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# Final Portland Cement MACT and NSPS Standards

Webinar

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# Outline

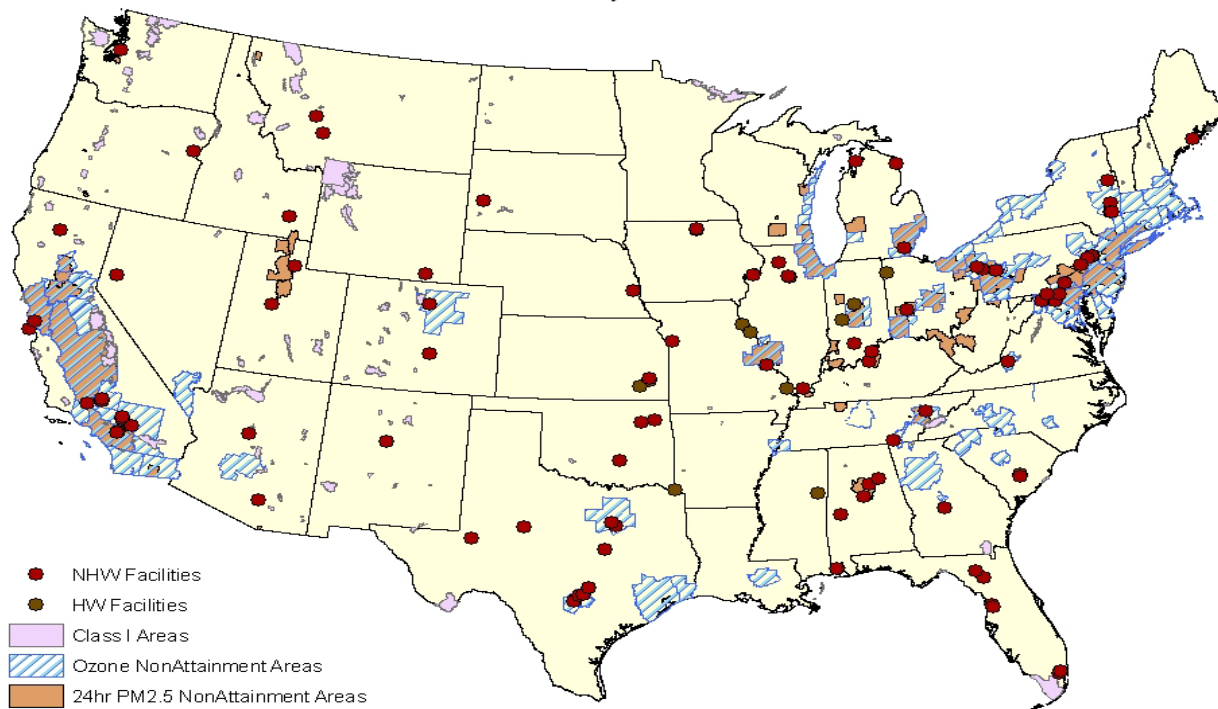
- Background
- Major Changes to existing NESHAP and NSPS
- Reconsideration petitions received
- Corrections/clarifications currently being contemplated
- Questions

# Portland Cement Plant Locations in 2009 – 107 Facilities

**2009:** 107 Facilities (77 major, 16 area, 14 hazardous waste) comprised of 170 kilns (147 non-hazardous waste kilns)

**Projected growth:** 6 new kilns by 2013

Cement Facility Locations



Source: EPA 2002-2006 Data

Pollutant	Annual Emissions (tons/yr)
CO <sub>2</sub>	81.4 million
PM	37,000
SO <sub>2</sub>	159,000
NO <sub>x</sub>	219,000
CO	150,000
Organic HAP	3,700
HCl	4,507
Hg	7

Data from NEI 2002 V3

# Other Rules Affecting Cement Kilns

- All cement facilities are subject to the Portland Cement NESHAP (40 CFR 63 subpart LLL) and NSPS (40 CFR 60 subpart F).
- Cement kilns that burn hazardous waste are subject to the Hazardous Waste Combustor NESHAP (40 CFR 63 subpart EEE). This rule is currently under reconsideration.
- Cement kilns that burn non-hazardous solid wastes as defined in the upcoming solid waste definition rule will be subject to the Commercial and Industrial Solid Waste Incinerator Units (CISWI) rule (40 CFR 60 subparts CCCC and DDDD), due to be signed January 14, 2011.

