Boiler MACT & Related Rules



Western Regional Boiler Association 45th Annual Meeting Portland, Oregon March 14, 2013 **ENVIRON**



- National Emissions Standard for Hazardous Air Pollutants (NESHAP)
 - Major Source Industrial, Commercial & Institutional (ICI) Boilers and Process Heaters
 - 40 CFR Part 63 Subpart DDDDD
 - Area Source ICI Boilers
 - 40 CFR Part 63 Subpart JJJJJJ
- Originally issued on March 21, 2011
- Reconsidered and Finalized on:
 - Jan. 31 (Major Source)
 - Feb. 1 (Area Source)







- New Source Performance Standard (NSPS)
 - Commercial & Industrial Solid Waste Incinerators (CISWI)
 - 40 CFR Part 60 Subparts CCCC & DDDD
- Non-Hazardous Secondary Materials (NHSM) Rule
 - 40 CFR Part 241
- Originally issued on March 21, 2011
- Reconsidered and Finalized on Feb. 7



NESHAPs

Definitions

- Major Source: \geq 10 tpy single HAP, or
 - \geq 25 tpy combination of HAPs
- Area Source: not a major source
- Maximum Achievable Control Technology (MACT)
 - Applies to major sources
 - Minimum stringency criteria (MACT Floor)
- Generally Available Control Technology (GACT)
 - May apply to area sources
 - EPA can specify management practices instead



Major Source Boiler MACT Applicability

- Stationary Boiler or Process Heater, Located at a Major Source
- Any Industrial, Commercial, or Institutional Facility
- In many cases, process emissions exceed HAP threshold, not boiler/process heater
 - Lumber manufacturing facilities (kilns)
 - Plywood manufacturing facilities (dryers and presses)







- Any unit covered by another NESHAP Rule
 - Electric utility steam generator, Recovery boiler, R&D, Refining kettle, Ethylene cracking furnace, Blast furnace stoves, etc.
- Hot water heaters
- Used as a control device to meet another standard
- Temporary units
- Blast furnace gas fuel-fired
- Hazardous waste combustors
- Residential boilers







- Gaseous fuels (natural gas, refinery gas, process gas, etc.)
- Liquid fuels (distillate oil, residual oil, residuals, etc.)
- Solid fuels (coals, biomass, solid waste, etc.)





New and Existing Units

• New

- Commenced construction after June 4, 2010
- Four groups within "new"
 - After June 4, 2010 & before May 20, 2011
 - After May 20, 2011 & before December 23, 2011
 - After December 23, 2011& before January 31, 2013
 - After January 31, 2013
- Existing
 - Not new









- New units by Jan. 31, 2013 or upon startup
- Existing units no later than Jan. 31, 2016







- 18 boiler or process heater subcategories
- Solid, liquid, and "Gas 2" fuels have limits on:
 - Hydrogen Chloride
 - Mercury
 - Filterable PM or Total Selected Metals (TSM)
 - Surrogates for metal HAPs
 - CO
 - Surrogate for VOC HAPs
- No limits for "Gas 1" units





HAP Emission Limits

- PM or TSM, HCl, Hg
 - lb/MMBtu heat input, or
 - Ib/MMBtu steam output or Ib/MWh electrical generation
 - Intended to provide energy efficiency benefit
- CO
 - ppmvd @ 3% O₂
 - Limits depend on continuous compliance method
 - Operating limits or CEMS
- Different limits for new (all four types) and existing
- Limits apply at all time, except startup and shutdown



Work Practice Standards

- Tune-up
 - Every 5 years:
 - Units with continuous oxygen trim system
 - Gas 1, Gas 2, and Light Liquid units \leq 5 MMBtu/hr
 - Limited use units
 - Every 2 years:
 - Heavy Liquid and Solid units < 10 MMBtu/hr w/o O₂ trim
 - Gas 1, Gas 2, and Light Liquid units > 5 MMBtu/hr and < 10 MMBtu/hour
 - Annually: All other units
- One-time energy assessment: All existing units
- Startup and shutdown requirements
 - Clean fuels during startup
 - Control devices and CEMS, if present, must be operable
 - Exceptions provided



