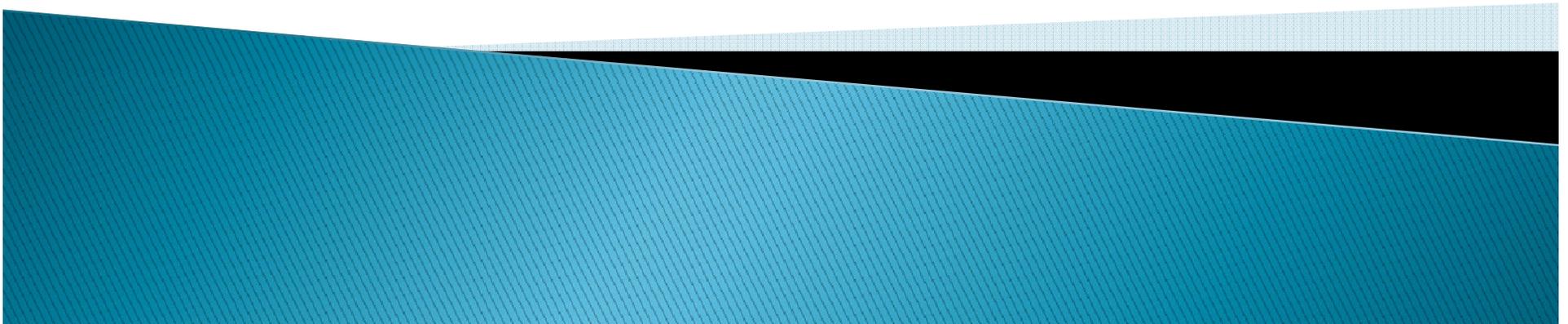


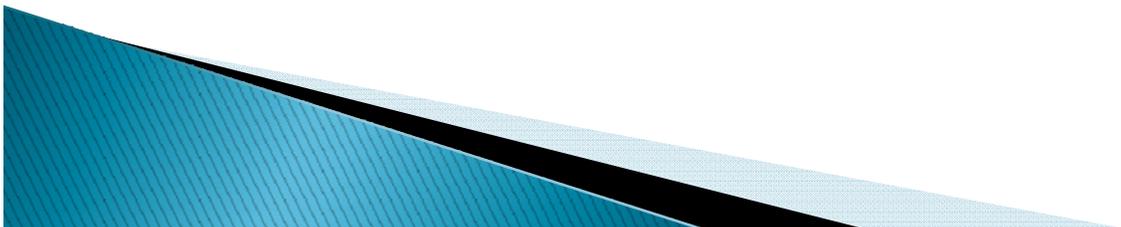
Public Utilities Commission of Ohio Combined Heat and Power March 9, 2012

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Ohio EPA
Division of Air Pollution Control



Topics

- ▶ Background on Boiler MACT rules
- ▶ Overview of the “Final” Rules
- ▶ Current Status
- ▶ Applicability to Combined Heat & Power



Chronology of the Boiler MACT Rules

- ▶ 40 CFR Part 63 Subpart DDDDD
- ▶ Originally promulgated on September 13, 2004
- ▶ Affected facilities – major HAP sources only
- ▶ Existing facilities – 3 years to comply
- ▶ Vacated by the D.C. Circuit Court of Appeals in June 2007
 - Definition of non-haz “solid waste”
 - Concerns whether “health-based” standards and “no-control” options were lawful
- ▶ September 2009 court order required EPA to finalize rules by December 16, 2010

Chronology of the Boiler MACT Rules (cont'd)

- ▶ April 29, 2010 Proposed Boiler MACT Rules
 - Affected 200,000 boilers
 - Widely criticized; unreasonable emission limitations
 - Emission limits for new, existing units; coal, oil, biomass
 - Estimated cost of compliance: \$12 billion (capital), \$3.9 billion (operating)
- ▶ USEPA granted 30-day extension to January 16, 2011 to re-issue
- ▶ December 2010; USEPA seeks 15-month extension; Court rejects request, gives final deadline of February 21, 2011.