# Portland Cement Regulatory History

- 1971 – NSPS for Portland Cement promulgated. PM emissions limits only.
- 1999 – Promulgated MACT standards for Portland Cement Manufacturing. Only regulated emissions for PM (all major sources) and Dioxins (all sources) and total hydrocarbons (THC) (greenfield sources only).
  - PM is a surrogate for non-mercury metals
  - THC is a surrogate for non-dioxin organic HAP
- 2000 – D.C. Circuit Court remanded parts of the MACT standards for Portland Cement. EPA must set standards for hydrochloric acid (HCl), mercury (Hg), and THC.

# Portland Cement Regulatory History (Con't)

- 2006 – Final response to remand. Numerical emission limits for Hg and THC for new sources only. Judicial review petitions were filed. Administrative petitions were also filed and we agreed to reconsider the final rule.
- June 2008 – Proposed NSPS amendments that lowered the PM limit and added limits for SO<sub>2</sub> and NO<sub>x</sub>.
- May 2009 – Proposed MACT, numerical emissions limits for HCl, Hg, THC, and PM for all sources
- August 6, 2010 Signed final rule, published on September 9, 2010.

# Major Changes as a Result of the September 2010 Final Rules

- Set numerical emissions limits for Hg, THC, and HCl for new and existing non hazardous waste (nhw) cement kilns.
- Significantly reduced the PM emissions limit for new (NSPS and NESHAP) and existing (NESHAP) nhw cement kilns.
- Regulated open clinker piles.
- Set separate emissions limits for kiln startup/shutdown.



# Major Changes as a Result of the September 2010 Final Rules (Con't)

- Added emissions limits for NO<sub>x</sub> and SO<sub>2</sub> to the NSPS.
- Required continuous monitoring for compliance.
- Added an affirmative defense requirement for malfunctions.
- Completely rewrote testing and monitoring section to (hopefully) make these sections easier to read and understand.

# Kiln MACT Limits in Proposed and Final Rule

Pollutant/Operating Mode	Proposed MACT	Final MACT
Mercury	Existing - 43 lb/MM tons clinker New - 14 lb/MM tons clinker	Existing - 55 lb/MM tons clinker New - 21 lb/MM tons clinker
Total Hydrocarbons	Existing - 7 ppmv New - 6 ppmv	Existing - 24 ppmv New - 24 ppmv
Organic HAP (also applies to raw material driers) *	Existing - 2 ppmv New - 1 ppmv	Existing - 9 ppmv New - 9 ppmvd

\* Alternative to the THC standard

# Kiln MACT Limits in Proposed and Final Rule (Con't)

Pollutant/Operating Mode	Proposed MACT	Final MACT
HCl (Applies to major sources only)	Existing - 2 ppmv New - 0.1 ppmv	Existing - 3 ppmv New - 3 ppmv
PM*	Existing - 0.085 lb/ton clinker New - 0.080 lb/ton clinker	Existing - 0.04 lb/ton clinker New - 0.01 lb/ton clinker
Hg, PM, HCl, THC, Organic HAP during Startup/Shutdown	Same as Normal Operation	Concentration based standard equivalent to normal operation with no oxygen correction

\* Compliance for the proposed limits was based on a short term test. Compliance for the final limits is a 30 day rolling average.

# Final Standards for Open Clinker Piles

- Clinker Piles over 1000 feet from plant boundary.
  - Enclose with a three sided barrier and roof
  - Cover the open side with a wind fence
  - Contain materials adjacent to the barrier with a wind fence on at least two sides
  - Cover clinker at all times except as necessary for loading and unloading
  - Inactive clinker piles may be covered with a tarp
- Clinker piles 1000 feet or less from plant boundary must be enclosed in a building.
- These requirements were taken directly from Rule 1156 of the South Coast Air Quality Management District.

# Monitoring and Testing Requirements

- Mercury
  - Monitors meeting requirements of PS-12A or 12B
  - 30-day rolling average
- THC
  - THC CEMS meeting requirements of PS-8
  - 30-day rolling average
- HCl
  - If the facility has a wet scrubber compliance test every 30 months using EPA Method 321
  - If no wet scrubber, continuous monitor meeting requirements of PS-15, 30-day rolling average
- PM
  - PM CEMS
  - 30-day rolling average

# NSPS Emissions Limits

Pollutant	Proposed	Final
PM*	0.086 lb/ton Clinker	0.01 lb/ton clinker
NOx	1.5 lb/ton clinker	1.5 lb/ton clinker
SO <sub>2</sub>	1.33 lb/ton clinker	0.4 lb/ton clinker

\* Compliance for the proposed limit was based on a short term test. Compliance for the final limit is a 30 day rolling average.

