

Update on EPA's Rulemakings Affecting Biomass/Bioenergy

Bioenergy Emissions and Health Impacts Short Course

Harrisburg, PA

March 22, 2012



Rules & Rulemakings

- **Industrial Boiler and Process Heater NESHAP**
 - Subpart DDDDD of part 63
- **Area Source Rulemaking for Boilers**
 - Subpart JJJJJ of part 63
- **Residential Wood Heaters NSPS**
 - Subpart AAA of part 60
- **Biomass and Greenhouse Gas Permitting**



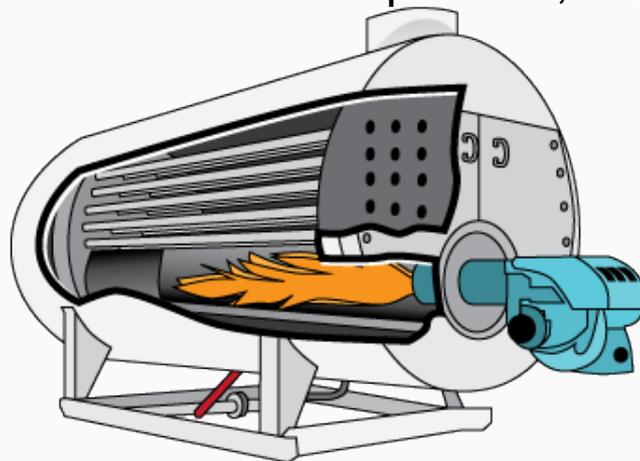
Industrial Boiler Overview

- March 2011: EPA issued final rules
 - Boiler major source rule (Boiler MACT)
 - Boiler area source rule
 - Commercial and industrial solid waste incineration (CISWI) rule
- Concurrently, EPA stated that it would initiate a reconsideration process affecting all 3 rules:
 - Address technical issues that arose from public comments
 - Give the public ample opportunity to comment on changes in the final rule that were not in the proposal
- May 16, 2011: EPA announced a stay of the Boiler MACT and CISWI rules' effective dates and solicited additional information and data, through July 15, 2011, on these rules
- December 2, 2011: EPA Administrator signed reconsideration proposal.
- December 23, 2011: Proposal published in Federal Register.
- February 21, 2012: Comment period closes.



Major Source Boilers Source Category

- There are about 14,100 boilers 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)
 - Liquid fuels (e.g. distillate oil, residual oil, process liquids)
 - Coal
 - Biomass (e.g., forest thinings, bagasse, sawdust)
 - Non-hazardous secondary materials (e.g., tire-derived fuel, wood residuals)
 - Combinations of fuels
- Boilers combust fuels to produce steam or hot water. The steam is used to produce electricity, drive an industrial process, or provide heat.





Overview of Section 112

- Mandates that EPA develop standards for hazardous air pollutants (HAP) for both major and area sources listed under section 112(c)
- Definitions
 - Major source is a facility that emits or has PTE 10 tons per year of single HAP or 25 tpy of total HAP
 - Area source is a facility that is not a major source
- Standards are based on the maximum achievable control technology (MACT)
- Sets minimum stringency criteria (MACT Floor)
- MACT may differ for new and existing sources



MACT Floor

- **For existing sources:**
 - “The average emission limitation achieved by the best performing 12 percent of existing sources..”
- **For new sources, the MACT floor is:**
 - “The emission control achieved in practice by the best controlled similar source...”



Health Benefits

- ❑ The Boiler MACT will reduce emissions of pollutants such as mercury, particulate matter, sulfur dioxide, metal hazardous air pollutants (HAP), and organic HAP.
- ❑ The proposed standards would have direct benefits to many communities where people live very close to these units.
- ❑ The rule will avoid up to 8,000 premature deaths, 4,900 heart attacks, and 51,000 cases of aggravated asthma.
- ❑ EPA estimates that Americans would receive \$18 to \$45 in health benefits for every dollar spent to meet the proposed standards.