Chronology of the Boiler MACT Rules (cont'd)

- ▶ U.S. EPA issues final Boiler MACT rules on February 21, 2011, in FR on March 21, 2011
 - U.S. EPA states it will reconsider parts of the rule; stay effectiveness
 - Emission limits for major sources of coal, oil, biomass and process gas
 - Requirements for area source boiler
 - Limits for incinerator
- Estimated cost of compliance: \$5.5 billion (capital – est.); \$2.2 billion (operating)

March 21, 2011 EPA FR Notices

- ▶ Major source Boiler/Process Heater MACT
 - 40CFR63, Subpart DDDDD
 - Replaces prior vacated 2004 rule
- ▶ Area source ICI Boiler MACT/GACT
 - 40CFR63, Subpart JJJJJJ
 - New rule
- ▶ Commercial & Industrial Solid Waste Incinerator NSPS
 - 40CFR60, Subparts CCCC (new), DDDD (existing)
 - Modifies existing rules
- ▶ Non-Hazardous solid waste definition
 - 40CFR241, Subparts A & B
 - Determines if materials are fuels under MACT or wastes under CISWI
- ▶ Notice of reconsideration

Scope and Impacts

- ▶ Major Source Boiler/Process Heater MACT
 - 13,800 boilers/process heaters
 - EPA estimate- capital cost \$5.1B; \$1.8B/yr total annual costs (\$1.4B/yr net with expected fuel savings)
 - EPA estimates implementation costs reduced by \$1.5B from proposal
- ▶ Area Source ICI Boiler GACT/MACT
 - 187,000 boilers
 - Revised approach from MACT to GACT for some subcategories
 - EPA estimate- capital cost \$1.4B; \$487MM/yr total annualized cost
 - EPA estimates \$209MM cost reduction from proposal
- ▶ CISWI
 - 88 solid waste incinerators
 - EPA estimate- capital cost \$652MM; \$232MM/yr total annualized cost
 - EPA estimates \$12MM cost reduction from proposal

Overview of the New “Final” Boiler MACT Rules

- ▶ Emission standards (cont’d)
 - Includes both input- and output – based limits
 - Emission limits testing requirements (fuel analysis for Hg and HCl)
 - Testing frequency reduced, particularly D/F
 - Work practice standards established to minimize periods of start-up and shut-down, in lieu of numerical emissions limits
 - Carbon monoxide CEMs eliminated from the rules



Boiler MACT: Compliance Requirements

- ▶ **Existing large boilers** ($\geq 10\text{MM/Btu/hr}$)
 - **Clean gas** (*natural gas, refinery gas, or process gas as clean as natural gas*)
 - Annual tune-up
 - No numeric emission limits
 - 1-time energy assessment
 - **Solid fuel (coal or biomass), Oil, Process gas that is not “clean” gas**
 - Numeric emission limits for 5 pollutants
mercury, dioxins/furans, particulate matter (PM), hydrogen chloride (HCl), carbon monoxide (CO)
 - 1-time energy assessment
 - **Limited Use**
 - Tune-up every other year
 - 1-time energy assessment
 - No numeric emission limits
- ▶ **Existing small boilers** ($< 10\text{MM/Btu/hr}$)
 - **Gas, solid fuel, oil, or limited use**
 - Tune-up every other year
 - 1-time energy assessment
 - No numeric emission limits

Boiler MACT: Compliance Requirements

- ▶ **New large boilers** ($\geq 10\text{MM/Btu/hr}$)
 - **Clean gas** (*natural gas, refinery gas, or process gas as clean as natural gas*)
 - Annual tune-up
 - No numeric emission limits
 - **Solid fuel** (coal or biomass), **Oil**, **Process gas that is not “clean” gas**
 - Numeric emission limits for 5 pollutants
mercury, dioxin, particulate matter (PM), hydrogen chloride (HCl), carbon monoxide (CO)
 - **Limited Use**
 - Tune-up every other year
 - No numeric emission limits
- ▶ **New small boilers** ($< 10\text{mm/BTU}$)
 - **Gas, solid fuel, oil, or limited use**
 - Tune-up every other year
 - No numeric emission limits

