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Summary of Final Boiler MACT et al Regulations

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Presentation Overview

- **Acronyms**
- **Recent Developments and et al**
- **Compliance Schedule**
- **Rule Applicability**
- **Boiler MACT**
- **Area Source Boilers**
- **Solid Waste Definition Rules**
- **CISWI**
- **Other Issues**

Acronyms

- **NESHAPS** – National Emission Standards for Hazardous Air Pollutants
- **MACT** - Maximum Achievable Control Technology
 - Basis for establishing emission limits for major stationary sources
- **GACT** – Generally Available Control Technology
 - Basis for establishing emission limits for area sources
- **HAPs** – Hazardous Air Pollutants
 - List of 188 pollutants established by EPA

Select Definitions

- **Electric Utility Steam Generating Unit**
 - Fossil-fuel fired combustion unit > 25MW that serves a generator that produces electricity for sale
- **Gaseous Fuel**
 - Includes natural gas, process gas, landfill gas, coal derived gas, refinery gas, and biogas
- **Liquid Fuel**
 - Distillate oil, residual oil, on-spec used oil, and biodiesel
- **Emission Credits**
 - Emission reductions generated by reduced fuel usage. Emission credits generated may be used to comply with the emissions limits.

Recent Developments

- **Pre-publication of four related final rules signed on 2/21/2011**
 - Boiler and Process Heater MACT Standards
 - Boiler GACT/MACT Standards (area sources)
 - Solid Waste Definition
 - Commercial and Industrial Solid Waste Incinerators (CISWI)
- **Rules were originally proposed on 6/4/2010**

Compliance Schedule

- **Pre-publication rules are final but are not effective (clock doesn't start ticking) until they are published in the Federal Register**
- **Usually 2 – 3 weeks**
- **Compliance for MACT and GACT rules is three years after the effective date**
- **CISWI compliance required within three years after an approved SIP plan but no later than 2/21/2016**

Rule Applicability

Boiler MACT

- **Any size boiler burning coal, biomass, liquid, or gas as a fuel and located at a source (facility) that is “major” for HAPs**
- **Major HAP Facility**
 - A facility with the potential to emit 10 tpy of one or 25 tpy of two or more hazardous air pollutants

Rule Applicability

oilier MACT/GACT

-

ny size boiler burning coal, biomass, or liquid, as a fuel and located at a source (facility) that is not “major” for HAPs.

- These facilities are usually referred to as area sources.
- Gas fired boilers and process heaters are exempt from the area source proposed regulations

- **Area Source (Facility)**

- any stationary source of HAPs that is not a major



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Major Source Boiler NESHAP

Boiler MACT

- **Subcategories**
- **Target Pollutants**
- **Numerical Emission Limits**
- **Work Practice Standards**
- **Energy Assessment**
- **Compliance Demonstrations**

Subcategories

- **Three main subcategories**
 - Solid fuel units (coal, biomass)
 - Liquid fuel units (oil)
 - Gas 2 units (gases other than natural gas and refinery gases)
- **Further subcategorized on size, design**
 - Large -- ≥ 10 MMBtu/hr heat input
 - Small -- < 10 MMBtu/hr heat input
 - Limited-use ($< 10\%$ capacity factor)
- **Total of 15 subcategories**

Subcategories

- Coal boilers (pulverized, stokers, fluidized bed units)
- Biomass boilers (stokers, fluidized bed units, suspension burners/dutch ovens, fuel cells, suspension/grate)
- Liquid fuel boilers (non-continental)
- Natural gas/refinery gas boilers
- Other gas boilers
- Metal process furnaces.
- Limited-use units.

