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Industrial Boiler MACT Updates

A&WMA Iowa Chapter - February 7, 2012

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December 2011 Proposed Updates and January 2012 Court Ruling Implications

Coverage of the Rules

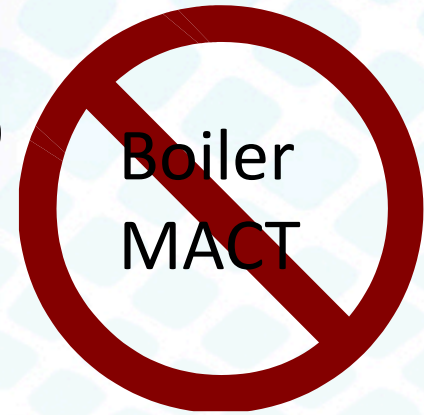
- Major sources
- Area sources (a.k.a. minor sources)
- Industrial, Commercial, and Institutional
 - ❖ All industries plus stores, laundries, apartments, restaurants, hotels, hospitals, clinics, nursing homes, schools, churches, courthouses, prisons, etc.
 - ❖ Excludes coal and oil-fired utility boilers (covered under separate NESHAP finalized in December 2011)
 - ◆ Combustion unit > 25 MWe (boiler, not turbine)
 - ◆ Serving a generator that produces electricity for sale
 - ◆ Cogen unit supplying > 1/3 of output capacity and > 25 MWe to grid

Applicability

- Industrial, commercial, and institutional boilers at both major and area sources
 - ◆ *Boiler* means an enclosed device using controlled flame combustion and having the primary purpose of recovering thermal energy in the form of steam or hot water
 - Excludes units combusting solid waste, unless the device is exempt from the definition of solid waste incineration unit
 - Excludes waste heat boilers
- Process heaters at major sources only
 - ◆ *Process heater* means a unit in which the combustion gases do not directly come into contact with process material or gases in the combustion chamber
- Applies to all new, existing, and reconstructed units

Exclusions/Exemptions

- Units combusting solid waste, unless exempted from CISWI rule
- Units subject to another MACT or used as a control device for another Part 60, 61 or 63 source (if 50% or more of heat input is from controlled gas stream)
- R&D units
- The following units are exempt from Major Source MACT:
 - ❖ Temporary units
 - ❖ Hot water heaters (definition based on fuel, size, and pressure and temperature limitations) (*excludes units < 1.6 MMBtu/hr, proposed*)
- *Exemption for temporary units at area sources (proposed)*
- Process heaters not covered under area source standards
- *Residential units at institutional or other facilities (proposed)*



History of The Boiler MACT Standard

- March 21, 2011 - final rules published
 - ❖ Boilers and process heaters at major sources (Subpart 5D)
 - ❖ Boilers at area sources (Subpart 6J)
 - ❖ CISWI Rule (40 CFR 60 Subpart CCCC)
 - ❖ Reconsideration of certain aspects of all three rules
- May 18, 2011 - EPA delays Major Source Boiler MACT and CISWI effective dates
- December 23, 2011 - EPA proposes updates to all three rules published in March 2011
 - ❖ Open for comments for 60 days after publication in Federal Register (due February 21, 2012)
 - ❖ Expect to be finalized in Spring 2012
- January 9, 2012 - D.C. U.S. District Court vacates EPA's May 16, 2011 stay of the major source effective date

December 2011 Proposed Changes for Major Source Rule

- New subcategories for light and heavy industrial liquids, separating some existing biomass subcategories
- New PM limits for each of the solid fuel subcategories
- Alternative total selected metals option for PM for solid fuel and Gas 2 subcategories
- Revised CO, HCl and Hg limits; updated output-based limits to reflect more accurate boiler efficiencies
 - ❖ Many decreased , especially for solid fuels
- Replaced dioxin/furan limits with work practice standards
- Removed PM CEMS requirements for biomass boilers
- Option for CO compliance via testing or CEMS
- No changes for natural gas boilers

