



# Update on the National Air Pollution Standards and Related Activities

Bill Harnett

U.S. EPA Office of Air Quality Planning and Standards

*Clean Air Act Advisory Committee*

*Meeting of Subcommittee on Permits, New Source Review and Toxics*

*Washington, DC*

*November 16, 2011*



# Outline of Presentation



- NAAQS Review Schedule and Implementation Milestones
  - SO<sub>2</sub>
  - NO<sub>2</sub>
  - NO<sub>2</sub>/SO<sub>2</sub> secondary
  - Lead
  - Carbon Monoxide
- Indian Country Designations Policy
- Regional Haze Implementation
- GHG Permitting
- MACT/NESHAP/NSPS
- National Air Emissions Measurement Study for Animal Feeding Operations

# NAAQS Review Schedule



MILESTONE	POLLUTANT						
	PM	NO <sub>2</sub> /SO <sub>2</sub> Secondary	Ozone	Lead	NO <sub>2</sub> Primary	SO <sub>2</sub> Primary	CO
Proposal	TBD	<u>July 12, 2011</u>	Fall 2013	Winter 2013	Summer 2015	Winter 2015	Spring 2016
Final	TBD	<u>Mar 20, 2012</u>	July 2014	Fall 2014	Spring 2016	Spring 2016	Winter 2016

NOTE: Underlined dates indicate court-ordered or settlement agreement deadlines.

# Anticipated NAAQS Implementation Milestones



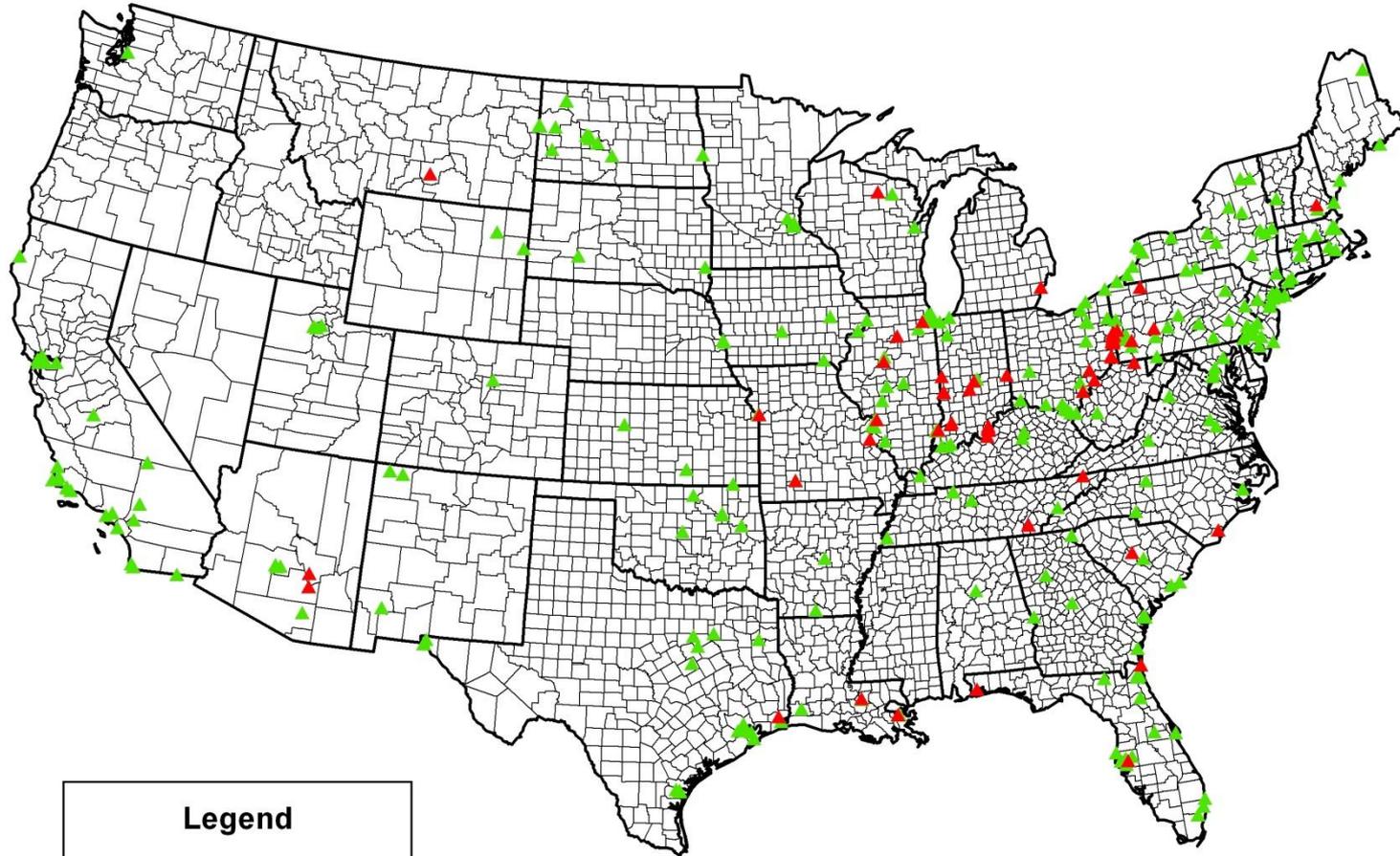
Pollutant	NAAQS Promulgation Date	Designations Effective	110(a) SIPs due (3 yrs after NAAQS promulgation)	Attainment Demonstration Due	Attainment Date
PM <sub>2.5</sub> (2006)	Sept 2006	Dec 2009	Sept 2009	Dec 2012	Dec 2014/2019
Lead	Oct 2008	Dec 2010/2011	Oct 2011	June 2012/2013	Dec 2015/2016
NO <sub>2</sub> (primary)	Jan 2010	Feb 2012	Jan 2013	Aug 2013	Feb 2017
SO <sub>2</sub> (primary)	June 2010	July 2012	June 2013	Jan 2014	July 2017
Ozone (2008)	Mar 2008	2012	Mar 2011	2015	2015-2035
Ozone (current review)	July 2014	2016	July 2017	2019/2020	2019-2039
PM <sub>2.5</sub> (current review)	TBD	TBD	TBD	TBD	TBD
NO <sub>2</sub> /SO <sub>2</sub> Secondary	Mar 2012	TBD	Mar 2015	TBD	TBD

