

Experience to Date with Boiler MACT

Potential Control Alternatives

Bob Fraser, QEP

McIlvane Hot Topic Hour
Industrial Boiler MACT – Impact and Control Options

About AECOM

- Fortune 500 - #352
- Acquired ENSR 2005; “AECOM Environment”
- Nationwide Network of Many Offices Working Together
- National Leader in Utility Sector Consulting
- Hundreds of MACT/RACT/BACT Emission Control Evaluations
- Case-by-Case (112(g)) MACT Determinations for New Utility Units

MACT

Clean Air Act Section 112(d)

“The MACT standards for existing sources must be at least as stringent as the average emission limitation achieved by the best performing 12 percent of existing sources...”

“For new sources, MACT standards must be at least as stringent as the control level achieved in practice by the best controlled similar source.”

Why Can't We Just Do Whatever It Is They Do?

Because the Proposed Limits Have Yet to be Demonstrated Continuously and Simultaneously by Any One Similar Source!

Boiler MACT

- **Maximum** (*or Hypothetical?*)

- Hard Numerical Limits for Several Fuel/Firing Subcategories
- ICR Data – Stack Testing from Selected Units
- Top 6% (and Best Single Unit); Pollutant-by-Pollutant
- For Any One Pollutant, 94% Cannot Replicate Stack Test
- Presumption that if Best 12% Had One Low Stack Test, for One Pollutant, Then Every Other Boiler Could Too
- Limits Apply Simultaneously and Continuously!

Boiler MACT

- **Achievable** (*or Possible?*)
 - Proposed Limits Have Never Been Demonstrated by any Known Boiler
 - Simultaneously
 - Continuously
 - Worst Case Operating Conditions
 - Startup, Low Loads, Transition
 - Combination Fuels Must Meet the More Stringent Category
 - Compliance in 3 yrs (4 with Extension)
 - EPA Projects no New Solid Fuel Boilers (and Many Existing Will Shut Down)

Boiler MACT

- **Control** (*or Coincidence?*)
 - How are the Tested Boilers Controlling Dioxin?
 - CO (Surrogate for Organic HAPs) vs. NO_x
 - How can CO be Reduced to 1 ppm Firing No. 6 Oil?
 - How are Similar Boilers Controlling Each Pollutant to Lowest 12% Stack Test Levels Continuously and Simultaneously?

Boiler MACT

• **Technology** *(or Educated Guess?)*

(EPA – Oxidation Catalyst + ACI + FF + Wet FGD)

- What Control Technology can I Purchase to Achieve Continuous Compliance with MACT?
- Commercial Guarantees for Dioxin Limits?
- Commercial Guarantees for Continuous Compliance (inc. Worst Case Fuels and Operating Conditions)?
- Oxidation Catalyst Retrofit for No. 6 Oil? Solid Fuels?
- Incinerators Control High Inlet Levels of Dioxin with ACI
- \$10-\$100+ Million for Something that “Should Work”.

CO (NO_x)

- Combustion Controls (Low CO and Low NO_x)
 - Fuel Properties / Feed
 - Boiler Controls
 - Staged Combustion (LNB)
 - Advanced Over Fire Air
 - Flue Gas Recirculation
- Re-tune Combustion Controls for Low CO and High NO_x
 - Gas Re-burn (NO_x)
 - SNCR
 - SCR
- Add-on Control (Regenerative Oxidation Catalyst?) for CO
 - Temperature Window
 - Sulfur / Metals
 - 1 ppm CO 30-day rolling?
 - Commercial Application, Cost and Meaningful Guarantees?

PM

- Filterable PM
 - ESP
 - ESP + Additional Field
 - ESP + Polishing FF
 - Fabric Filter
 - Wet Venturi Scrubber
 - WESP
- Meaningful Guarantees?

HCL

- Lower Chlorine Fuel
- Ash+
 - ESP
 - FF or ESP +FF
- Wet Venturi Scrubber
- Wet FGD
- WESP

Hg

- Lower Hg Fuels
- Collateral Reduction in Existing System
 - Ash and LOI
 - Catalyst
 - Scrubber
 - $T < 380$ Degrees
- Improved Collateral Reduction in Upgraded APC?
- ACI Duct Injection
- ACI Duct Injection + FF
- Meaningful Guarantees?

Dioxin TEQ

- Little or No Data
- Lower Chlorine Fuel
- Lower VOC (CO)
- Residence Time @ 800 to ~460 Degrees F
- PM Collector Inlet Temp < ~450 Degrees F
- ACI
- ACI + FF
- Meaningful Guarantees?

FAQ's

- Will the Rule be Modified? Stayed, Remanded, Vacated?
- What Are Our Dioxin Emissions Now? Rolling 30-Day CO?
- If We Modify the Unit / Switch Fuels – Do We Then Have to Meet New Unit MACT Limits?
- We are Permitted for Multiple Fuels. Might We Be Subject to Multiple Limits?
- Can Any Advanced Combustion Controls Satisfy Both MACT CO *and* Future NO_x Limits?
- In Order to Achieve Compliance by 2015, We had to Start Planning Last Year?
- How Much Will This All Cost? Should We Just Convert To Gas?
- How Do We Explain This to Management ?
- How Many Years Before I Retire?

Questions?

Bob Fraser

bob.fraser@aecom.com

**Sr. Technical Director
AECOM
(978) 589 3043**