December 2011 Proposed Changes for Area Source Rule

- Additional subcategories
- Initial tune-up required after two years instead of one year (seeking comments on changing to three years)
- Tune-ups every five years instead of every two years for seasonal boilers and/or oil-fired boilers ≤ 5 MMBtu/hr
- No initial tune-up for new boilers
- Change to CO and Hg emission limits for coal boilers
- Natural gas units still excluded from regulation
- Proposed exemption for temporary units

Major Source MACT



Major source is a facility with PTE:

- ≥ 10 tpy of any one hazardous air pollutant

AND/OR

- ≥ 25 tpy of total hazardous air pollutants

Major Source MACT Subcategories

1. Pulverized coal
 2. Coal stoker
 3. Coal fluidized bed
 4. *Biomass stoker - wet fuel*
 5. *Biomass stoker - kiln-dried fuel*
 6. Biomass fluidized bed
 7. *Biomass suspension*
 8. *Biomass Dutch/pile oven*
 9. Biomass fuel cell
 10. Biomass hybrid suspension/grate burners
 11. Units designed to burn solid fuels
 12. *Units designed to burn heavy liquid fuels (residual oil, other non-light liquids)*
 13. *Units designed to burn light liquid fuels (distillate, biodiesel, vegetable oil)*
 14. Units designed to burn liquid fuel in non-continental states or territories
 15. Units designed to burn natural gas, refinery gas, or other Gas 1 fuels
 16. Units designed to burn other gases ("Gas 2")
 17. Metal process heaters/furnaces
 18. Limited-use boilers and process heaters
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- Units designed to burn coal/solid fossil fuel
- Units designed to burn biomass/bio-based solid fuel

Subcategories shown in red, italicized text are December 2011 proposals

Emissions Standards

- Limits for HCl, CO, Hg, PM, Dioxins/Furans
 - ❖ Proposed option to meet TSM limits instead of PM
 - ◆ TSM = arsenic, beryllium, cadmium, chromium, lead, manganese, nickel, selenium
 - ❖ Proposed to go to work practices only for Dioxins/Furans
- Limits are fuel-based (Hg and HCl) or combustion based (PM/TSM, CO, D/F) for each subcategory
- Option for input based (lb/MMBtu or ppm) or output based (lb/MMBtu, lb/MWh) limits
- Emissions averaging allowed for PM, HCl, and Hg from existing sources in same subcategory (with 10% penalty and approved plan)
- Work practices for startup and shutdown



Startups, Shutdowns, and Malfunctions (1 of 2)

- Applies to both major sources and area sources
- Startup and shutdown (SU/SD)
 - ❖ Minimize startup and shutdown events, *defined as 0-25% load (proposed)*
 - ❖ *No longer requirement to follow manufacturer's instructions*
 - ❖ *Monitor O₂ concentrations (proposed)*
 - ❖ *Train boiler operators on SU/SD procedures (proposed)*
 - ❖ *Recordkeeping of events and O₂ data (proposed)*
- Malfunctions - numerical standards apply
 - ❖ EPA established "affirmative defense" within the rule
- SSM Plans are not required



Startups, Shutdowns, and Malfunctions (2 of 2)

- Malfunction means a “sudden, infrequent, and not reasonably preventable failure of air pollution control and monitoring equipment, process equipment, or a process to operate in a normal or usual manner”
 - ❖ Does not include abnormal operations due to poor maintenance or careless operation
- Affirmative Defense definition added to the rule
 - ❖ Used in enforcement proceedings to avoid penalties
 - ❖ Very specific requirements

Work Practice Standards (1 of 3)