# SO<sub>2</sub> NAAQS



- New 1-hr 75 ppb SO<sub>2</sub> NAAQS promulgated June 3, 2010
- Epidemiologic studies have associated exposure to SO<sub>2</sub> with increased emergency room visits and/or hospitalizations.
- Clinical studies reported that five minute SO<sub>2</sub> exposures  $\geq$  200 ppb can result in respiratory problems, such as narrowing of the airways, which can cause difficulty breathing and increased asthma symptoms.
- Standard provides substantial protection from high, 5–10 minute concentrations of concern.

# SO<sub>2</sub> Monitor Design Values 2008-2010



**Legend**

- ▲ Above 2010 1 Hr NAAQS
- ▲ Below 2010 1 Hr NAAQS

# SO<sub>2</sub> NAAQS Implementation



- Challenge in determining nonattainment/attainment areas. Difficult to have sufficient ambient monitoring.
- Proposed approach: use monitoring (59 violating monitors with 2008-10 data) AND modeling information. Account for reductions from major rules by 2017.

Nonattainment Areas Based on Monitoring	Other Areas
2012: Designate nonattainment areas (to attain by 2017)	2012: Designate areas without monitoring as “unclassifiable”
2013: Sec. 110 infrastructure plans due	2013: Sec. 110 infrastructure plans plus attainment and maintenance plan due; with modeling, show attainment by 2017
2014: Attainment plans due, with modeling	
2017: Attainment date	2017: Verify attainment

