NAAQS Issues

Impact of Ambient Air Quality Rules on Fossil Fueled Power Plants
McIlvaine Company
December 5, 2011

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Edison Electric Institute
This presentation:
- Identify some problems but not fixes
- NAAQS compliance obligations after CSAPR/MACT?
- Utility emissions plummeting
- CSAPR and MACT – new controls
- MACT update
- CSAPR update
- Impacts on Ozone & PM (with other Fed/state programs)
- Regional haze update
- NAAQS uncertainties, including new Transport Rules
Possible Timeline for Environmental Regulatory Requirements for the Utility Industry

**Ozone (O₃)**
- NOx Cap
- Ozone NAAQS

**SOₓ/NOₓ/Visibility**
- SO₂ Primary NAAQS
- NOₓ Primary NAAQS
- CO₂ Regulation (PSD/BACT)

**CAIR/Transport**
- CAIR Vacated
- CAIR Remanded
- Transport Rule Proposal Issued (CAIR Replacement)
- EPA Action on Regional Haze/BART
- CSAPR Issued (CAIR/Transport Rule Replacement)
- SOₓ/NOₓ Secondary NAAQS
- GHG NSPS Final
- PCB Proposed Rule Expected
- 316(c) Final Rule Expected
- Ozone Transport Rule
- PM Transport Rule

**Water**
- Effluent Guidelines Final Rule Expected
- Effluent Guidelines Compliance 0-5+ yrs After Final Rule

**PCB Phase-out**
- Effluent Guidelines Implementation (existing sources)
- BART (Visibility) Deadline at Some Plants

**PM/PM₂.₅**
- Proposed PM-2.₅ NAAQS Revision
- Proposed Final PM-2.₅ NAAQS Revision

**Ash**
- HAPs MACT Final Rule Expected
- HAPs MACT Phase I Reductions
- Final Rule for CCBs Mgmt

**Hg/HAPS**
- CSAPR Phase II Reductions
- CSAPR Final Rule Expected (start of phase-out period)

**CO₂**
- GHG NSPS Proposal
- GHG NSPS Final
- Proposed Final Rule for CCBs Management
- Final Rule for CCBs Mgmt
- PCB Final Rule Expected (start of phase-out period)
- Begin Compliance Requirements Under Final CCB Rule (ground water monitoring, double liners, closure, dry ash conversion)

Adapted from Wegman (EPA 2003 Updated 09-12-2011)
## Anticipated NAAQS Implementation Milestones (October, 2011)

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>NAAQS Promulgation Date</th>
<th>Designations Effective</th>
<th>110(a) SIPs due (3 yrs after NAAQS promulgation)</th>
<th>Attainment Demonstration Due</th>
<th>Attainment Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO$_2$ (primary)</td>
<td>Jan 2010</td>
<td>Feb 2012</td>
<td>Jan 2013</td>
<td>Aug 2013</td>
<td>Feb 2017</td>
</tr>
<tr>
<td>SO$_2$ (primary)</td>
<td>June 2010</td>
<td>July 2012</td>
<td>June 2013</td>
<td>Jan 2014</td>
<td>July 2017</td>
</tr>
<tr>
<td>PM$_{2.5}$ (current review)</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>NO$_2$/SO$_2$ Secondary</td>
<td>Mar 2012</td>
<td>TBD</td>
<td>Mar 2015</td>
<td>TBD</td>
<td>TBD</td>
</tr>
</tbody>
</table>
Power Plants Reduce Emissions Despite Increasing Electricity Demand

1990 represents the base year. Graph depicts increases or decreases from the base year.

Sources: U.S. Department of Energy, Energy Information Administration (EIA), U.S. Environmental Protection Agency (EPA), and U.S. Bureau of Economic Analysis.

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## EGU Emissions

<table>
<thead>
<tr>
<th>Emission</th>
<th>Year</th>
<th>SO2 (million tons /yr)</th>
<th>NOx</th>
<th>PM2.5</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGU</td>
<td>1990</td>
<td>15.7</td>
<td>6.7</td>
<td></td>
<td>CAMD</td>
</tr>
<tr>
<td></td>
<td>2005</td>
<td>10.4</td>
<td></td>
<td>0.51</td>
<td>MACT RIA - base case</td>
</tr>
<tr>
<td></td>
<td>2008</td>
<td></td>
<td>3</td>
<td></td>
<td>CAMD</td>
</tr>
<tr>
<td></td>
<td>2010</td>
<td>5.1</td>
<td></td>
<td>2</td>
<td>CAMD</td>
</tr>
<tr>
<td></td>
<td>2016</td>
<td>3.6</td>
<td></td>
<td>0.38</td>
<td>MACT RIA - base case</td>
</tr>
<tr>
<td></td>
<td>2016</td>
<td>1.2</td>
<td></td>
<td>0.29</td>
<td>MACT RIA - control case</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(92% reduction)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-EGU</td>
<td>2016</td>
<td></td>
<td>1.4</td>
<td>0.41</td>
<td>MACT RIA - control case</td>
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<tr>
<td>Point</td>
<td></td>
<td>(incl. 2011 boiler MACT)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National</td>
<td>2016</td>
<td></td>
<td>3.9</td>
<td>3.8</td>
<td>MACT RIA - control case</td>
</tr>
<tr>
<td>Man-made</td>
<td></td>
<td>(utilities: 8% of total)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
How Low Can You Go?