What Units are Not Included

- **Any boiler and process heater listed as an affected source under another MACT**
- **Examples:**
 - Fossil fuel-fired electric utility boilers
 - Boilers burning municipal waste, hazardous waste, non-hazardous solid waste, medical waste.
 - Black liquor recovery boilers
- **Synthetic minors – become an area source**

Target Pollutants

- **Metals (filterable PM as surrogate)**
- **Mercury (Hg)**
- **Products of Incomplete combustion (CO surrogate)**
- **Dioxin/furan (D/F)**
- **Acid gases (HCl surrogate)**

Numerical Emission Limits

- **What Boilers Have Numerical Emission Limits?**
 - Major Sources (MACT)
 - All boilers – all fuels
 - **Exception** – no numerical emission limits for natural gas or refinery gas boilers, small boilers (< 10MMBtu/hr, limited use boilers (< 876 hours/year)
 - Area Sources (GACT)
 - Coal – CO and Hg numerical emission limit (≥ 10 MMBtu/hr)
 - No numerical emission limits for biomass, oil or small coal (< 10 MMBtu/hr)

Boiler MACT Emission Limits Existing Sources

| Fuel | Unit | PM (lb/MMBtu) | HCl (lb/MMBtu) | Hg (lb/MMBtu) | CO (ppmv - 3% O ₂) | D/F TEQ (ng/dscm) |
|---------|----------------------------------|------------------|-------------------|------------------|-----------------------------------|----------------------|
| Coal | Pulverized | 0.039 | 0.035 | 0.0000046 | 160 | 0.004 |
| | Stoker | 0.039 | 0.035 | 0.0000046 | 270 | 0.003 |
| | Fluidized bed | 0.039 | 0.035 | 0.0000046 | 82 | 0.002 |
| Biomass | Stoker | 0.039 | 0.035 | 0.0000046 | 490 | 0.005 |
| | Fluidized bed | 0.039 | 0.035 | 0.0000046 | 430 | 0.02 |
| | Suspension burner/ Dutch oven | 0.039 | 0.035 | 0.0000046 | 470 | 0.2 |
| | Fuel cell | 0.039 | 0.035 | 0.0000046 | 690 | 4 |
| | Hybrid Suspension/Grate | 0.039 | 0.035 | 0.0000046 | 3500 | 0.2 |
| Liquid | | 0.0075 | 0.00033 | 0.0000035 | 10 | 4 |
| Gas | Natural gas | None | None | None | None | None |
| | Refinery gas | None | None | None | None | None |
| | Other gas (Gas 2) | 0.043 | 0.0017 | 0.000013 | 9 | 0.08 |

Comparison with Original Rule

Existing Coal Fired Boilers

| Compound | Original Existing MACT Limit | Revised Final Rule | Units |
|--|------------------------------|--------------------|------------------------|
| PM | 0.07 | 0.039 | lb/MMBtu |
| HCl | 0.09 | 0.035 | lb/MMBtu |
| Hg | 9.00E-06 | 4.6.E-06 | lb/MMBtu |
| Dioxin TEQ basis (no limit under original MACT) | Pulverized | 0.004 | TEQ ng/dscm @ 7% O2 |
| | Stoker | 0.003 | TEQ ng/dscm @ 7% O2 |
| | Fluidized Bed | 0.002 | TEQ ng/dscm @ 7% O2 |
| Carbon Monoxide (no limit under original MACT for existing) | Stoker/grate/other | 160 | ppm @ 3% O2 as Propane |
| | Pulverized Coal | 270 | ppm @ 3% O2 as Propane |
| | Fluidized Bed | 82 | ppm @ 3% O2 as Propane |