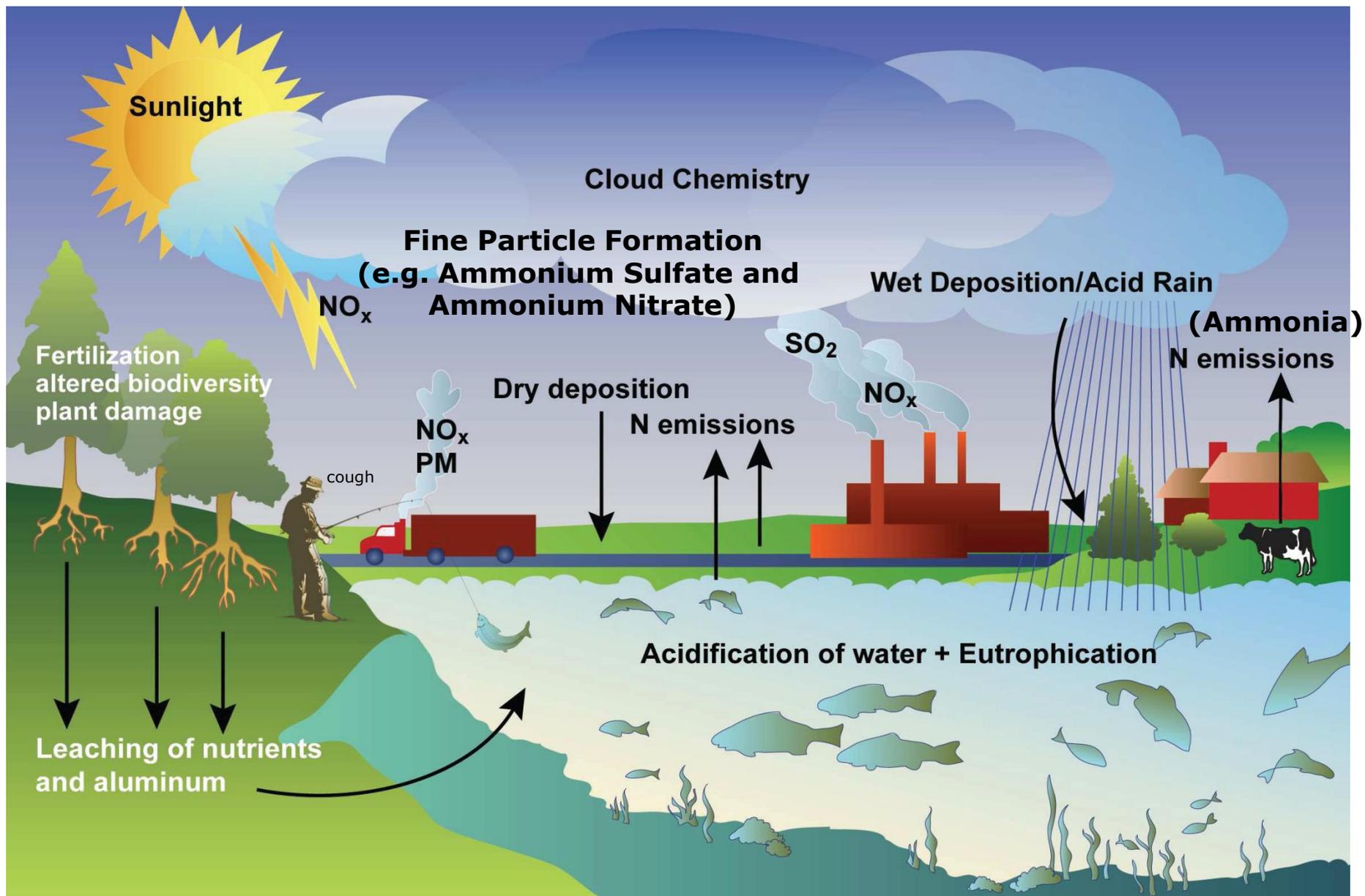
- Sept. 2011: implementation and modeling guidance out for public comment. Final version in late 2011. See <http://www.epa.gov/air/sulfurdioxide/implement.html>
- Future rulemaking is planned for 2012