Initial Compliance Demonstrations

- Existing units (began before June 4, 2010)
 - Performance test or fuel analysis (for Hg, HCl, TSM)
 - No later than 180 days after compliance date
 - Establish operating limits during performance tests
 - Initial tune-up and one-time energy assessment
 - Complete by compliance date
- New units
 - Performance test or fuel test (for Hg, HCl, TSM) no later than:
 - July 30, 2013 (July 29, 2016 if subject to higher limit), or
 - 180 days after startup
 - Establish operating limits during performance tests
 - Initial tune up





Performance tests and operating limits

or

 Fuel testing (for HCl, Hg, or TSM only) and operating limits

or

- Continuous monitors for CO, PM, HCI, Hg
- Optional alternatives:
 - Emissions averaging
 - Efficiency credits (for output-based limits)





Operating Limits

- Apply to units with no CEMS
- PM control:
 - Wet scrubber liquid flow rate
 - Fabric filter opacity and leak detection system
 - ESP opacity and electric power inputs
 - Other opacity
- CO Oxygen analyzer
- HCl control:
 - Wet acid gas scrubber effluent pH
 - SO₂ CEMS
- Hg Dry scrubber or carbon injection rate
- Performance test maintain within 110% of max test load
- Fuel analysis maintain fuel type/mix



Initial Notifications and Reporting

- Initial Applicability Notification
 - By May 31, 2013 if constructed before Jan. 31, 2013
 - Within 15 days of startup if constructed after Jan. 31, 2013
- Initial Notification of Compliance Status
 - 60 days following completion of all test/demonstrations
- Compliance reports submitted semiannually
 - January 1 June 30 by July 31
 - July 1 December 31 by January 31
- Intent to conduct performance test
 - Submit at least 30 days prior to test







- Keep copies of:
 - Submitted notifications and reports
 - All supporting documentation
 - Records of monitoring data, operating limit averages
 - Monthly fuel use and types
 - Fuel analysis calculations (if applicable)
 - Malfunction documentation (actions taken)
 - Startups & shutdowns (time, date, duration, fuel used)
- Keep for:
 - Five years following applicable date
 - First two years must be onsite (or accessible onsite)
 - Remaining three years can be offsite





- Industrial, commercial, or institutional boiler located at, or part of, an area source of HAPs
 - Check entire facility HAP emissions, not just boiler
 - No process heaters
- If trying to become area source to avoid major source rule, must be established as an area source before the first substantial compliance date
- May need to develop a non-applicability determination, and keep records of exemption



Area Source Rule Exemptions

- Boilers subject to another NESHAP
- Boilers that fire hazardous waste
- R&D boilers
- Gas-fired boilers (not just natural gas, any gas)
 - Liquid fuel for 48 hr/yr testing, and during curtailment
- Hot water heaters
- Boilers used as a control device
- Temporary boilers
- Residential boilers
- Electric boilers
- Electric utility steam generators



Area Source Rule Requirements

- Numerical emission limits for:
 - Coal, biomass, and oil units > 10 MMBtu/hr
 - Excluding limited use & seasonal boilers
 - Mercury and CO (coal only) for new and existing units
 - PM (filterable) for new units only
- Tune-ups required for some units < 10 MMBtu/hr
- Units >10 MMBtu/hr:
 - One-time energy assessment
 - Startup/shutdown work practices standards



Area Source Compliance Dates

- Earlier than for major sources
- Existing boilers March 21, 2014
- New boilers:
 - May 21, 2011 if startup was before that date
 - Upon startup if startup is after May 21, 2011
- Unlike Major Source Rule, Area Source Rule not stayed, so initial notification was due in Sep. 2011
- Initial tune up & initial compliance for existing units was delayed by "no action" letters until final rule was finalized





