtu/h and combusting coal, biomass, or residual oil**
- **Process parameters – depending on control device used to demonstrate compliance**
  - Fabric filter: opacity or bag leak detection system
  - ESP: opacity or power input
  - Wet scrubber: pressure drop and liquid flow rate
  - Sorbent/carbon injection: injection rate
  - Other (e.g., multiclone): opacity
  - Fuel analysis: fuel type or mixture
- **Oxygen and process parameters are operating limits that must be maintained**

Energy Conservation Requirements

Pollution prevention is one of EPA's highest priorities, and using energy efficient technologies minimizes the generation of emissions.

- **Tune-ups**
  - Applicable to small boilers and process heaters and natural gas and refinery gas-fired units.
- **Energy Assessment**
  - Provides valuable information on improving energy efficiency
  - Energy conservation measures identified are not required to be implemented
- **Alternate Output-Based Emission Limits**
  - Compliance alternative that allows existing affected sources to demonstrate compliance on an output-basis.
  - Provide incentives for implementing efficiency improvements (e.g., conversion to combined heat and power (CHP))

Petition Issues Raised

- **Subcategories**
  - Create subcategory based on fuel type
  - Expand Gas 1 to include other gases
  - New subcategories assigned without public comment
  - Remove solid fuel subcategory
- **Monitoring**
  - Include CO CEM limit option
  - Remove PM CEM requirement
- **Emission Limits**
  - Incorporate new data
- **MACT Floor Methodology**
  - Switching to 99.9% UPL for CO limits
- **Exemptions**
  - Exempt small units from rule
- **Compliance**
  - Allow for emission averaging across subcategories

Petition Issues Raised (cont.)

- **Tune-up Provisions**
  - Clarify timing if initial tune-up for new units
- **Energy Assessment**
  - Limit scope, clarify, expand
- **Output-Based Standards**
  - Allow averaging, concerns with the emission credits, clarify
  - Expand credit provisions to new sources
- **Compliance Date**
  - Extend compliance date for sources switching to CHP
- **Fuel Sampling**
  - Allow for automated samplers
  - Reduce burden of monthly fuel analysis option
- **HBEL**
  - Allow HBCA for HCl and manganese
- **Surrogates**
  - PM not a surrogate for non-mercury metals
  - Establish limits for organics or a surrogate besides CO
  - Do not use HCl as a surrogate for other acid gases

Proposed Changes to Boiler MACT

- **Proposed extending the compliance date to 3 years after promulgation of amendments**
- **Proposed separate subcategories for biomass stokers combusting "kiln-dried biomass" and "wet biomass"**
- **Proposed separating biomass suspension burners and biomass dutch ovens due to inherently different designs**
  - Also clarified that pile burners are considered to be part of the dutch oven subcategory
- **Proposed separate PM emission limits for each combustor design.**
  - The March 2011 final rule regulated all solid fuel units in a single subcategory
- **Proposed alternative "Total Selected Metals" (TSM) emission limits to the PM limits for the various solid fuel combustor designs**
- **Proposed new CO limits for each combustor design**
  - **Based on new data and additional QA of all data**
  - **Standards more stringent for some subcategories and less stringent for others**

Proposed Changes to Boiler MACT (cont.)

- **For units complying with CO emission limits through the use of a stack test, proposed to revise the monitoring requirements**
  - Rather than requiring oxygen monitoring in the stack, oxygen monitoring would be required in the firebox
- **Proposed "CO CEMS-based" alternative to stack test-based CO limits**
  - Developed emission limits based on the available CO CEMS data
- **Proposed work practices standards in lieu of numeric emission limits for dioxin**
  - All units that were subject to numeric emission limits under the final rule would be required to conduct an annual tune-up to ensure good combustion
- **Changes to PM CEMS Application**
  - Proposed to remove requirement for biomass units because technology is not demonstrated for those units
- **Startup and shutdown requirements**
  - Proposed more specific requirements that apply, in lieu of numeric emission limits, during periods of startup and shutdown