# NSPS Monitoring Requirements

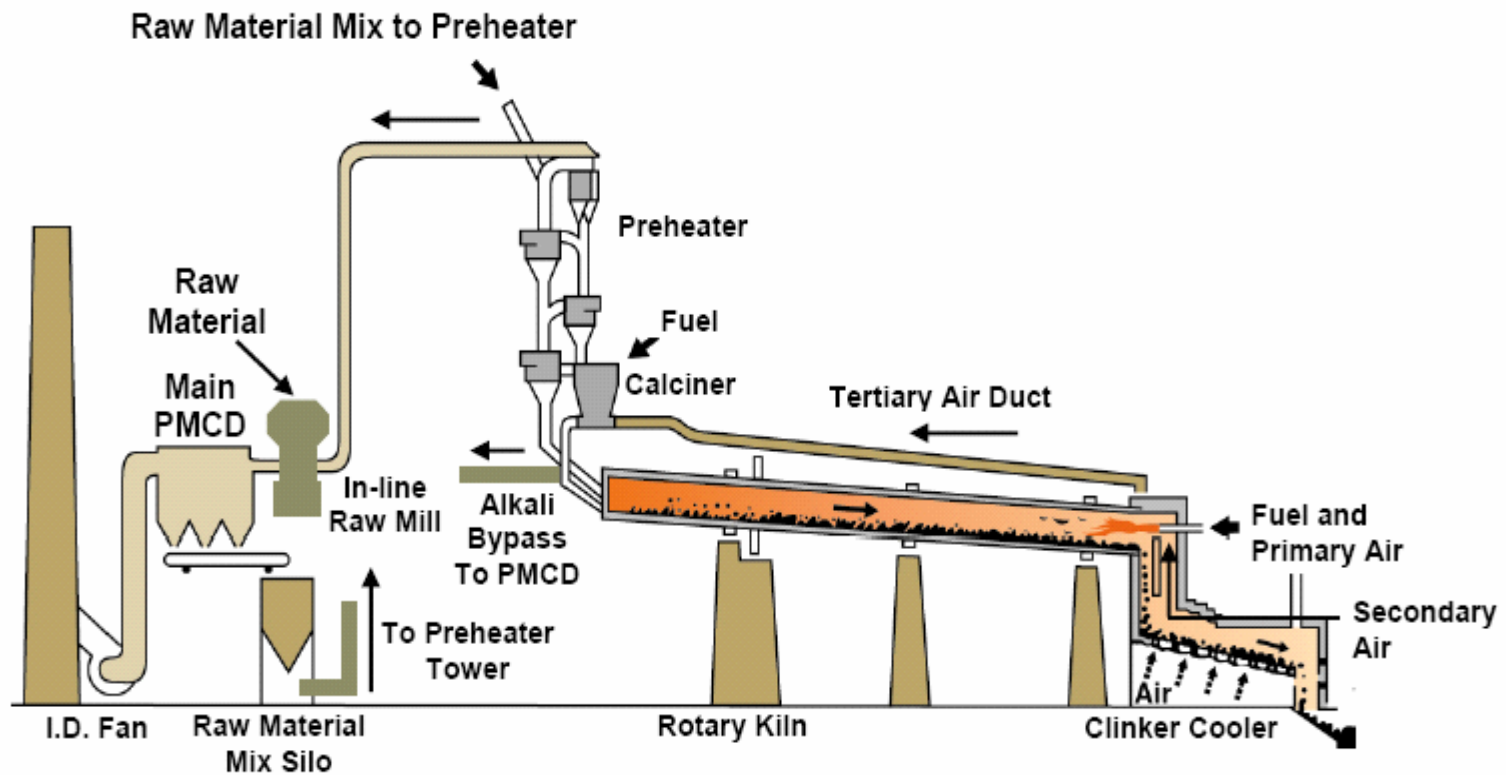
- SO<sub>2</sub>
  - SO<sub>2</sub> monitor meeting requirements of PS-2
  - 30-day rolling average
  
- NO<sub>x</sub>
  - NO<sub>x</sub> CEMS meeting requirements of PS-2
  - 30-day rolling average
  
- PM
  - PM CEMS meeting requirements of PS-11
  - 30-day rolling average

# What Didn't Change

- The emission limits for dioxin/furans and temperature limit requirements were not changed.
- Emission limits for opacity were unchanged – except that opacity limits are not applicable to any source with a bag leak detector or PM CEMS.
- We did not set NSPS VOC or CO limits



# Process Diagram Preheater/Calciner Kiln



# Current Control Technologies

- Mercury - one kiln currently controls mercury using activated carbon injection and estimates they can achieve 85 percent control.
- THC - one kiln controls THC with a regenerative thermal oxidizer and achieves 98 percent removal of THC and CO combined.
- PM - all kilns have either ESPs or fabric filters to meet the 1999 NESHAP PM limit of 0.5 lb/ton clinker (0.3 lb/ton feed).
- SO<sub>2</sub> – five kilns have limestone wet scrubbers for SO<sub>2</sub> control. A few kilns have some type of lime injection system. These controls also reduce HCl emissions and (at least in the case of wet scrubbers) mercury emissions.
- NO<sub>x</sub> – Five to fifteen kilns have selective non-catalytic reduction systems.