# NO<sub>2</sub> NAAQS Implementation



- On January 22, 2010, EPA strengthened the primary national ambient air quality standard (NAAQS) for nitrogen dioxide (NO<sub>2</sub>) to increase protection of public health
  - Added a 1-hour NO<sub>2</sub> standard at 100 parts per billion (ppb); and
  - Retained the annual average NO<sub>2</sub> standard at a level of 53 ppb
  - Scientific evidence links short-term NO<sub>2</sub> exposures with an array of adverse respiratory effects including increased asthma symptoms
- To determine compliance, EPA also made changes to the NO<sub>2</sub> air quality monitoring network requirements. Monitoring is needed to measure:
  - Peak, short-term concentrations. 52 near-road sites in cities with population > 1 million (2013-14)
  - Highest concentrations of NO<sub>2</sub> that occur over wider community areas,
  - Concentrations impacting susceptible and vulnerable groups
- No violating monitors based on existing community-wide monitoring network. No nonattainment areas expected to be designated initially.
- Guidance on NO<sub>2</sub> PSD permit modeling issued June 29, 2010  
<http://www.epa.gov/NSR/guidance.html>
  - Estimating ambient NO<sub>2</sub> concentrations and determining compliance with the new 1-hour NO<sub>2</sub> standard

# Ecosystem Effects of Nitrogen and Sulfur



# NO<sub>2</sub>/SO<sub>2</sub> Secondary Standards

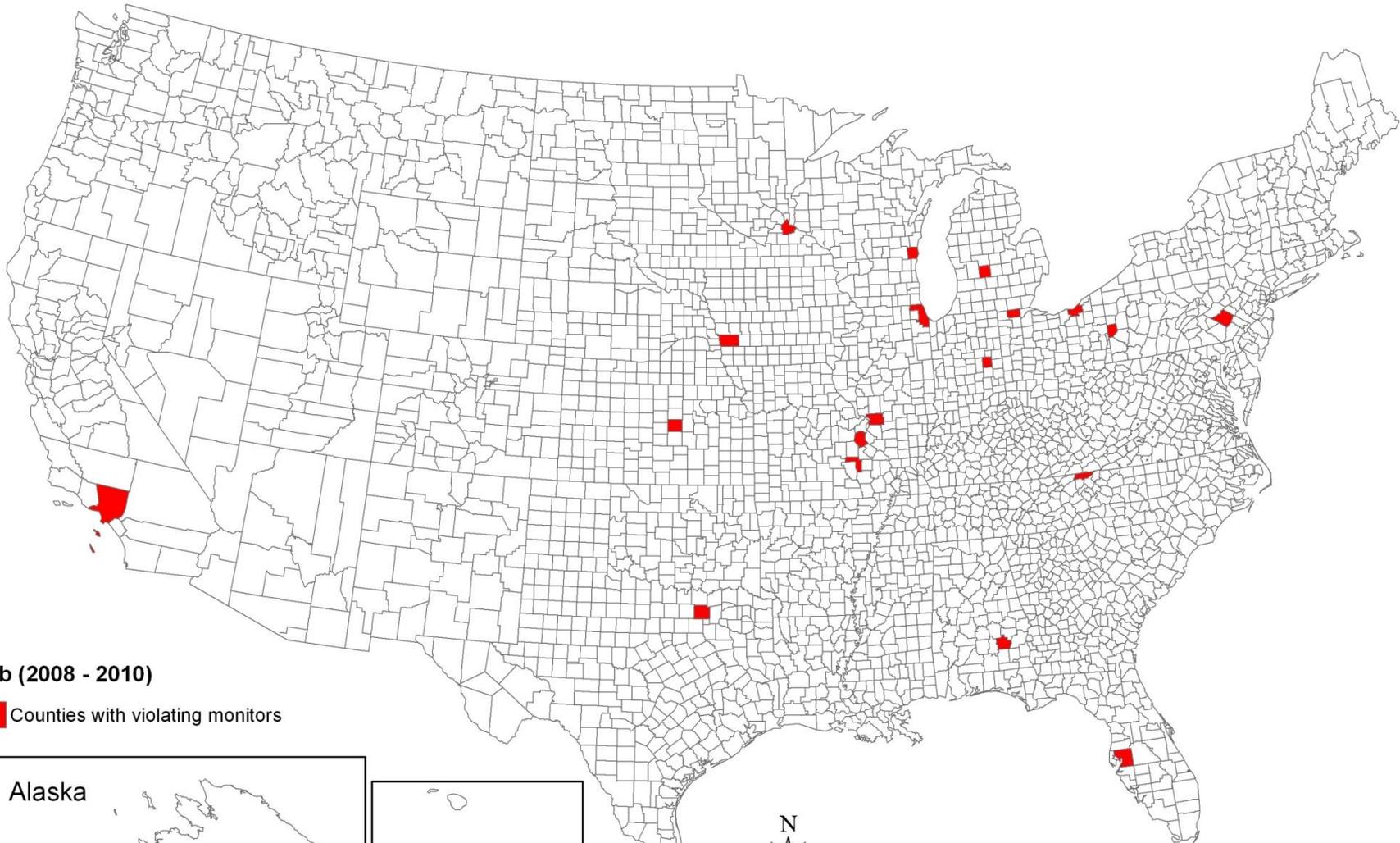


- Intended objective: develop combined secondary standard to address ecological effects associated with both pollutants (with a focus on effects to aquatic ecosystems)
- In July 2011, EPA proposed to revise the secondary NO<sub>2</sub> and SO<sub>2</sub> standards by establishing an additional set of secondary standards identical to the new health-based primary standards set in 2010