Comparison with Original Rule

Existing Biomass Boilers

| Compound | Original Existing MACT Limit | Proposed Rule | Units |
|---|------------------------------|---------------|------------------------|
| PM | 0.07 | 0.039 | lb/MMBtu |
| HCl | 0.09 | 0.035 | lb/MMBtu |
| Hg | 9.00E-06 | 4.6E-06 | lb/MMBtu |
| D/F TEQ basis (no limit under original MACT) | Stoker | 0.005 | TEQ ng/dscm @ 7% O2 |
| | Fluidized Bed | 0.02 | TEQ ng/dscm @ 7% O2 |
| | Dutch/Suspension | 0.2 | TEQ ng/dscm @ 7% O2 |
| | Fuel Cell | 4 | TEQ ng/dscm @ 7% O2 |
| | Hybrid Suspension/Grate | 0.2 | |
| Carbon Monoxide (no limit under original MACT for existing) | Stoker | 490 | ppm @ 3% O2 as Propane |
| | Fluidized Bed | 430 | ppm @ 3% O2 as Propane |
| | Dutch/Suspension | 470 | ppm @ 3% O2 as Propane |
| | Fuel Cell | 690 | ppm @ 3% O2 as Propane |
| | Hybrid Suspension/Grate | 3500 | ppm @ 3% O2 as Propane |

Comparison with Original Rule

Existing Liquid Fuel Boilers

| Compound | Original Existing MACT Limit | Revised Final Rule | Units |
|--------------------|------------------------------|--------------------|------------------------|
| PM | NA | 0.0075 | lb/MMBtu |
| HCl | NA | 3.3E-04 | lb/MMBtu |
| Hg | NA | 3.5E-06 | lb/MMBtu |
| Carbon Monoxide | NA | 10 | ppm @ 3% O2 as Propane |
| Dioxin (TEQ basis) | NA | 4 | TEQ ng/dscm @ 7% O2 |

Existing Units burning gases other than natural gas or refinery gas

| Compound | Original Existing MACT Limit | Revised Final Rule | Units |
|--------------------|------------------------------|--------------------|------------------------|
| PM | NA | 0.043 | lb/MMBtu |
| HCl | NA | 0.0017 | lb/MMBtu |
| Hg | NA | 13E-06 | lb/MMBtu |
| Carbon Monoxide | NA | 9 | ppm @ 3% O2 as Propane |
| Dioxin (TEQ basis) | NA | 0.08 | TEQ ng/dscm @ 7% O2 |

Work Practice Standards

Boiler “tune-up”

- Major Sources (MACT)
 - Annually for all large (≥ 10 MMBtu/hr) natural gas/refinery gas boilers
 - Once every 2 years (biennial) for all small boilers (≤ 10 MMBtu/hr) and limited use boilers – all fuels
- Area Sources (GACT)
 - Once every 2 years (biennial) for all small boilers (<10 MMBtu/hr) – all fuels

Boiler “Tune-up”

- **Burner inspection and adjustment**
- **Optimize flame pattern and adjustment**
- **Inspect and adjust fuel/air control system**
- **Optimize CO. Measure CO before and after tune-up**
- **Maintain records. Provide reports as necessary**

Work Practice Standards

Facility-wide energy assessment

- Major Sources (MACT)
 - One time only – all boilers – all fuels
- Area Sources (GACT)
 - One time only for all boilers ≥ 10 MMBtu/hr – all fuels

Energy Assessment

- **USEPA/DOE Energy Star Guidelines**
 - Recommended – not required
- **Requires “qualified” personnel**
 - DOE Qualified Specialist
 - AEE Certified Energy Manager
- **Content**
 - Energy efficiency
 - Costs
 - Cost savings
 - Emission reduction
 - Implementation Schedule
- **Written report**



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Compliance Demonstrations

Initial Compliance Demonstrations

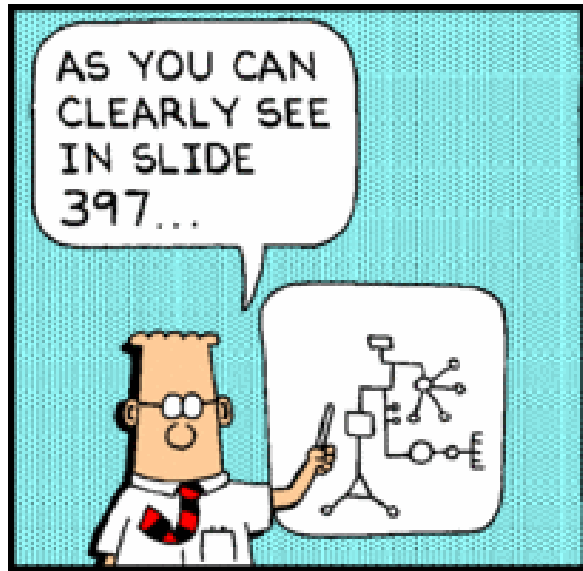
- **Initial and annual stack test for all pollutants except D/F**
- **Provisions to extend stack tests to every three years**
- **D/F initial stack test only**

