Proposed Area and Major Source
Boiler NESHAP Overview

October 27, 2010

David Dunn
Environmental Resources Management
www.erm.com
Workshop Objectives:

Help Facilities Better Understand:

- Boiler NESHAP Requirements
- Applicability Status and Compliance Options
- Need to Develop a Long-Term Strategic Plan
- Comments Received on the Proposed Rules
The Proposed Revised/New Rules

- 40 CFR 63 Subpart DDDDD (Major Source Boiler & Process Heater MACT)
- 40 CFR 63 Subpart JJJJJJJJ (Area Source Boiler GACT)
- 40 CFR 241 – Concurrent Solid Waste Incinerator Definition Rule (CISWI)

Potential Questions:
- Are you Major for HAP’s?
- Do You Burn a Solid Waste or Non-Traditional Fuel?
- Could a Single Site be Subject to Both NESHAP and CISWI?
- What Are Your Questions?
What is NESHAP?

- Emissions standards for hazardous air pollutants (HAPs) in specific source categories
- HAPs known or suspected of causing cancer or other serious health effects; 187 identified
- Standards apply to Major and some Area Sources
- Technology based standards - Maximum Achievable Control Technology (MACT) Floor:
  - Existing sources: Top 12 percent if 30 or more sources/facilities
  - New Sources: Best available control for that source
  - Area sources: EPA may use generally available control
Boiler NESHAP Overview

• Proposed NESHAP Emission Limits are Potentially Very Restrictive for Existing Sources
  • New Units (i.e. after June 4, 2010) Have Additional and/or Even Lower Emission Limits

• Major Source Boiler MACT (Subpart DDDDD)
  • Emission Limits are >65% LOWER Than Prior MACT
  • Additional Pollutants are Regulated
  • Fewer Compliance Options are Allowed
  • CO and/or PM CEMS Required Based on Source Capacity
  • Strongly Discourage the Use of Coal and Biomass!?
  • Very Extensive Add-on Controls Likely for Solid Fuel Boilers
Overview (continued)

• Area Source Boiler GACT
  • Outcome of Integrated Urban Air Toxic Strategy (Residual Risk)
  • CO and Mercury (Hg) Emission Limits for Existing Coal Boilers
  • CO Emission Limits for Biomass and Fuel Oil Boilers (even if Gas Backup)
  • CO CEMS for Boilers >100x10^6 BTU/hr Capacity
  • Work Practice Tune-Up Requirement for Non-Gaseous Fired Boilers <10x10^6 BTU/hr Capacity
  • “Beyond the Floor” Facility-Wide Energy Efficiency Assessment by Qualified Personnel
NESHAP Schedule!

- Proposed Rules Published on June 4, 2010
- Public Comment Period Ended August 3, 2010
- Court Ordered Final Rules Due by January 16, 2011
- Initial Notification Due to State and USEPA 120 Days After Promulgation
- Initial Compliance Date
  - Existing Sources – 3 Years After Rule Promulgation
  - New Sources – At Rule Promulgation or Source Startup, whichever is Later
- Notice of Compliance Status Report Deadline Dependent on Compliance Option, But No Later Then 240 Days After Initial Compliance Date
- Area Source Annual Compliance Report Due by March 1 Each Year
- What Permit Amendments Are Needed and When?
HAP Emission Status

- **Major Source**
  - >10 TPY of a Single HAP or >25 TPY All HAP’s Aggregated Together
  - Based on Site-Wide Worst Case Potential Emissions
  - Includes All Federally Enforceable Permit Limitations
  - No SIC Code Split as for PSD
- **Area Source is Not a Major Source of HAP’s (i.e. <10/25 TPY)**
Site HAP Status Example

- HAP Status is Dependent on Many Factors

<table>
<thead>
<tr>
<th>Coal Chlorine Content (ppm)</th>
<th>100</th>
<th>300</th>
<th>600</th>
<th>900</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCl TPY</td>
<td>7.5</td>
<td>22.5</td>
<td>45</td>
<td>67</td>
</tr>
</tbody>
</table>

! Coal Hg Emissions are Also Extremely Variable!
Is HAP Area Source Status Feasible?

- What Fuel or Boiler Changes Needed?
- What Process Changes or Reformulation Needed?
- Are New or Retrofit Emission Controls Likely Required?
- How Long Will Boiler, Fuel, and/or Control Changes Take to Achieve?
- Can Fuel Vendors Provide a Content (e.g. Cl) Warranty?
- What Additional Data Needed to Support Decision Making?
- When Will/Should the Site Air Permit be Amended?
- What Are the Best Compliance Options to Maximize Operating Flexibility?
- What Are the Total Costs?