# Projected Control Technologies

## ■ Mercury

- Limestone wet scrubber
- Activated carbon injection <sup>a</sup>
- Diversion of some material collected in the main PMCD directly to the finish mill

## ■ THC

- Activated carbon injection <sup>a</sup>
- Regenerative thermal oxidizer (may require a wet scrubber upstream for acid gas removal)

<sup>a</sup> Includes a second fabric filter for carbon capture

# Projected Control Technologies (Con't)

- PM<sup>a</sup>
  - Addition of membrane bags
  - Replacement of ESPs with fabric filters
- HCl and SO<sub>2</sub>
  - Limestone wet scrubber
  - Lime Injection
- NO<sub>x</sub>
  - Selective non-catalytic reduction
  - Selective catalytic reduction

<sup>a</sup> If a source installs an ACI system to control mercury, which would include a new fabric filter to capture the carbon, changes to the existing PMCD may not be necessary to meet the new PM limit

# Projected Control Technologies

Control Type	Pollutants Controlled	Maximum estimated control efficiency (percent)	Number of projected installations <sup>c</sup>
Lime injection	HCl	70	2
Limestone wet scrubber	Mercury HCl	Mercury – 80 HCl – 99.9	59-117
Activated Carbon Injection <sup>a</sup>	Mercury THC/Organic HAP	Mercury – 90 Organic HAP - 80	71-153
Regenerative Thermal Oxidizer <sup>b</sup>	THC	98	10-21
Membrane Bags added to existing Fabric Filter	PM	>99.9	6-28
Fabric Filter	PM	>99.9	0-2
Selective NonCatalytic Reduction	NOx	50-60	7

<sup>a</sup> Includes a second fabric filter for carbon capture

<sup>b</sup> May require a wet scrubber upstream for acid gas removal.

<sup>c</sup> Based on an estimated population of about 153 kilns. Many kilns may require multiple controls.

# Reconsideration Petitions

- We have received four petitions for reconsideration. Two of these included a request for a stay. Petitioners main issues:
  - Impacts of CISWI solid waste definition on NESHAP standards (requesting redo of floors with potential CISWI kilns removed).
  - Regulation of open clinker storage piles (no opportunity for comment on the final regulations).
  - Startup, shutdown and malfunction standards (final rule approach was fundamentally different from proposal).
  - Significantly reduced PM limits (based on new data, public did not have the opportunity to comment on these data).
  - Affirmative defense for malfunctions.
  - Monitoring provisions and their applicability to monovents.
- Nineteen lawsuits have been filed.



# Current Rulemaking Efforts

We plan to publish a notice in a few weeks. This notice will:

- Clarify that for existing sources the compliance date for all new and changed requirements is three years.
- Confirm that all emissions limits from the 1999 and 2006 final rules remain in effect until a source has complied with the September 2010 limits.



# Future Actions

- We intend to further revise the testing and monitoring section of the rule in response to questions or comments received on errors and clarity. This will be done through notice and comment rulemaking.
- We have made no decision at this time on the requests for reconsideration.





# Questions

- Question: Do sources have to continue to comply with the old limits until the new limits take effect?
- Answer: Yes, and we are going to publish a notice to clarify that the 1999 and 2006 limits remain in effect until a source has complied with the new emissions limits.

# Questions

- Question: Is there a way to convert the new PM limit to a lb/ton feed basis? And why are the new limits in lb/ton clinker rather than lb/ton feed?
- Answer: We use a conversion of 1.65 tons feed per ton of clinker. The old 0.3 lb/ton feed PM limit is equivalent to 0.5 lb/ton clinker, and is not equivalent to the new 0.04 lb/ton clinker limit for existing kilns. We decided to normalize the standard on an output basis because we believe it encourages sources to be more efficient.

# Questions

- Question: What is the current state of the art for the kilns which use selective catalytic reduction (SCR) to reduce NO<sub>x</sub>?
- Answer: We know of three kilns in Europe that have installed SCR systems. As far as we know these installations have been successful. There is one cement kiln in the US that is in the process of installing SCR. We hope to obtain information from US installation once it becomes operational. The main concern with SCR is the potential buildup of material in the catalyst.

# Questions

- Question: What concerns have been raised concerning the use of PM CEMS?
- Answer: The main concern was using PM CEMS after a wet scrubber. Not all types of PM CEMS will work in these environments.



# Other Questions?