Continuous Compliance

- **Boilers \geq 250 MMBtu/hr require a PM CEMS**
 - all fuels
- **All other boilers $>$ 10 MMBtu/hr require an O₂ CEMS. No CO CEMS is required.**
 - Limit will be based on lowest one-hour average during initial performance test.
 - Limit will be 12-hour block average

Continuous Compliance

- **Fuels analysis can be used to demonstrate compliance with Hg and HCl standards**
 - Analysis required for each fuel type – not each fuel supplier
- **Operational parameters for boilers and air pollution control (APC) system are required to demonstrate continuous compliance**
 - Limits set during initial performance test



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Other Issues

- **HAP by HAP**
- **HBCA**
- **SSM**
- **Achievability**
- **Emission Averaging**
- **PM CEMS**
- **Reconsideration**

Area Source Boilers

- **Applicable to existing and new coal-, oil-, and biomass-fired boilers**
- **Does not include natural gas or refinery gas fired boilers**
- **Existing coal-fired boilers with a heat capacity ≥ 10 MMBtu/hr are required to meet CO and Hg numerical emission standards**

Area Source Boilers

- **Existing biomass- and oil-fired boilers and coal-fired boilers with a heat capacity < 10 MMBtu/hr are required to follow work practice standards and perform a biennial boiler tune-up; there are no numerical emission limits.**
- **All existing facilities with coal-, oil-, and biomass-fired boilers with a heat capacity ≥ 10 MMBtu/hr are required to conduct an energy assessment.**

Solid Waste Definition Rule

- **Non-hazardous materials (NHSM) that are not considered solid waste and burned in combustion units are subject to the Boiler MACT or Area Source Boiler rules**
- **NHSM that are considered solid waste and burned in combustion units are subject to the CISWI rules**
- **For NHSM to be used as fuel and not be considered a solid waste, it must meet legitimacy criteria.**

Solid Waste Definition Rule

- **The following may not be considered solid wastes:**
 - Scrap tires
 - Resinated wood residuals
 - Coal refuse
- **Definition of traditional fuels includes**
 - Clean biomass, fossil fuels and their derivatives, and “on-spec” used oil.

Solid Waste Definition Rule

- **Discarded materials may be considered NHSM and not solid wastes if they have been sufficiently processed to produce a new fuel or ingredient product.**
- **A voluntary petition process is available for facilities that want to obtain a non-waste determination.**

CISWI

- **This final rule impacts any industrial or commercial facility using a solid waste incinerator**
- **There are four subcategories subject to the rule, including incinerators, energy recovery units, waste burning kilns, and small remote incinerators. Burn-off ovens have been eliminated as a subcategory.**

CISWI

- **There are emission limits for nine pollutants: Hg, Pb, Cd, HCl, PM, CO, D/F, NOx, and SO2.**
- **The compliance date is three years after an approved State Implementation Plan (SIP), but no later than February 21, 2016.**

Summary

- **Major Source Boiler MACT applies to all boilers at major stationary sources of HAPs**
- **Going forward – Starting Points**
 1. Are you a major or area source of HAPs?
 2. What fuel(s) are you burning in your boilers?
 3. Do you need to comply with numerical emission limits or work practice standards?
 4. Are you in compliance with numerical standards?
- **Gap Analysis**

QUESTIONS ?????

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