The Proposed Utility MACT Rule

Brian Higgins
Nalco Mobotec

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Overview

• Utility MACT Overview
  - What is Utility MACT?
  - Limits

• Complicating Factors
  - Washington DC factors
  - Possible Changes to the Rule

• Compliance
  - Requirements
  - Strategies
  - CSAPR Coordination
Synonyms for **Utility MACT**

- **Clean Air Act**
  - 112

- **HAPs**
  - Hazardous Air Pollutants

- **NESHAP**
  - National Emission Standards for HAPs

- **Air Toxics**

- **MACT**
  - Maximum Achievable Control Technology

- **MATS**
  - Power Plant Mercury and Air Toxics Standards
What is Utility MACT?

- HAP reduction through direct measurement of
  - HAPs or surrogates

- Regulated Emissions
  - Non-Mercury Metals (via Particulate Matter)
  - Acid Gases (via HCl)
  - Mercury

- Reduced Emissions (Work Practice Standards)
  - Organic HAPs (via CO)
  - Dioxin and Furans
Important Utility MACT Dates

- Draft rule issued March 16, 2011
- Published in the Federal Register May 3, 2011
- Expected Promulgation December 2011
- Three-Year Compliance from Promulgation
  - Expected to be December 2014
  - One year extensions can be granted on a case-by-case basis
- EPA Updates at: www.epa.gov/airquality/powerplanttoxics/
Proposed Coal Limits

- **Proposed Limits:**
  
  - **PM** 0.030 lb/MMBtu (total PM)
    - Includes both filterable and condensable PM
    - Will be difficult for ESPs
    - EPA expects a large number of fabric filters
  
  - **HCl** 0.002 lb/MMBtu (~1.4 ppm @ 6% O₂ wet)
    - DSI where there isn’t already WFGD/DFGD
  
  - **Hg**
    - 1 lb/TBtu >8300 Btu fuel
    - 4 lb/TBtu <8300 Btu fuel (beyond-the-floor)
      - Fuel and backend dependent (equipment & temperature)
  
  - **CO and D/F**
    - Work Practice Standards (GCP - Good Combustion Practice)
Washington DC

- Ozone NAAQS reconsideration was withdrawn

- House passes the TRAIN Act (9/23/11)
  - Transparency in Regulatory Analysis of Impacts on the Nation
  - Strikes CSAPR and MACT - “shall be of no force and effect”
  - Seeks a three year delay

- Other actions
  - Greenhouse Gas Reporting
  - Coal Ash Regulations
  - CSAPR - Texas Lawsuit

- Election cycle
  - Movement on Jobs and Energy Reliability

A more lenient final rule may be expected
Complicating Factors (as Proposed)

- Pet coke
  - Oil Derived? Or combined with coal as a solid fuel? Blends?

- Health based methods rejected for HCl limits
  - Opens the door for changes later

- Technology based methods rely on having good data
  - Errors in the data are points of contention

- SSM
  - Start Up and Shut Down are included in emission limits
  - Malfunctions are not included (“Affirmative Defense”)

- Low Emitting EGU (LEE)
  - Monthly fuel testing required to show low Cl and Hg

- Emission averaging across site is allowed

- Output based emission limits (lb/MMBtu versus lb/MWh)
PM Compliance

- PM is a surrogate for non-mercury HAP metals
- PM CEMs for non-mercury HAP metals compliance
  - PM CEMs only measure filterable PM
  - Compliance requires total PM (filterable + condensable)
  - During testing, CEM PM is correlated to total PM
  - A new PM CEMs operational limit is then established
- A very difficult standard to meet
  - For existing coal, PM limit = 0.03 lb/MMBtu
  - 10 ppm of $\text{SO}_3 = 0.03 \text{ lb/MBtu}$ condensable PM
    - Other condensable PM sources (e.g., ammonium chloride)
  - Could spell the end of sulfur burners for ESP improvement
    - Big (positive) impact on ACI for Hg - Other ESP additives might see use
- Fabric filters may be needed for high $\text{SO}_3$ emitting sites
Alternative PM Compliance