  - Because of remaining complexities and uncertainties, EPA cannot judge whether a new, multi-pollutant standard would provide the appropriate degree of protection
  - Planning a 5-year field pilot program to collect and analyze data to inform next NAAQS review
  - 3-5 locations in acid-sensitive ecoregions (starting 2013)
  - Final decision on revised NAAQS due March 2012
- Exploring ways to align any new future implementation requirements with primary standards

# Lead NAAQS Implementation

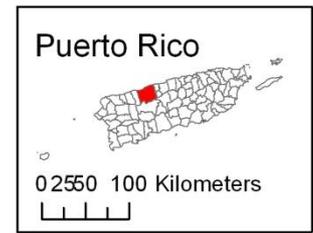
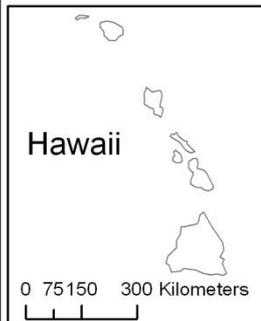
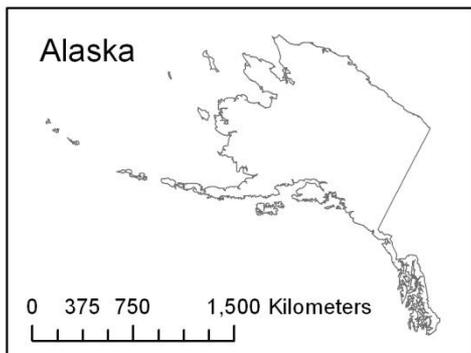


- Lead NAAQS promulgated in October 2008
  - Exposure causes neurological effects in children and cardiovascular effects (e.g., high blood pressure and heart disease) in adults.
  - Infants and young children are especially sensitive to even low levels of lead, which may contribute to behavioral problems, learning deficits and lowered IQ.
  - Standard:  $0.15 \mu\text{g}/\text{m}^3$  (rolling 3-month average)
- Area Designations
  - December 2010: Round 1 (16 nonattainment areas). SIP deadline June 2012; Attainment deadline December 2015.
  - Late 2011: Round 2 (5 new areas). SIP deadline June 2013. Attainment deadline December 2016.
  - <http://www.epa.gov/leaddesignations/2008standards/>
- Implementation Assistance
  - Draft technical note on modeling (February 5, 2009) available at <http://www.epa.gov/ttnamti1/files/ambient/pb/ModelingQA.pdf>
  - Implementation Q & A covering general implementation issues, monitoring and modeling (July 8, 2011) available at <http://www.epa.gov/airquality/lead/implement.html>
  - Updating control technology guidance for stationary sources (final in 2012)