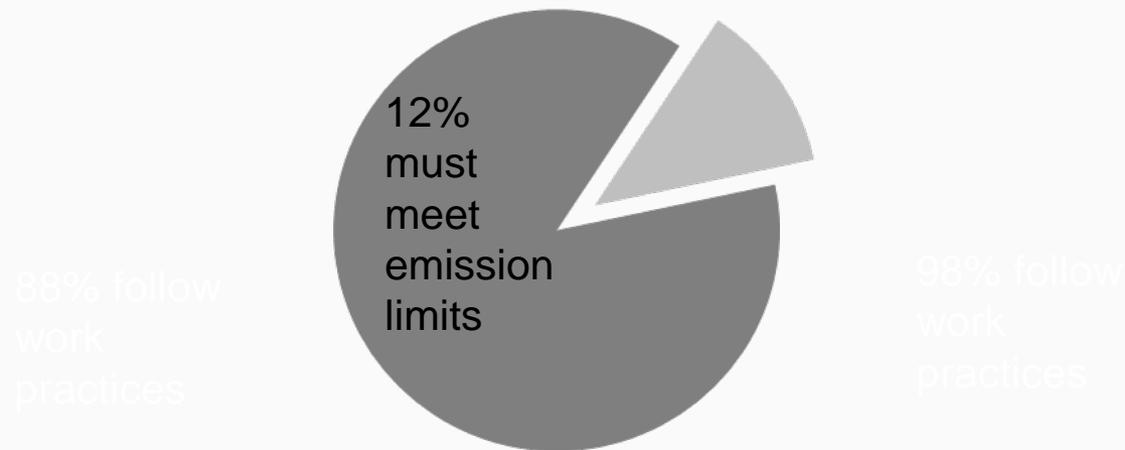




Breakdown of Major Source Boiler Standards

Major Source Boilers

About 14,100 covered units



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.



Proposed Changes to Major Source Rule that Impact Biomass Units

- Proposed separate subcategories for biomass stokers combusting “kiln-dried biomass” and “wet biomass.”
 - Kiln-dried biomass stokers combust biomass that is never more than 20% moisture and is typically less than 2 percent moisture (averages 0.5% - 1.5% moisture).
 - Most biomass materials are considered “wet” for purposes of this subcategory distinction
- 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
 - In response to petitions that pointed out that the design of the combustor and the fuel type influences particle size, and that certain types of controls are unproven on some combustor designs
 - Proposing limits for each combustor design results in standards that are less stringent than the final rule limits for most of the biomass subcategories



Proposed Changes to Major Source Rule that Impact Biomass Units (continued)

- Proposed an alternative to the PM limits for the various solid fuel combustor designs
 - Proposed “Total Selected Metals,” or TSM, alternative emission limits
 - Would provide increased flexibility, particularly for units with inherently low metals emissions
- Proposed new CO limits for each combustor design.
 - Based on new data and additional QA of all data
 - Standards would be more stringent for some subcategories and less stringent for others
- 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; provides a better indication of good combustion
- Proposed “CO CEMS-based” alternative to stack test-based CO limits
 - Developed emission limits based on the available CO CEMS data
 - Facilities could choose to meet the CO CEMS-based limits rather than the stack test-based limits



Proposed Changes to Major Source Rule that Impact Biomass Units (continued)

- Proposed work practices standards in lieu of numeric emission limits for dioxin for all subcategories
 - Based on EPA's assessment of the level of dioxin that can be accurately measured
 - 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



Summary of Boiler MACT (Subpart DDDDD) Requirements for Biomass Units

- Units ≥ 10 MMBtu/hr designed to burn biomass
 - Numeric emission limits for Hg, HCl, PM (or TSM), and CO
 - Annual tune-up
 - One-time energy assessment (existing units only)
 - Oxygen monitoring and control (or CO CEMS)
 - Control device monitoring as specified
- Units < 10 MMBtu/hr designed to burn biomass
 - Biennial tune-up (units ≤ 5 MMBtu/hr must complete a tune-up every 5 years)
 - One-time energy assessment (existing units only)



A Word About Section 129 Incinerator Rules

- Section 129 of the Clean Air Act covers units that combust solid waste.
- Under section 129, EPA must set emission limits for 9 pollutants (particulate matter (PM), hydrogen chloride (HCl), mercury (Hg), lead (Pb), cadmium (Cd), dioxin, carbon monoxide (CO), nitrogen oxides (NO_x), and sulfur dioxide (SO₂)) based on “MACT.”
- If a boiler burns solid waste, it will be subject to standards under section 129, unless it qualifies for limited statutory exemptions.
 - Municipal waste combustors (MWCs) are already subject to the Large MWC or Small MWC standards
 - Commercial or industrial boilers that combust solid waste will be subject to CISWI
 - Institutional boilers that combust solid waste will be subject to the “other solid waste incinerators” or OSWI standards