*A Long Term Strategic Compliance Plan Needs to be Developed!*
Many NESHAP Subcategories

- **Fuel:** Coal, Biomass, Liquid, and Gaseous Fuel Units
  - 11 Subcategories Under Boiler MACT
  - 3 Subcategories Under Boiler GACT
- **Size:** Large > 10 MMBTU/hr & Small ≤ 10 MMBTU/hr
- **Use:** Limited <10% Annual Capacity Factor
- **Existing Versus New or Reconstructed Sources**
- **Emission Limits, Compliance Options and Requirements Differ Between Subcategories and for New vs. Existing Sources!**
Pollutants Covered by Boiler NESHAP’S

• **Major Source:**
  - PM as surrogate for non-mercury metallic HAP
  - HCl as surrogate for non-metallic inorganic HAP
  - CO as surrogate for non-dioxin organic HAP
  - Dioxin/Furans
  - Mercury (Hg)

• **Area Source**
  - PM as surrogate for non-mercury metallic HAP
  - CO as surrogate for organic HAP
  - Mercury
## Emission Limit Example

### Prior Versus Reissued Boiler MACT (Existing Coal Stoker Units)

<table>
<thead>
<tr>
<th>Pollutant (lbs/MM BTU)</th>
<th>PM</th>
<th>HCl</th>
<th>Hg</th>
<th>CO (ppm)</th>
<th>Dioxin (ng/dscm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior</td>
<td>0.06</td>
<td>0.09</td>
<td>0.000009</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Proposed</td>
<td>0.02</td>
<td>0.02</td>
<td>0.000003</td>
<td>50 (Corrected to 3% Oxygen)</td>
<td>0.003</td>
</tr>
</tbody>
</table>

? Do Most Current Coal Boilers Comply With Proposed Limits?

? What Has US EPA Stated the “MACT Floor” Base Controls Are?
Emission Limit Example (continued)

<table>
<thead>
<tr>
<th>Pollutant (lbs/MM BTU)</th>
<th>PM</th>
<th>HCl</th>
<th>Hg</th>
<th>CO (ppm)</th>
<th>Dioxin (ng/dscm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area Source</td>
<td>NA</td>
<td>NA</td>
<td>0.000003</td>
<td>310 (Daily Average Corrected to 7% Oxygen)</td>
<td>NA</td>
</tr>
<tr>
<td>Major Source</td>
<td>0.02</td>
<td>0.02</td>
<td>0.000003</td>
<td>50 (Corrected to 3% Oxygen)</td>
<td>0.003</td>
</tr>
</tbody>
</table>

Significant Regulatory Advantage to Area Source HAP Status!!!
## Area Source Boiler GACT Emission Limits

<table>
<thead>
<tr>
<th>Source</th>
<th>Subcategory</th>
<th>Particulate Matter (PM)</th>
<th>Mercury</th>
<th>Carbon Monoxide (CO) (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>New Boiler</strong></td>
<td>Coal</td>
<td>0.03</td>
<td>3.0E-06</td>
<td>310 (@ 7% oxygen)</td>
</tr>
<tr>
<td></td>
<td>Biomass</td>
<td>0.03</td>
<td></td>
<td>100 (@ 7% oxygen)</td>
</tr>
<tr>
<td></td>
<td>Oil</td>
<td>0.03</td>
<td></td>
<td>1 (@ 3% oxygen)</td>
</tr>
<tr>
<td><strong>Existing Boiler</strong></td>
<td>Coal</td>
<td></td>
<td>3.0E-06</td>
<td>310 (@ 7% oxygen)</td>
</tr>
<tr>
<td></td>
<td>Biomass</td>
<td></td>
<td></td>
<td>160 (@ 7% oxygen)</td>
</tr>
<tr>
<td></td>
<td>Oil</td>
<td></td>
<td></td>
<td>2 (@ 3% oxygen)</td>
</tr>
</tbody>
</table>

CO CEMS Required for Boilers >100 Btu/hr Capacity
Natural Gas Boilers are Exempt Sources (Fuel Oil Used Only During Curtailment)
Are Process Heaters Regulated Under Area Source Boiler GACT?
Compliance Options

- Options are Emission Limits, Emission Controls, Alternative Criteria, or a Combination

- Specific Options:
  - Emission Limits (With or Without Controls) via Stack Testing
  - Fuel Analysis for HCl and/or Hg
  - Emission Averaging (Not Allowed for Area Sources)
  - Health Based Alternative No Longer Allowed
Fuel Analysis Example

- Applicable to Both Area and Major Sources
- Major and Area HAP sources have same 0.000003 lb Hg/MMBtu limit
- Fuel Sampling with 90th percentile result compared to allowable emission limit (not just average)
- Potential scenario where average sample results are well under limit, but 90th percentile result is over!