**Pb (2008 - 2010)**

■ Counties with violating monitors



# CO NAAQS Implementation



- Final decision to retain existing standards (9 ppm 8-hr, 35 ppm 1-hr) issued on August 12, 2011
- Current implementation approach will continue
- Final ambient air monitoring requirements include co-locating one CO monitor with a “near-road” NO<sub>2</sub> monitor in urban areas having populations of 1 million or more
  - Approximately 52 CO monitors within 52 urban areas, as part of the overall CO monitoring network
  - States may request that an alternative near-road location be used to house a required near-road CO monitor, to be approved by the EPA Regional Administrator on a case-by-case basis

# Policy for Separately Designated Areas of Indian Country



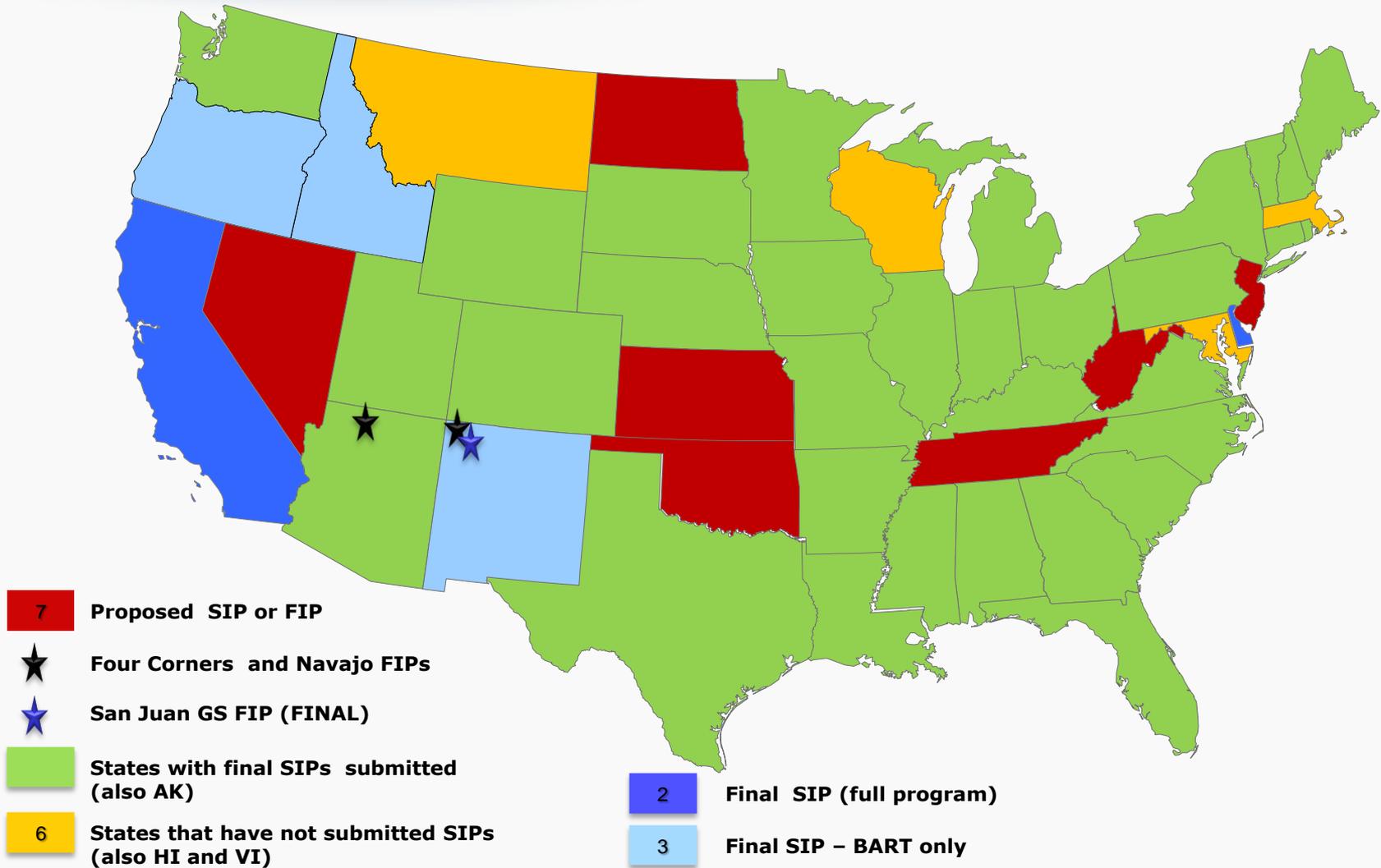
- Draft policy for consultation with Tribes regarding nonattainment area designation process
  - Distributed for comment and undergoing final revision
- On a case-by-case basis, and after consultation with tribes, EPA may designate an area of Indian country separately from adjacent areas
- Indian country to be acknowledged explicitly in Area Designations tables in Code of Federal Regulations (part 81)
- Key points
  - Encourage states and tribes to coordinate on nonattainment recommendations
  - Same factors evaluated for Indian Country as for state areas
  - Where Indian Country is designated separately from an adjacent state area, redesignation to attainment will be independently evaluated for Indian Country