Comparison of Final MACT Limits to Proposal

<u>HAP/Fuel</u>	<u>Proposal</u>	<u>Final</u>	<u>Factor Better</u>	<u>Proposal</u>	<u>Final</u>	<u>Factor Better</u>	<u>Units</u>	<u>Output Based (lb/MMBtu steam output)</u>	
	<u>Existing Boilers</u>			<u>New Boilers</u>				<u>Existing</u>	<u>New</u>
Hg Biomass	0.9	4.6	5.1	0.2	3.5	17.5	lb/TBtu	4.50E-06	3.40E-06
PM Biomass	0.02	0.039	2.0	0.008	0.0011	0.1	lb/MMBtu	0.038	0.0011
HCl Biomass	0.006	0.035	5.8	0.004	0.0022	0.6	lb/MMBtu	0.04	0.0021
Hg Coal	3	4.6	1.5	2	3.5	1.8	lb/TBtu	4.50E-06	3.40E-06
PM Coal	0.02	0.039	2.0	0.001	0.0011	1.1	lb/MMBtu	0.038	0.0011
HCl Coal	0.02	0.035	1.8	0.00006	0.0022	36.7	lb/MMBtu	0.04	0.0021
Hg Oil	4	3.5	0.9	0.3	0.21	0.7	lb/TBtu	3.30E-06	2.00E-07
Hg Oil non-continental	4	0.78	0.2	0.3	0.78	2.6	lb/TBtu	8.00E-07	8.00E-07
PM Oil	0.004	0.0075	1.9	0.002	0.0013	0.7	lb/MMBtu	0.0073	0.001
HCl Oil	0.0009	0.00033	0.4	0.0004	0.00033	0.8	lb/MMBtu	0.003	0.003
Hg Gas 2	0.2	13	65.0	0.2	7.9	39.5	lb/TBtu	7.80E-06	2.00E-07
PM Gas 2	0.05	0.043	0.9	0.003	0.0067	2.2	lb/MMBtu	0.026	0.004
HCl Gas 2	0.000003	0.0017	566.7	0.000003	0.0017	566.7	lb/MMBtu	0.001	0.003
Or clean gas 2 can opt in to Gas 1 work practice if:	NA	Hg content <40 ug/m3		NA	Hg content <40 ug/m3		-	NA	NA
		H ₂ S content <4ppmv			H ₂ S content <4ppmv		-	NA	NA

- Limits above for units ≥10MMBtu/hr
- PM CEMS required for solid fuel >250MMBtu/hr

Comparison of Final MACT CO Limits to Proposal

<u>HAP/Fuel</u>	<u>Proposal</u>	<u>Final</u>	<u>Factor Better</u>	<u>Proposal</u>	<u>Final</u>	<u>Factor Better</u>	<u>Units</u>	<u>Output Based (lb/MMBtu steam output)</u>	
	<u>Existing Boilers</u>			<u>New Boilers</u>				<u>Existing</u>	<u>New</u>
CO Biomass stoker	560	490	0.9	560	160	0.3	ppm at 3%O2	0.35	0.13
CO Biomass FB	250	430	1.7	40	260	6.5	ppm at 3%O2	0.28	0.18
CO Biomass Dutch/ Suspension	1010	470	0.5	1010	470	0.5	ppm at 3%O2	0.45	0.45
CO Biomass Fuel Cell	270	690	2.6	270	470	1.7	ppm at 3%O2	0.34	0.23
CO Biomass Hybrid Suspension/ Grate	NA	3500	NA	NA	1500	NA	ppm at 3%O2	2	0.84
CO Coal pulverized	90	160	1.8	90	12	0.1	ppm at 3%O2	0.14	0.01
CO Coal stoker	50	270	5.4	7	6	0.9	ppm at 3%O2	0.25	0.005
CO Coal FB	30	82	2.7	30	18	0.6	ppm at 3%O2	0.08	0.02
CO Oil	1	10	10.0	1	3	3.0	ppm at 3%O2	0.0083	0.0026
CO Oil non-continental	1	160	160.0	1	51	51.0	ppm at 3%O2	0.13	0.043
CO Gas2	1	9	9.0	1	3	3.0	ppm at 3%O2	0.005	0.002