- Tune-ups
 - ❖ Annual tune-ups for ALL boilers ≥ 10 MMBtu/hr
 - ❖ *Every 5 years for units ≤ 5 MMBtu/hr that are natural gas, refinery gas, other gas 1 fuels or light liquids (proposed)*
 - ❖ Biennial tune-ups for ALL other units < 10 MMBtu/hr and limited use units
- Implementation and documentation of a tune-up program
 - ❖ EPA says 80 percent of owners/operators have already implemented a tune-up program
 - ❖ Inspect, clean, and replace burners as necessary
 - ❖ Inspect and adjust flame pattern
 - ❖ Inspect and calibrate air-to-fuel ratio control system
 - ❖ Minimize, measure, and report CO concentration
- Do not need to submit documentation unless requested

Work Practice Standards (2 of 3)

- One-time energy assessment of boiler systems for all existing units
- Previous assessments conducted after January 1, 2008 may be acceptable
- Scope and duration dependent on total annual heat input
- Assessments must be conducted by “qualified energy assessor”
 - ❖ Demonstrated capabilities to evaluate typical energy savings opportunities for steam generation and major energy using systems
 - ❖ Lists of experience areas as well as capabilities and knowledge areas within definition of *qualified energy assessor* in the rule

Work Practice Standards (3 of 3)

➤ Energy assessment includes:

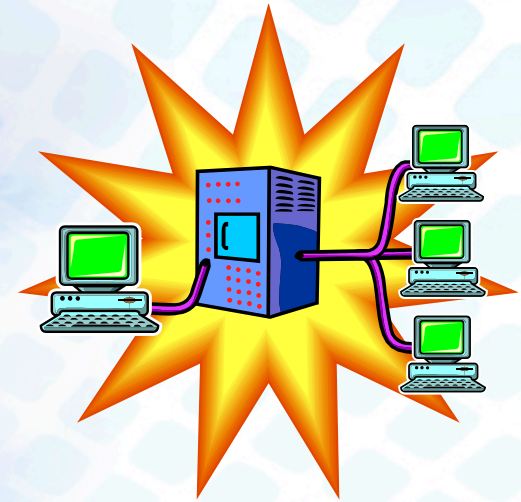
- ❖ Visual inspection of boiler or process heater system
- ❖ Evaluation of operating characteristics of facility, specs of energy using systems, O&M procedures, unusual operating constraints
- ❖ Inventory of major *on-site* energy consuming systems *using energy generated by the subject boiler(s) (proposed)*
- ❖ Review of architectural and engineering plans, facility O&M procedures, and logs and fuel usage
- ❖ Review of facility energy management practices and recommendations for improvement
- ❖ List of major energy conservation measures
- ❖ List of energy savings potential
- ❖ Report detailing ways to improve efficiency, cost of specific improvements, benefits and time frame for recouping investments

Testing Requirements

- Methods prescribed by rule
- Maximum mercury, TSM, and HCl input rates established based on analyses of fuel used during testing
- Test runs of 1 hr (CO) or time to collect a specified amount of that pollutant (PM, HCl, Hg)
- All tests to be conducted annually
 - ❖ Can drop to triennially after 2 consecutive tests show emissions to be less than 75% of standard
- All test results to be submitted via EPA's Electronic Reporting Tool (ERT)
- Site-specific testing/monitoring plans required
- Option to use monthly fuel analysis in lieu of testing for Hg, TSM, and/or HCl (no control device credit)

Monitoring Requirements (1 of 3)

- Site-specific monitoring plan
- Operating ranges established during performance testing (max or min of average hourly value measured during stack tests)
- Monitor operating load/steam generation (max of 110% of tested rate)
- *30-day rolling average unless otherwise noted (proposed)*
- For units with wet scrubbers *and no PM CPMS*
 - ❖ Pressure drop and liquid flow rate (minimum based on lowest 1-hr avg from stack test)
 - ❖ pH if complying with HCl limit (12-hr block, minimum based on lowest 1-hr avg from stack test))



Monitoring Requirements (2 of 3)