# EPA Actions on Regional Haze SIPs



- For the protection of visibility in national parks and wilderness areas
  - Ensure “reasonable progress” toward Clean Air Act goal of remedying existing impairment
  - Best Available Retrofit Technology on major contributing sources
  - Plans required from all States in 2008.
- Complaints filed by environmental groups to spur additional action by States and EPA
  - To address States that have not submitted a plan, or to require additional action by EPA on already-submitted plans
  - In some cases, EPA has required a Federal implementation plan to require control measures from specific sources
- Rule proposing that Transport Rule can satisfy BART for certain sources is under development
  - Expect proposal in December 2011 and final in May 2012
- Upcoming requirements
  - 2013 progress review (5-year mark)
  - 2018 state implementation plan revision (required every 10 years)

# Regional Haze Program Status



# Status of State GHG Programs



- In 2010, EPA took a series of actions to ensure that permitting would continue without disruption after the date when GHG emissions became subject to PSD regulations - January 2, 2011.
- “SIP Call,” requiring 13 states to revise their PSD programs to cover GHG emissions.
  - Arizona (Pinal Co., Rest of AZ), Arkansas, California (Sacramento), Connecticut, Florida, Idaho, Kansas, Kentucky (Rest of KY, Jefferson Co.), Nebraska, Nevada (Clark Co.), Oregon, Texas, Wyoming
- FIPs to cover those programs that did not address how the program will apply to pollutants newly subject to regulation or that did not submit revised SIPs by their selected deadline.
  - Arizona (Pinal Co. and Rest of AZ), Arkansas, Florida, Idaho, Kansas, Kentucky (Jefferson Co.), Oregon, Texas, Wyoming

# Status of State GHG Programs



- As of October 2011, 5 of the 13 “SIP Called” states have received approval of their plans to regulate GHGs and 5 of these states are awaiting approval of their plans to receive that authority
  - **Approved**
    - Connecticut, Kansas, Kentucky (Rest of KY), Nebraska, California (Sacramento)
  - **Awaiting Approval (States with \* are Delegations)**
    - Arizona (Pinal Co.\*, Rest of AZ)\*, Kentucky (Jefferson Co.), Nevada (Clark Co.), Oregon, Idaho
- Once EPA approves the plan for Nevada (Clark Co.), EPA or the states will have authority to permit GHG sources for all the states

# GHG Permit Status



- As of November 2011, about 100 permit applications that likely include a GHG component have been submitted and include source categories such as:
  - Biofuel Production
  - Cement Plants
  - Electric Generating Units
  - Lime Production Facilities
  - Outer Continental Shelf Exploration
  - Pulp and Paper Mills
  - Refineries
- 16 companies/plants have been issued GHG permits
  - EPA issued 2 of these permits (Palmdale Hybrid Energy Center in Antelope Valley, CA and Eni Holy Cross Drilling Project in OCS Eastern GOM)
  - SIP-approved state/local permitting authorities issued the other 13
- EPA has provided comments on 15 draft GHG permits to be issued by state agencies
- EPA is currently reviewing approximately 15 GHG permit applications for which EPA will issue the permits