Units >10MMBtu/hr

Comparison of Final MACT D/F Limits to Proposal

<u>HAP/Fuel</u>	<u>Proposal</u>	<u>Final</u>	<u>Factor Better</u>	<u>Proposal</u>	<u>Final</u>	<u>Factor Better</u>	<u>Units</u>	<u>Output Based (lb/MMBtu steam output)</u>	
	<u>Existing Boilers</u>			<u>New Boilers</u>				<u>Existing</u>	<u>New</u>
D/F Biomass stoker	0.004	0.005	1.3	0.00005	0.005	100.0	ng/dscm at 7%O2	4.40E-12	4.40E-12
D/F Biomass FB	0.004	0.02	5.0	0.007	0.02	2.9	ng/dscm at 7%O2	1.80E-11	1.80E-11
D/F Biomass Dutch/Suspension	0.03	0.2	6.7	0.03	0.2	6.7	ng/dscm at 7%O2	1.80E-10	1.80E-10
D/F Biomass Fuel Cell	0.02	4	200.0	0.0005	0.003	6.0	ng/dscm at 7%O2	3.50E-09	2.86E-12
D/F Biomass Hybrid Suspension/Grate	NA	0.2	NA	NA	0.2	NA	ng/dscm at 7%O2	1.80E-10	1.80E-10
D/F Coal pulverized	0.004	0.004	1.0	0.002	0.003	1.5	ng/dscm at 7%O2	3.70E-12	2.80E-12
D/F Coal stoker	0.003	0.003	1.0	0.003	0.003	1.0	ng/dscm at 7%O2	2.80E-12	2.80E-12
D/F Coal FB	0.002	0.002	1.0	0.00003	0.002	66.7	ng/dscm at 7%O2	1.80E-12	1.80E-12
D/F Oil	0.002	4	2000.0	0.002	0.002	1.0	ng/dscm at 7%O2	9.20E-09	4.60E-12
D/F Gas2	0.009	0.08	8.9	0.009	0.08	8.9	ng/dscm at 7%O2	3.90E-11	4.10E-12

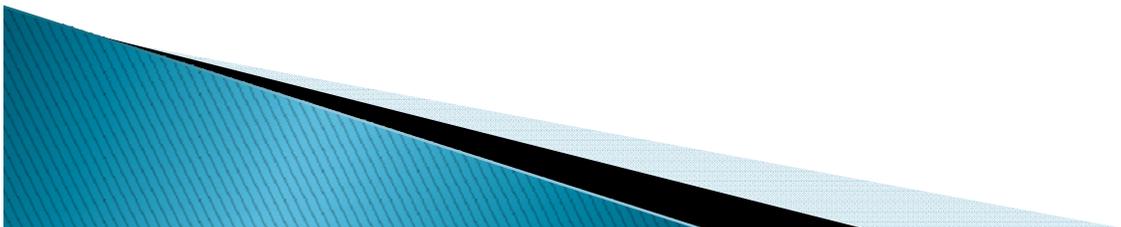
Units >10MMBtu/hr

Summary of Changes from Proposal

- ▶ Carbon Monoxide (CO)
 - Drop CO CEMS requirement
 - Do Method10 stack test
 - Units with CO limit- use O2 CEMS for continuous compliance
 - Maintain O2 no lower than lowest hourly average during CO test

- ▶ Dioxins/Furans- one time emission test

- ▶ Ability for Gas 2 to opt-in to Gas 1- gas must have
 - Hg <40 ug/m3 (ASTM D5954; ASTM D6350 or equiv)
 - and H2S <4 ppmv (ASTM 4084a or equiv)