Proposed Revisions to the “Identification of Non-Hazardous Secondary Materials that are Solid Waste” Final Rule

- Clarified that certain materials are already included within the scope of biomass, that is considered a traditional fuel;
- Proposed a process for an owner or operator of a facility to petition EPA for a determination, based on a balancing of the legitimacy criteria and such other relevant factors, that a particular non-hazardous secondary material is not considered a solid waste when used as a fuel;
- Identified a number of secondary materials, including resinated wood products, as non-wastes when used as a fuel; and
- Revised the legitimacy criteria to expressly allow the comparison of groups of contaminants and clarified that contaminant comparisons may be made for any traditional fuel for which a combustion unit is designed to burn.



Boiler Area Source Background

- The area source boilers have generally not been subjected to regulation/permitting, so little is known about them.
- Natural gas is the principal fuel type used, but many do combustion wood.
- Control techniques for area sources are similar to those used on major sources, such as, scrubbers, baghouses, ESP, and good combustion practices (GCP) which control carbon monoxide and organic HAP.



Area Source Provisions

- Section 112(d)(5) allows for area source standards based on GACT (Generally Available Control Technology)
 - Major source standards are based on MACT
 - Under GACT may consider costs and economic impacts
- Focus of standards is on the 30 Urban HAP
- Section 112(h) allows EPA to promulgate a work practice standard, if it is not feasible to enforce an emission standard
 - Not feasible means the application of measurement methodology is not practicable due to technological and economic limitations
- EPA may exempt area sources from Title V if we determine compliance would be impracticable, infeasible, or unnecessarily burdensome
- Section 112(c)(6) requires listed categories be subject to MACT
 - Both industrial boilers and institutional/commercial boilers are on list of 112(c)(6) source categories
 - Mercury
 - POM



Boiler Area Source Rule Background

- An area source facility emits or has potential to emit less than 10 tons per year (tpy) of any single HAP and less than 25 tpy of any combination of HAP.
- Expected to apply to about 187,000 boilers located primarily at commercial facilities (e.g., hotels, office buildings, restaurants) and institutional facilities (e.g., schools, hospitals, prisons)
- Rule does NOT apply to boilers that are gas-fired
- About 11,000 (or 6%) area source boilers are estimated to be biomass-fired.
- Standards vary slightly for existing units vs. new units
- Biomass boiler defined as a boiler that burns at least 15% biomass on an annual heat input basis



Proposed Changes to Area Source Rule that Impact Biomass Units

- Proposed to change initial compliance date for tune-up from March 21, 2012 to March 21, 2013
- Proposed change to definition of biomass boiler to a boiler that burns any biomass and is not in the coal subcategory
 - A coal boiler burns any coal and less than 15% biomass on an annual heat input basis
- Proposed to create a subcategory for seasonal boilers
 - Proposed to require seasonal boilers to conduct tune-ups every five years instead of every other year
 - Proposed definition of a seasonal boiler is one that is shutdown for a period of at least 210 consecutive days
- Proposed exemption for residential boilers located at industrial, commercial, or institutional facilities (e.g., farms)



Summary of Area Source Rule (Subpart JJJJJJ) Requirements for Biomass Boilers

- **Existing large biomass boilers (≥ 10 mm/BTU)**
 - Tune-up every other year
 - 1-time energy assessment
 - No numeric emission limits
- **Existing small biomass boilers (< 10 mm/BTU)**
 - Tune-up every other year
 - No numeric emission limits
- **New large biomass boilers (≥ 10 mm/BTU)**
 - Numeric emission limit for 1 pollutant
 - *particulate matter (PM)*
 - *testing every 3 years*
 - *monitoring opacity or control device parameter*
 - Tune-up every other year
- **New small biomass boilers (< 10 mm/BTU)**
 - Tune-up every other year
 - No numeric emission limits



What's Next?