- For units with dry scrubbers or carbon injection
 - ❖ Sorbent injection rate (minimum based on lowest 1-hr avg from stack test)
- For units with fabric filters *and no PM CPMS*
 - ❖ Bag Leak Detection Systems - no alarms more than 5% of operating time in any 6-month period
- For units with ESPs *and no PM CPMS*
 - ❖ Voltage and current for secondary power (minimum based on lowest 1-hr avg from stack test)
- Boilers subject to emission limits
 - ❖ Monthly fuel records indicating use by each boiler or process heater, including type and amount of fuel
- Hours of operation for limited-use units



Monitoring Requirements (3 of 3)

- For coal and residual oil (Nos. 4-6) units < 250 MMBtu/hr and *all* biomass (*proposed*)
 - ❖ COMS (limit is 10%, daily block average) unless equipped with a wet scrubber or wet ESP; OR
 - ❖ Bag leak detection system if equipped with fabric filter
- For coal and residual oil (Nos. 4-6) units \geq 250 MMBtu/hr, use PM *CPMS (proposed - no longer CEMS)*
- All units with CO limits
 - ❖ *Monitoring and use of an O₂ trim system to optimize air to fuel ratio and combustion efficiency or a CO CEMS (proposed)*
 - ❖ *If using a CO CEMS, 10-day rolling average (proposed)*
- *Option to use Hg CEMS and/or SO₂ CEMS (must correlate with of HCl) (proposed)*

Major Source Compliance Deadlines

➤ Existing Boilers

- ❖ Currently March 21, 2014 due to January 2012 vacatur of effective date stay
 - ◆ EPA will issue a “No Action Assurance” letter shortly
- ❖ Three years after publication of final rule updates (proposed)
- ❖ Ability to request a one year extension

➤ New Boilers

- ❖ Currently May 20, 2011 or upon startup due to January 2012 vacatur of effective date stay
 - ◆ EPA will issue a “No Action Assurance” letter shortly
- ❖ 60 days after publication of the final rule or upon startup, whichever is later (proposed)

- For CISWI units that cease burning solid waste and become subject to Boiler MACT, upon fuel switch

Area Source MACT / GACT



Area source is a facility with PTE:

- < 10 tpy of any one hazardous air pollutant
- < 25 tpy of total hazardous air pollutants

Subcategories

- Categories are industrial, commercial, and institutional boilers
- Subcategories based on type of fuel combusted:
 1. Coal (any solid fossil fuel and no more than 15% biomass)
 2. Biomass (*any biomass* on annual heat input basis *and not in coal category*)
 3. Oil (any liquid fuel and not in coal or biomass categories)
- Subcategories based on heat input rating:
 - ❖ ≥ 30 MMBtu/hr
 - ❖ ≥ 10 MMBtu/hr, and < 30 MMBtu
 - ❖ < 10 MMBtu/hr (also ≤ 5 MMBtu/hr for oil boilers)
- *Seasonal vs. non-seasonal for oil and biomass boilers (proposed)*
 - ❖ *Seasonal means a unit shutdown for at least 7 consecutive months (210 consecutive days) due to market conditions*
- Gas-fired units are exempt
 - ❖ Includes units using a liquid fuel as backup if usage is restricted to periods of gas curtailment/emergency with up to 48 hr/yr on oil for testing

Emission Limits

- CO, PM, Hg limits for all coal boilers ≥ 10 MMBtu/hr
 - ❖ Increased Hg and CO limits (proposed)
- PM Limits for all new biomass and oil boilers ≥ 10 MMBtu/hr
- Work practices for all boilers < 10 MMBtu/hr and all existing biomass and oil boilers
- Work practices for startup and shutdown

Monitoring Requirements (1 of 2)

- *30-day rolling averaging period for all monitoring systems, except as otherwise noted (proposed)*
- For units subject to PM and Hg limits
 - ❖ COMS (limit is 10%, daily average) OR
 - ❖ Pressure drop and liquid flow rate if equipped with a wet scrubber
 - ❖ BLDS if equipped with fabric filter (alarms sounding <5% during 6-month period)
 - ❖ Minimum secondary amperage and secondary voltage *or total secondary power (proposed)* if equipped with ESP
 - ❖ Sorbent injection rate if using sorbent injection system