Emissions Testing/Operating Limits

- ▶ Annual emissions testing for all limits except D/F
- ▶ If 2 years show $\leq 75\%$ of limit, can skip 2 years
 - But retest no later than 37 months from prior test
- ▶ Cannot operate $> 110\%$ of average operating load (e.g., heat input; steam generation) during most recent performance test
 - Compliance on 12 hour block average basis
- ▶ PM CEMS for ≥ 250 MMBtu/hr
- ▶ For fabric filter control on solid fuel units ≤ 250 MMBtu/hr
 - Opacity operating limit
 - 10% daily block average basis (using 6 minute averages)
 - Or bag leak detection system with alarm sounding not more than 5% of operating time per 6 month period

Startup, Shutdown and Malfunction Provisions

- ▶ Follow certain procedures during startups/shutdowns in lieu of numerical limits
 - Minimize startup and shutdown periods following manufacturer's recommended procedures
 - Emission limits do apply during malfunctions
- ▶ Affirmative defense provisions for excess emissions during malfunctions
 - In response to an action to enforce the emission limitations and operating limits... entities may assert an affirmative defense, if the entity
 - Notify the Administrator by telephone or fax as soon as possible, but no later than 2 business days after the initial occurrence of the malfunction
 - Submit a written report to the Administrator within 45 days of the initial occurrence of the exceedance (can request 30 day extension)

EPA Reconsideration Process

- ▶ EPA also announced on 5/21/11 their intention to reconsider provisions in Boiler MACT, Area Source MACT/GACT, CISWI
 - Topics on which additional public review and comment are appropriate:
 - Revisions to the proposed subcategories in Boiler MACT
 - Establishment of a fuel specification in Boiler MACT which gas-fired boilers that use a fuel other than natural gas may be considered Gas 1 units
 - Establishing work practice standards for limited use major source boilers
 - Establishment of standards for biomass and oil-fired area source boilers based on GACT
 - Providing an affirmative defense for malfunction events for major and area source boilers and for CISWI units

EPA Intention to Reconsider

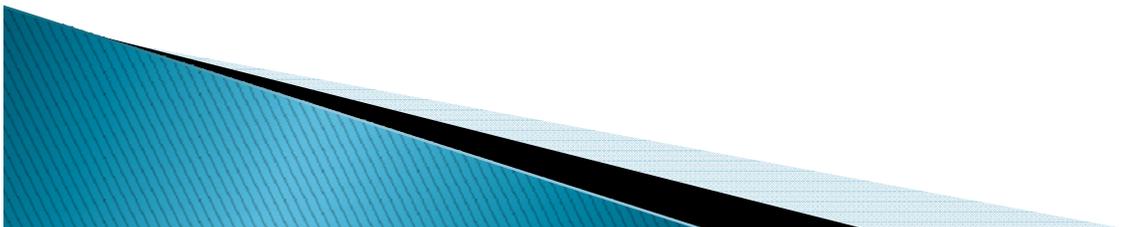
- ▶ Issues that arose after the comment period or were impracticable to comment upon
 - Revisions to the proposed monitoring requirements for carbon monoxide for Boiler MACT and CISWI
 - Revisions to the proposed dioxin emission limit and testing requirement for major source boilers
 - Establishing a full-load stack test requirement for carbon monoxide coupled with continuous oxygen monitoring for Boiler MACT and CISWI
 - Establishing a definition of “homogenous waste” in the CISWI rule
 - Setting PM standards under GACT for oil-fired area source boilers
 - Certain findings regarding the applicability of Title V permitting requirements for area source boilers

Petitions for Stay

- ▶ Petition for administrative stay of Boiler MACT and CISWI rules filed by industrial coalition April 27, 2011
 - May 16, 2011- EPA announced a full stay of the effective date of both rules
 - Under Section 307(d) of Administrative Procedures Act
 - Did not impose a time limit
 - EPA accepted further data and information until July 15, 2011