- Public comment period closed on February 21, 2012
 - Comments were being accepted only on the specific issues outlined in the preamble
 - The EPA will summarize comments, develop responses and amend the rule as appropriate, and plans to issue the final rule in the Spring of 2012



NSPS Review – Subpart AAA Residential Wood Heaters

- Applicability
 - Wood heaters
 - An enclosed wood burning appliance capable of and intended for space heating or domestic water heating
 - Firebox volume less than 20 cubic feet
 - Minimum burn rate 11 pound per hour
 - Manufactured after July 1, 1988, or
 - Sold at retail after July 1, 1990
- Devices exempt
 - Masonry fireplaces
 - Boilers
 - Solid fuel burning appliance used for heating spaces, other than the space where appliance is located, by distribution through pipes of a gas or fluid heated in appliance
 - Furnaces
 - Cookstoves
- Standards
 - PM limit:
 - If equipped with catalytic combustor: 4.1 grams per hour
 - If equipped without a catalytic combustor: 7.5 grams per hour
- Compliance
 - May be determined by manufacturer on model line



NSPS Review – Subpart AAA Residential Wood Heaters

- Draft* proposal package being reviewed internally
- Draft should be ready to start normal 90-day review by other federal agencies by March 2012
- Anticipated schedule:
 - Summer 2012 – Proposed rule to be signed by EPA Administrator and published in *Federal Register* and on-line
 - 90-day public comment period – Opportunity for people to submit information for EPA to consider as we develop the final rule. Information on how to comment will be on the website when we propose the rule.
 - If requested, a public hearing will be held during the comment period
 - Summer 2013 – Final rule to be signed by EPA Administrator and published in *Federal Register* and on-line

* Proposal is still draft and subject to change pending EPA Administrator's review and signature on rulemaking proposal in *Federal Register* for public comment



Background

- EPA authority for regulating new sources is under Section 111 of the Clean Air Act – emission standards that reflect Best Systems of Emission Reduction (taking costs into account) that the Administrator has determined to be adequately demonstrated
- The current rule (issued in 1988) covering emissions from wood-burning residential heaters requires manufacturers to design new residential wood heaters to meet particulate emission (PM) limits, have representative heaters (per model line) tested by an EPA-accredited lab, and attach EPA label after EPA approval
- Current rule also requires operation according to owner's manual
- Not for existing wood-burning devices



Previous Feedback from Public

- Many want us to propose the strongest standards as soon as possible, especially for hydronic heaters.
- Some want us to ban hydronic heaters.
- Some want us to propose wood stove standards tighter than Washington State's.
- Some want us to not set standards on residential heaters at all.
- Some want us to make the test methods stronger.
- Some want us to propose carbon monoxide emission limits, visible emission limits, and requirements for seasoned wood, energy audits, proper sizing, heat storage, and certified installers.



Wood Smoke Fine Particle Emissions Are Significant

Emissions

Fine Particle

- 2008 National Emission Inventory: 2,449,000 tons
- 2008 Residential Wood Combustion: 318,000 tons (13%)



Wood Smoke Can Cause Significant Health Effects

- Residential wood smoke can increase particle pollution to levels that cause significant health concerns (e.g., asthma attacks, heart attacks, premature death).
- Several areas with wood smoke problems either exceed EPA's health-based standards or are on the cusp of exceeding those standards.
- For example, residential wood smoke contributes 25 percent of the wintertime particle pollution problem in Keene, New Hampshire.
- Wood smoke makes up more than 50 percent of the wintertime particle pollution problem in Sacramento, California, and Tacoma, Washington.



Many Requests for Standards for Hydronic Heaters, aka Outdoor Wood Boilers

- Petition from 6 northeastern states plus Michigan and Northeast States for Coordinated Air Use Management
- Request from the Hearth, Patio, and Barbecue Association Outdoor Wood-fired Hydronic Heater Caucus
- Numerous calls and emails from neighbors and others concerned about health effects. Note: The proposal will not control emissions from existing wood-burning devices. The EPA authority for this rule is for control of new sources. Numerous states and local jurisdictions do regulate existing devices, however.