- Limbo:
  - A West Indian dance in which the dancers keep bending over backward and passing under a pole that is lowered slightly each time
  - A region on the border of hell or heaven
Some Key Dates –
EGU Emission Regulation

- 2012 – CSAPR SO2, NOx and ozone-season NOx
- 2014 – CSAPR SO2 (16 Group 1 states)
- 2014/15 – controls related to 2006 PM2.5 NAAQS
- 2015-16 – Utility MACT controls – SO2 and PM2.5
- 2015 + - Utility NOx controls related to 2008 ozone NAAQS
- 2016? – Utility SO2 controls to meet 2010 1-hr SO2 NAAQS in 2017 (compliance based on modeling 2017 concentrations)
- 2016-7 – BART (5 yrs after 2012 settlement agreement dates)
- Meeting 2013 (PM) and 2014 (ozone) NAAQS
  - 2019+ – deadline to meet 2014 ozone NAAQS
  - 2020? – controls to meet 2013 PM2.5 NAAQS
  - When new Transport Rule controls needed?
  - When local controls needed?
Cross-State Air Pollution Rule
(proposed as Transport Rule, replaces CAIR)

- Final rule in Federal Register August 8, 2011
- Supplemental proposal (July 11) to add NO\textsubscript{X} ozone season requirements for IA, KS, MI, MO, OK, WI (OK = 28th state)
- Revision proposal:
  - Modified state budgets
  - Trading variability assurance provisions pushed to 2014
Cross-State Air Pollution Rule

- Numerous legal challenges filed:
  - Challenging final rule: states, power entities; coal companies; UMWA; IBEW; customers
  - States, environmental groups and three electric generators intervening to support EPA
  - Issues: imposition of FIP, notice and comment, inclusion of Texas for PM, models/data, time to comply, reliability, electricity price impact
  - Requests for stay
Counties Violating Air Quality Standards in the Cross-State Air Pollution Rule Region (based on 2003-07 air quality monitoring data)

Counties in red are violating one or more of the following NAAQS:

- 1997 PM$_{2.5}$
- 1997 ozone
- 2006 PM$_{2.5}$

The counties in red have at least one ozone and/or PM$_{2.5}$ monitor which violated the NAAQS in the periods 2003-2005, 2004-2006, and/or 2005-2007.
Cross-State Air Pollution Rule

Counties with Monitors Projected to Have Ozone and PM$_{2.5}$ Air Quality Problems in 2014 with the Cross-State Air Pollution Rule

This analysis assumes that the Clean Air Interstate Rule is not in effect. It does reflect other federal and state requirements to reduce emissions contributing to ozone and fine particle pollution that were in place as of February 2009.
Concern is regional visibility degradation from emission sources, as affects visual air quality in 156 Class I areas

Compliance through SIPs:
- Long-term goal: no degradation by 2064
- Reasonable progress/Best Available Retrofit Technology

SIPs – consent decree requiring EPA to act from December 2011 through November 2012
- BART limits for 1962-77 plants, considering cost, impact on visibility
  - BART: for large electric plants, SO$_2$ scrubber and NOx controls by ~2017 (EPA FIPs for some western plants)
Utility MACT Issues

- EPA projects the installation of:
  - 81 GW of dry scrubbing controls, such as DSI, to address acid gases
  - 93 GW of activated carbon injection (ACI) to address mercury
  - 166 GW of fabric filters (baghouses) to address non-mercury metals

- Some plants will close or re-power
- Some plants will need more than 3 or even 4 years
- Litigation
National Ambient Air Quality Standards (NAAQS)

- NAAQS continually ratcheted down over time
  - President halted reconsideration of 2008 rule in Sept. 2011
  - **PM 2.5** – 1997, 2006, 2012
  - New 1-hour **NO\textsubscript{2}** and **SO\textsubscript{2}** standards in 2010
NAAQS - Uncertainties

- Litigation
- 5-year reviews to reevaluate standard levels
- Designations – especially given new approach to using modeling for 1-hour SO₂ NAAQS
- State implementation plans (SIPs) to apportion necessary actions
- Regional EPA “transport rules” to address new PM and ozone NAAQS (following CSAPR and previous transport rules)
NAAQS - Uncertainties

- Cost/benefit
- Attainability/background levels
- Implementation
  - Modeling – designations
  - Modeling – new sources
  - Offsets in non-attainment areas
- Primary (health) vs. "secondary" (environment/welfare) standards