Effectiveness of MACT

- ▶ U.S. EPA adopted rule by the court deadline, then went ahead and “stayed” the effectiveness of the rule
- ▶ Environmental groups took U.S. EPA to court
- ▶ Court vacated U.S. EPA’s stay of rules
- ▶ U.S. EPA has stated they will not enforce the rule – see attached letter



Effectiveness of MACT

▶ Main points of letter

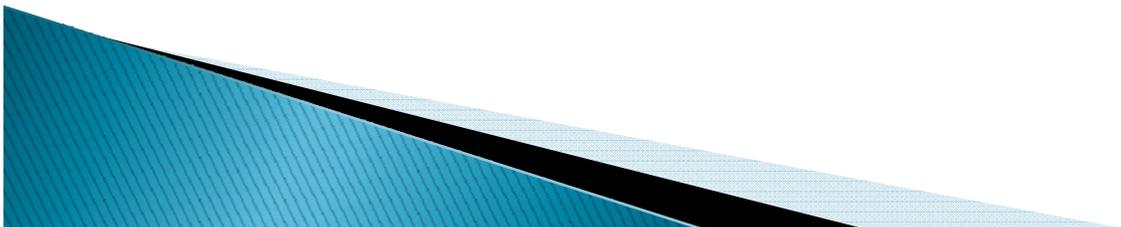
- EPA plans to issue final reconsideration of standards this spring
- May include a biomass exemption
- Will attempt to reduce compliance costs
- “EPA will not enforce any of the administrative notification requirements”
- Plans to “reset” compliance clock to allow full three years
- Will address third-party lawsuits on a case-by-case basis,.....
but does not expect any(?).

Net Impact to Compliance Schedule?

- ▶ Reconsideration should be issued prior to July 1, 2012
- ▶ Expect some additional relief in the Hg limits for coal, CO limits, monitoring requirements, and recordkeeping requirements, however, rule will still have substantial control costs for coal-fired boilers
- ▶ Sources will obtain three years to comply, by “resetting” the clock
- ▶ Under the MACT, sources can obtain up to an additional year by showing more time is needed for compliance
- ▶ For the major sources, the request would be sent to Ohio EPA, since Ohio EPA has delegation of the major source MACT
- ▶ For the area sources, there should not be an issue with the need for additional time – but requests would go to US EPA

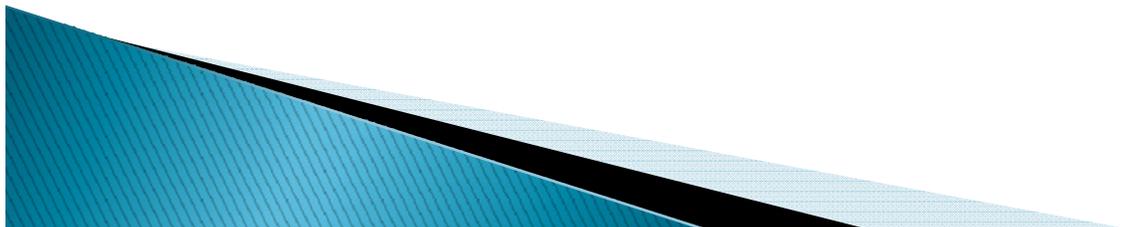
Opportunities for CHP

- ▶ Whenever the rules are finalized, there is going to be substantial cost associated with compliance with MACT
- ▶ Some facilities will need to evaluate compliance costs verses installation of new equipment
- ▶ New equipment can be more efficient and CHP should be evaluated
- ▶ Some facilities are currently flaring excess gas – Boiler MACT may prompt shutdown of old boilers and replacement of new boiler that can be designed to utilize waste gas



Opportunities for CHP

- ▶ Ohio EPA will work with entities to prioritize permitting of any CHP projects
- ▶ Have experience with CHP permits



Questions and Discussion

- ▶ Contact the Ohio EPA District Office or Local Air Agency, or
- ▶ bob.hodanbosi@epa.state.oh.us

Note: information in tables on emission limits came from the Council of Industrial Boiler Owners (CIBO)