<table>
<thead>
<tr>
<th>Hg (lb/MMBtu)</th>
<th>% of Rule Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual sample Hg results range</td>
<td>.000001 to 0.000005</td>
</tr>
<tr>
<td>Average Hg emission rate from all samples</td>
<td>0.0000014</td>
</tr>
<tr>
<td>90th Percentile</td>
<td>0.0000031</td>
</tr>
<tr>
<td>Rule Limit</td>
<td>0.000003</td>
</tr>
</tbody>
</table>

- Bottom line is, fuel sample variability can greatly affect whether the HCl and/or Hg limit can be met on an ongoing basis by Fuel Analysis Option!
Control System Design Issues

- Will Any Additional Emission Controls be Needed?
- For What Pollutants – PM, HCl, Hg, CO, etc.?
  - Many Evaluation, Testing, Operating Limit, Permitting, SSM Plan, etc. Actions Will be Required if Emission Controls are to be Used
- What Level of Emission Control is Needed/Appropriate?
  - Consider Tradeoffs of Compliance Assurance, Fuel and Supply Variability, Coal Replacement Costs, Capital and Operating Costs, Co-Generation Needs, etc.
  - Retrofit of Existing Controls Versus New Controls
- Detailed Near-Term Site Evaluation Needed to Compare Options and Select a Potential Strategy – Many Site-Specific Issues to Consider
- Schedule Needs to Account for Control Equipment Design, Fabrication, Construction, Testing, etc., if Applicable
Another Requirement!!

Energy Assessment

- Identify major energy consuming systems
- Review available architectural and engineering plans, facility operation and maintenance procedures and logs, as well as fuel usage
- Identify a list of major energy conservation measures
- Determine the energy savings potential of the energy conservation measures identified
- Prepare a comprehensive report detailing the ways to improve efficiency, the cost of specific improvements, benefits, and the time frame for recouping those investments
- Develop a facility energy management program according to the ENERGY STAR guideline for energy management (Major Sources Only)
- Assessment conducted by qualified personnel

Should Implementation of Findings be Required?
The Solution is a Process Issue.

Each part of the process may be part of the answer!
## Boiler NESHAP Planning Timeline

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/2010</td>
<td>Data Gathering and Initial Planning (as needed)</td>
</tr>
<tr>
<td>1/2011</td>
<td>Boiler Stack Testing Completed (as needed)</td>
</tr>
<tr>
<td>4/2011</td>
<td>Engineering Evaluation and Fuel Supplier Review</td>
</tr>
<tr>
<td>8/2011</td>
<td>Compliance Option Selection</td>
</tr>
<tr>
<td>12/2011</td>
<td>Technology Selection and Design (as needed)</td>
</tr>
<tr>
<td>6/2012</td>
<td>Permitting and Regulatory Negotiations</td>
</tr>
<tr>
<td>1/2013</td>
<td>Fabrication, Construction, Check Out and Training</td>
</tr>
<tr>
<td>6/2013</td>
<td>Testing, Monitoring, Reporting, etc</td>
</tr>
<tr>
<td>12/2013</td>
<td>Ongoing NESHAP Compliance Activities</td>
</tr>
</tbody>
</table>
What’s Next for Facilities?

• Assess if you have boilers/process heaters subject to the rules
• Identify applicable emission limits and if you can comply with these limits at all times (even during start-up and shutdown)
• Evaluate if need additional emissions controls, perform economic analyses and plan for future budgets
• Determine if need additional monitoring systems
• Consider operational, process and/or fuel changes to reduce the regulatory burden
• If applicable, plan for a facility-wide energy assessment
Public Comments to US EPA

- Over 3,000 Commentors on Both NESHAPs
- Limits are Unachievable
- Will Significantly Adversely Impact Use of Biomass Renewable Energy
- MACT Floor Should be Determined on a Source Basis, not Pollutants by Pollutant
- Variability Not Adequately Addressed
- Averaging Periods Need to be Longer Due to SSM Events
- CO Surrogate and Compliance Not Appropriate/Feasible at Very Low CO Levels
- Very Low CO Levels Will Increase NOx Emissions
- Energy Assessment Not Appropriate, Excessive, Not Enforceable, etc.
Questions?
References

• Proposed Major and Area Source Boiler Rules
  • [http://www.epa.gov/ttn/atw/boiler/boilerpg.html](http://www.epa.gov/ttn/atw/boiler/boilerpg.html)

• Proposed Solid Waste Definition Rule
  • [http://www.epa.gov/epawaste/nonhaz/define/index.htm](http://www.epa.gov/epawaste/nonhaz/define/index.htm)
ERM Contact Information

David Dunn david.dunn@erm.com
ERM
300 Chastain Center Boulevard
Suite 375
Kennesaw, GA 30144
770.590.8383
www.erm.com