Monitoring Requirements (2 of 2)

- No CO CEMS required, *but it is an option that can be used in lieu of testing (proposed)*
 - ❖ Replaced with triennial stack testing for CO for coal-fired units ≥ 10 MMBtu/hr
 - ❖ O₂ monitoring (30-day average)
 - ❖ *10-day rolling average if using CO CEMS (proposed)*
- For units choosing to comply with Hg limits using fuel analyses instead of triennial testing
 - ❖ Monthly fuel analyses
- Monitor operating load/steam generation *or fuel feed rate (proposed)* (max of 110% of tested rate)

Work Practice Standards

➤ Tune Ups

- ❖ Existing or new coal-fired boilers (with heat input capacity >10 MMBtu/hr); existing or new biomass or oil-fired boilers
- ❖ Conduct a tune-up of the boiler biennially *or every five years for seasonal boilers or oil-fired boilers ≤ 5 MMBtu/hr (proposed)*
- ❖ Similar requirements as for major source boilers

➤ Energy Assessment

- ❖ Existing coal, biomass or oil (heat input capacity ≥ 10 MMBtu/hr)
- ❖ One-time EA, completed on or after January 1, 2008
- ❖ Similar requirements as for major source boilers

Area Source Compliance Deadlines

➤ Existing Boilers

- ❖ Subject to tune-up only: *March 21, 2013 (proposed)*
 - ◆ *EPA requesting comments on whether this should be March 21, 2014)*
 - ◆ EPA intends to stay the current March 21, 2012 deadline for at least 90 days to allow for time to finalize the extension
- ❖ Subject to emission limits or an energy assessment: March 21, 2014

➤ New Boilers

- ❖ 180 days after March 21, 2011 or upon startup, whichever is later *if subject to limits, otherwise upon startup (proposed)*
- For CISWI units that cease burning solid waste and become subject to Boiler MACT, upon fuel switch

Commenting on the December 2011 Proposed Rules

- Submit your comments, identified by Docket ID No. EPA-HQ-OAR-2002-0058, by one of the following methods:
 - ❖ www.regulations.gov
 - ❖ Email: a-and-r-Docket@epa.gov
 - ❖ Fax: (202) 566-9744
- EPA is soliciting comments on the proposed changes or reconsiderations only
- Consider submitting comments in favor of the proposed changes
- Expect EPA to grant a 30 day extension to the comment period (90 days total) - March 22, 2012 (otherwise the comment deadline is February 21, 2012)

Potential Comment Areas 1 of 3

- Applicability/Exemptions
- Surrogates and Selected Regulated Pollutants
 - ❖ TSM limit option
 - ❖ Work practice for Dioxins/Furans
- Output-Based Standards
 - ❖ Analysis to account for average subcategory factors and feed water temperature
 - ❖ Assumption that energy of electricity generated is 10 MMBtu/MWh
- New Subcategories
 - ❖ Change to PM as a fuel-based limit
 - ❖ Light vs. heavy oils

Potential Comment Areas 2 of 3

➤ Monitoring

- ❖ O₂ trim system requirement
- ❖ PM CPMS in lieu of CEMS
- ❖ Option for CEMS for Hg or SO₂ (correlate to HCl)
- ❖ 30-day averages for most parameters

➤ CO CEMS

- ❖ Revised limits, but EPA needs more data
- ❖ Alternative limits option (so that best performers would meet limit at all times)

➤ Revised limits

➤ Affirmative Defense for Malfunctions

Potential Comment Areas 3 of 3

- Tune-up Work Practice
 - ❖ New intervals proposed for certain sizes
 - ❖ Clarification of due dates
- Energy Assessment Work Practice
 - ❖ Clarification to only applies to systems on-site and associated with affected boiler
 - ❖ Duration requirements
- Should EPA require switching to cleaner fuel(s)?
- Compliance date extensions

For additional information,
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