- Alternative to PM CEMs
  - Bi-monthly measurements (monthly if no PM device; e.g., oil)

- Option 1: Total non-Hg HAP testing
  - Total non-Hg metals < 40.0 lb/Tbtu

- Option 2: Individual non-Hg metals testing
  - Antimony, Sb < 0.6 lb/Tbtu
  - Arsenic, As < 2.0 lb/Tbtu
  - Beryllium, Be < 0.2 lb/Tbtu
  - Cadmium, Cd < 0.3 lb/Tbtu
  - Chromium, Cr < 3.0 lb/Tbtu
  - Cobalt, Co < 0.8 lb/Tbtu
  - Lead, Pb < 2.0 lb/Tbtu
  - Manganese, Mn < 5.0 lb/Tbtu
  - Nickel, Ni < 4.0 lb/Tbtu
  - Selenium, Se < 6.0 lb/Tbtu
PM Compliance Solutions

- Fabric Filters (Bag Houses) are the obvious 100% solution

- Wet ESPs work well
  - Expensive and have not seen broad installation

- Many existing cold side ESPs will meet proposed requirements

- Tuning marginal ESP units
  - Modification (new TR sets, larger plate separation, more fields)
  - Chemical additives to improve ash resistivity
  - Combustion modifications to reduce LOI and ash carry over
  - Fuel switch (e.g., lower ash fuel)
  - Derate (worse case)

- Beware that other “MACT Solutions” might help or hurt ESP
  - For example, trona injection for HCl capture
  - CSAPR consideration
HCl Compliance Solutions

- Desulphurization systems get HCl as co-benefit
  - Means that very low HCl is required
  - But maybe not due to health based standards
  - The answer to this will drive the solutions

- Ultimate solution: WFGD (then DFGD)

- Duct (or Dry) Sorbent Injection (DSI)
  - Trona
  - Sodium Bicarbonate
  - Hydrated Lime (or other calcium-based sorbents)

- Other chemical additives (duct or furnace)
  - Magnesium chemistries
  - Some fuel additives

- Fuel switching or blending

- Wet ESPs
Mercury Compliance

• Hg is a bioaccumulating HAP

• Three compliance options
  - Mercury CEMS
    • Continuous - 30 day average
  
  - Sorbent Traps
    • EPA 30B
    • Averaged over 28-30 days
    • One trap pair must be less than 14 days

  - Low mercury fuel (low emitting EGU)
    • Certification and routine fuel analyses required

• Extensive details in Appendix A of the proposed rule
Mercury Compliance Solutions

- Halogen Oxidizers

- Activated Carbon Injection
  - Can ruin ash sales and affect ESP
  - Beware high $\text{SO}_3$, which interferes

- Alkali injection
  - Usually as a co-benefit from other technologies

- Proprietary non-carbon sorbents
  - Many in development
  - Goal is usually to preserve ash sales

- Co-benefit from acid gas reduction
  - Scrubbers (wet or dry) and DSI
  - Reemission control in scrubbers
  - Watch out for water regulations
CO and Dioxin/Furan Compliance

- **Work Practice Standards**
  - GCP = Good Combustion Practice; as follows:
    - Inspect burner (Fix if needed)
    - Inspect flame pattern (Fix if needed)
    - Inspect fuel-to-air control (Fix if needed)
    - Optimize for CO and NOx
    - Measure CO and NOx

- **Document**
  - CO & NOx before and after
  - Description of corrective actions
  - Maintain a record of fired fuels
Summary

• Utility MACT rule should be final soon  
  - Will probably be more lenient than proposed

• There are some complicating factors that the final rule will hopefully address

• There are compliance strategies that can be implemented to reach the proposed limits

• CSAPR compliance should be part of a MACT strategy
Thank You

Brian Higgins

bhiggins@NalcoMobotec.com

415.370.0921