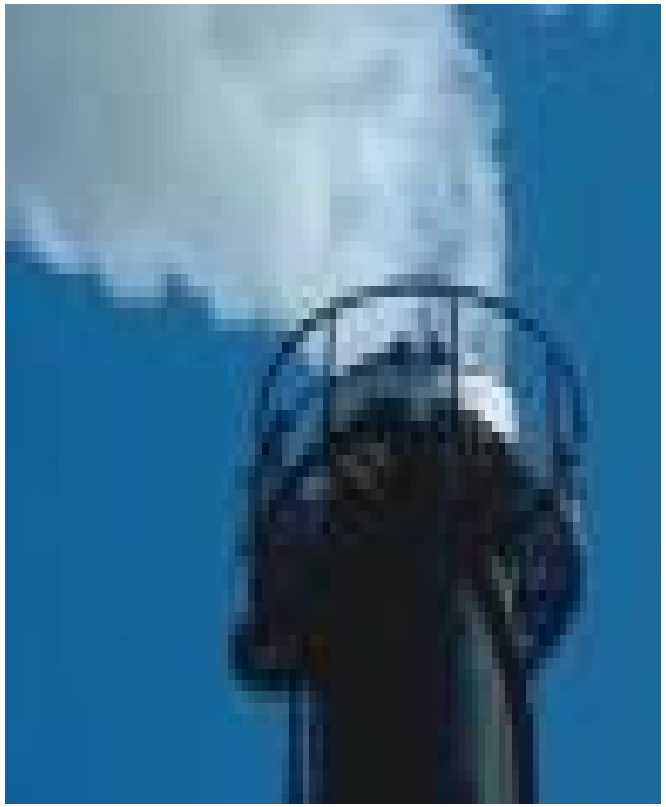
BOILER AREA SOURCE RULE

Boiler Area Source Rule

- **Three subcategories based on design type:**
  - Coal-fired units
    - 3,700 units
      - 2% of area source boilers
      - 89% less than 10 million Btu/hr
  - Biomass-fired units
    - 11,000 units
      - 6% of area source boilers
      - 93% less than 10 million Btu/hr
  - Liquid fuel-fired units
    - 168,000 units
      - 92% of area source boilers
      - 95% less than 10 million Btu/hr

Compliance Requirements - Existing Area Source Boilers

- **Existing large boilers (>=10mm/BTU)**
  - **Coal-fired**
    - Numeric emission limits for 2 pollutants *mercury, carbon monoxide (CO)*
    - 1-time energy assessment
  - **Biomass-fired and Oil-fired**
    - Tune-up every other year
    - 1-time energy assessment
    - No numeric emission limits
  - **Gas-fired**
    - No requirements, Not covered by rule
- **Existing small boilers (<10mm/BTU)**
  - **Coal -fired, Biomass-fired, Oil-fired**
    - Tune-up every other year
    - No numeric emission limits
  - **Gas-fired**
    - No requirements, Not covered by rule



Compliance Requirements - New Area Source Boilers

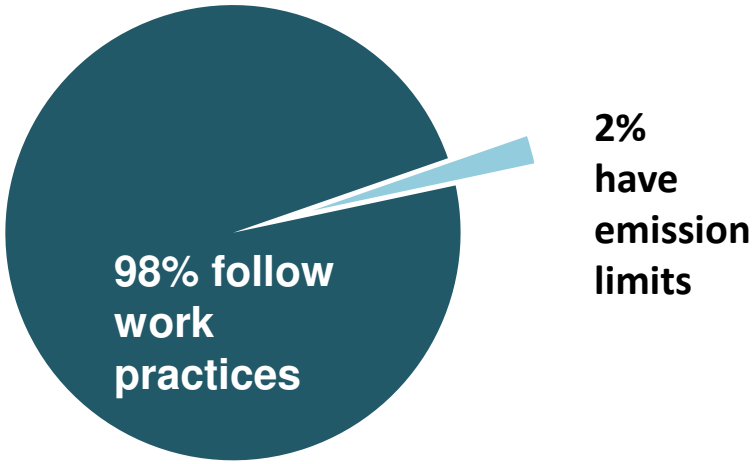
- **New large boilers (>=10mm/BTU)**
  - **Coal-fired**
    - Numeric emission limits for 3 pollutants
      mercury, carbon monoxide (CO), particulate matter (PM)
  - **Biomass-fired, Oil-fired**
    - Numeric emission limit for 1 pollutant
      particulate matter (PM)
    - Tune-up every other year
  - **Gas-fired**
    - No requirements, Not covered by rule
- **New small boilers (<10mm/BTU)**
  - **Coal-fired, Biomass-fired, Oil-fired**
    - Tune-up every other year
    - No numeric emission limits
  - **Gas-fired**
    - No requirements, Not covered by rule

Breakdown of Area Source Boilers

Area Source Boilers

About 187,000 covered units

No natural gas boilers are covered by this rule.