Tune-ups for Area Source Boilers

- Initial, then biennial:
 - Existing coal units < 10 MMBtu/hr, oil units > 5 MMBtu/hr, biomass units
- Biennial:
 - New coal units < 10 MMBtu/hr, oil units > 5 MMBtu/hr, biomass units
- Initial, then every 5 years:
 - Existing coal/biomass/oil unit with oxygen trim, oil unit < 5 MMBtu/hr, limited use, seasonal
- Every 5 years:
 - New coal/biomass/oil unit with oxygen trim, oil unit < 5 MMBtu/hr, limited use, seasonal





Area Source Recordkeeping and Reporting

- Initial Notification (by Jan. 20, 2014)
- Notification of Initial Compliance
 - 120 days after compliance date
- Records establishing exemptions/applicability
 - Source status (area vs. major), boiler capacity, etc.
- On-going Monitoring/Recordkeeping
 - Records of fuel type and usage
 - Mercury: Fuel analysis or stack testing
 - PM: Stack test
 - CO: Stack test and O₂ CEMS
 - Operating parameter limits for control equipment





- New requirement never seen in other rules before
- Focused on steam and process heating systems
- Purpose is to "identify cost-effective energy conservation measures"
- "Cost effective" means payback < 2 years
- Must conduct the assessment, but no requirement to implement findings
- Compliance dates
 - Jan. 31, 2016 for major sources
 - Mar. 21, 2014 for area sources





Energy Assessment Requirements

- Visual inspection
- Operating characteristics and specifications
- Inventory major energy use systems
- Review plans, O&M procedures, and fuel usage
- Report includes:
 - Ways to improve efficiency
 - Time frame to recoup investments in improvements



Common Energy Assessment Questions

- How long do I have to comply?
 - Major sources: Jan. 31, 2016, Area sources: Mar. 21, 2014
- Do I have to assess only boiler, or other systems as well?
 - Only boiler and downstream energy use systems
- Can I complete this using internal resources?
 - Yes, as long as assessors are qualified (see rule)
- How long will the assessment process take?
 - Depends on size/scope, likely 2 to 6 weeks
- What are some guidelines on costs?
 - Depends on complexity/size, ~\$5k to \$50k+
- Are steam/hot water end users included?
 - Entire system including central plant, distribution, end users





- Section 129 of Clean Air Act required EPA to establish Standards for Solid Waste Incineration Units
 - Solid Waste Incineration Unit defined as "a distinct operating unit of any facility which combusts any solid waste material from commercial or industrial establishments or the general public"
- Covers sources of all sizes; function of solid waste combustion unit determines applicability





Final CISWI Rule

- NSPS for new sources (Subpart CCCC)
 - Federal rule applicable to the source
- Emissions Guidelines for existing sources (Subpart DDDD)
 - Rule applicable to the regulatory agency
 - Source applicable rule must be developed by states
- A CISWI unit is any combustion unit at a commercial or industrial facility used to combust solid waste
- Non-Hazardous Secondary Materials that are non-waste fuels may be combusted in boilers or process heaters that are not subject to the CISWI Rule





Non-Hazardous Secondary Materials Rule

- Used to identify which NHSM are, or are not, solid wastes
- Demonstrate compliance by Feb. 7, 2016
- Two groups of NHSM:
 - Material transferred to a third party, not discarded, indistinguishable from a fuel product
 - Material discarded, but "transformed" by being "processed," and meeting "legitimacy criteria"
- Regulatory path for "non-discarded" NHSM
- Sources may "self-certify" for "transformed" NHSM





- Includes, but not limited to :
 - Removing or destroying contaminants present in the material,
 - Significantly improving the fuel characteristics of the material (e.g., sizing or drying the material),
 - Chemically improving the as-fired energy content of the material, or
 - Improving the ingredient characteristics.
- Not sizing alone





NHSM Legitimacy Criteria

- Managed as a valuable commodity:
 - Reasonable storage time prior to use
 - Managed consistent with any analogous fuel, or
 - Contained to prevent release
- Have meaningful heating value and be used in energy recovery unit
- Contaminants at levels comparable to traditional fuels unit is "designed to burn"





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