Our Initial Efforts to Reduce Emissions from Hydronic Heaters:

- EPA developed a voluntary program to encourage manufacturers to redesign their models to reduce emissions-- faster than an EPA regulation
 - Phase 1 rolled out January 2007
 - 22 Phase 1 partners, 12 Phase 1 qualified models (>70% reduction in emissions)
- We provided technical and financial support for the Northeast States for Coordinated Air Use Management to develop a “model rule” ...
 - Most of the northeast states and some other states used the model rule as the starting point for adopting state rules to control emissions from certain wood-fired devices
- We developed Phase 2 of the voluntary program and a BurnWise education program to further reduce emissions
 - Phase 2 started in October 2008
 - 24 Phase 2 partners, 27 Phase 2 qualified models (90% reduction in emissions)



Overview of Key Draft Proposals

- Strengthen PM emission limits to reflect today's demonstrated Best Systems of Emission Reductions , considering costs
- Add efficiency standards to also reduce carbon monoxide emissions
- Include pellet stoves and single-burn rate appliances explicitly
- Include indoor and outdoor wood “boilers” (hydronic heaters) and wood-fired furnaces
- Revise test methods as appropriate



Compliance & Enforcement Aspects

- Improve compliance assurance by streamlining the compliance audit process and conducting more inspections of labs and manufacturers and random audits
- Add electronic reporting by manufacturers and labs
- Add 3rd Party ISO-accredited laboratories to supplement assurance of the certification process
- Add compliance monitoring and enforcement activities by states and EPA Regional Offices (in addition to EPA Headquarters)
- Require emission tests on each type of fuel that manufacturer specifies/warrants for use
- Require that certification tests for pellet-burning devices use pellet fuels that are graded and licensed



Expect to regulate...

Expect to tighten emissions on new woodstoves to levels required in State of Washington



Expect to regulate new wood pellet stoves to emission levels required in State of Washington



Will still encourage changeout of wood stoves built before 1990



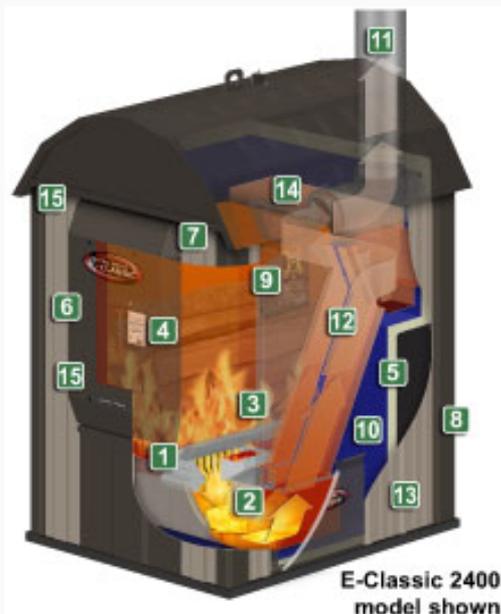


Expect to regulate...

New Wood-fired Forced-air Furnaces



New Wood-fired Hydronic Heaters



New Masonry Heaters



New Single-burn-rate Stoves





Expect to require labeling for...

New Cook Stoves



New Coal-fired Stoves



New Camp Stoves





Expect to not regulate...

Masonry (Site-built) and Manufactured Fireplaces

Chimineas



Pizza Ovens





Projected Impacts of Draft Proposal

- We expect the rule would reduce particle pollution by ~5,400 tons in 2018; many reductions would be in areas with particle pollution problems in NE and NW.
- Expect health benefits would be in the billions of dollars and lives would be saved.
- Expect that future costs would be less than \$10 million per year.

Potential PM_{2.5} Emissions from New Units Sold (tons/year in 5th year, 2018)

Appliance	Baseline (Current NSPS)	Draft NSPS Revisions
EPA Certified Wood Stoves	700	700
Single-burn-rate Stoves	1200	300
Pellet Stoves	250	250
Indoor Forced-air Furnaces	3900	970
Hydronic Heaters (90% outdoor, 10% indoor)	1700	80

Biomass and GHG Permitting



- Biomass Deferral
 - In Jan 2011, EPA announced an expedited rulemaking to defer completely the application of pre-construction permitting requirements to biomass-fired CO₂ *and other biogenic* CO₂ emissions for a **period of three years**.
 - Final Rule, Fact Sheet, and Response to Comments at: <http://www.epa.gov/nsr/actions.html>;
 - Deferral applies to CO₂ emissions only.
- EPA recently sent the Biomass study to SAB for review
- Spring 2012: SAB Biomass releases scientific study
- Late 2012: If necessary, EPA will propose rule addressing biomass study



INFORMATION AND CONTACT

- Information on the MACT, NSPS, and area source rulemakings for industrial, commercial, and institutional boilers is available on EPA's web site at:
 - www.epa.gov/ttn/atw/combust/list.html
- Contact: William Schrock
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schrock.bill@epa.gov