98% (about 183,300) would need to follow work practice standards, such as tune ups, to minimize toxics.

2% (about 3,700) would need to meet emission limits to minimize toxics

Petition Issues Raised

- **Initial Compliance Date**
  - Provide alternative schedule for seasonal boilers
- **Subcategories**
  - Add subcategory for seasonal boilers
- **Exemptions**
  - Add temporary boiler exemption
- **Monitoring**
  - Provide alternatives to O2 monitoring
- **Energy Assessments**
  - Remove, lessen, expand, or clarify
- **Surrogates**

Proposed Changes to Subpart JJJJJJ

- **New subcategory for seasonally operated boilers**
  - Required to complete a tune-up every five years, instead of on a biennial basis
- **Added temporary boilers to list of exempted boilers.**
- **Changing compliance date for existing boilers subject to tune-up requirement from March 21, 2012 to March 21, 2013 (1 year extension)**
- **Amended the definition of "period of natural gas curtailment or supply interruption" to include on-site gas system emergencies and equipment failures, and that it includes the curtailment of any gaseous fuel and is not limited to just natural gas.**
- **Amended the monitoring requirements to allow sources subject to a CO emission limit the option to install, operate and maintain a CO CEMS system.**
- **Changing the requirement for subsequent tune-ups only for oil-fired boilers equal to or less than 5 MMBtu/hr to a tune-up once every 5 years.**
- **Added residential boilers and electric boilers to the list of boilers not subject to subpart JJJJJJ.**
  - The definition of "residential boiler" includes boilers in dwellings located at institutional facilities (e.g., universities) or commercial/industrial facilities (e.g., farms)
- **Revising the definition for "Hot water heater" to clarify that hot water boilers with a heat input capacity less than 1.6 million Btu per hour are included in this definition.**
- **Amended the mercury emission limits for coal fired boilers.**
  - Mercury limit changed from 4.8 lb/TBtu to 22 lb/TBtu

What if Sources Need Help?

Posted at http://www.epa.gov/ttn/atw/boiler/boilerpg.html

- 4/21/11 - Tune-up Guidance and Example Recordkeeping Form- AREA SOURCES
- 4/21/11 - Initial Notification of Compliance Status for Boilers Subject to Tune-ups- AREA SOURCES
- 6/30/11 - Fast facts area source requirements
- 7/18/11 - Brochure for Area Source Boilers
- 7/20/11 - Table of Requirements- AREA SOURCES
- 7/26/11 - Initial Notification of Applicability for AREA Sources
- 7/26/11 - Small Entity Compliance Guide- AREA SOURCES
- 5/24/12 - Tune-up Guide for Owners & Operators- AREA SOURCES
- 5/24/12 - Tune-up Guide for Technicians- AREA SOURCES
- 7/31/12 - DOE Guidance on Emissions Credits

Information & Contacts

- **Information available on EPA's web site at:**
  - www.epa.gov/ttn/atw/boiler/boilerpg.html
  - www.epa.gov/boilercompliance/
  - www.epa.gov/airquality/combustion
- **Rule Contacts**
  - Boiler MACT- Jim Eddinger, (919) 541-5426 or eddinger.jim@epa.gov
  - Boiler Area Source Rule-Mary Johnson, (919) 541-5025 or johnson.mary@epa.gov
  - CISWI-Amy Hambrick, (919) 541-0964 or hambrick.amy@epa.gov
  - Non-hazardous Secondary Materials-George Faison, (703) 305-7652 or faison.george@epa.gov
- **Implementation/Applicability Contact (OECA or EPA Regional Office)**
  - Sara Ayres, (202) 564-5391 or ayres.sara@epa.gov