# EPA Comments on GHG Permits



- Include adequate support and explanation for form of GHG BACT emissions limit
  - Numerical emissions limit, or design standard or some other requirement if numerical limit deemed infeasible.
  - Must specify averaging time for limits.
  - Consider setting output based limits for GHG (lb/MWh).
  - Limits can be on CO<sub>2</sub>e basis or individual gas basis.
- Ensure practical enforceability, adequate compliance monitoring to measure emissions or efficiency over time.
  - Consideration of a source's non-CO<sub>2</sub> constituents— e.g., CH<sub>4</sub> and N<sub>2</sub>O at combustion sources.
  - CEMS or other CO<sub>2</sub> measurement- preferably direct measurement for EGUs and other large sources.

# EPA Comments on GHG Permits (Cont.)



- Provide adequate explanation for rejecting control options (e.g., CCS) based on feasibility or cost.
  - BACT analysis should explain if most efficient turbine or boiler was not selected.
  - Permit record should clearly show where CCS was eliminated as a potential BACT control technology.
- Affirm that the CO<sub>2</sub>e emissions during start-up and shut-down are included in the compliance calculation for the CO<sub>2</sub>e BACT limits.
- **Bottom line: documentation of GHG control considerations and BACT limits is important for a robust permit record**

# Biomass and GHG Permitting



- Biomass Deferral
  - In Jan 2011, EPA announced an expedited rulemaking to defer completely the application of pre-construction permitting requirements to biomass-fired CO<sub>2</sub> *and other biogenic* CO<sub>2</sub> emissions for a **period of three years**.
    - Final Rule, Fact Sheet, and Response to Comments at: <http://www.epa.gov/nsr/actions.html>;
    - Deferral applies to CO<sub>2</sub> emissions only.
- EPA recently sent the Biomass study to SAB for review
- Spring 2012: SAB Biomass scientific study released
- Late 2012: If necessary, proposed rule addressing biomass study

# Future GHG Permitting Activities



- Ongoing GHG permitting implementation
  - Tailoring Rule Steps 1 & 2
  - Q&A website
- Winter 2012 – Proposed Tailoring Step 3 Rule
- July 2012 – Scheduled Final Tailoring Step 3 Rule (one year for states to adopt)
- July 2013 – Tailoring Rule Step 3 goes into effect
- 2016 - 5-year GHG NSR study and Step 4 final rule

# Oil and Gas Sector Rulemakings



- NSPS improvements are being considered for several emission points, including:
  - Completions of hydraulically fractured (“fracked”) gas wells
  - Compressors
  - Storage vessels
  - Pneumatic devices
  - Equipment leaks
- NESHAP revisions are being considered for:
  - Glycol dehydrators
  - Storage tanks
- Oil and Gas Sector NESHAP and NSPS
  - Proposal issued July 28, 2011
  - Comment period ends November 30, 2011
  - Final to be issued February 28, 2012



Pollutant	2005 Emissions (tpy)
VOC	3,000,000
HAP	130,000
Methane	300 MMT CO <sub>2</sub> e

# Oil and Gas Sector Rulemakings



- On July 28, 2011, the U.S. Environmental Protection Agency (EPA) proposed a suite of highly cost-effective regulations that would reduce harmful air pollution from the oil and natural gas industry while allowing continued, responsible growth in U.S. oil and natural gas production.
- The proposal includes the first federal air standards for wells that are hydraulically fractured. The standards would:
  - Reduce emissions of smog-forming volatile organic compounds (VOCs), and air toxics including the carcinogen benzene.
  - Yield a significant environmental co-benefit by reducing methane emissions from new and modified wells. Methane is a potent greenhouse gas –more than 20 times as potent as carbon dioxide.
- The updated, flexible standards level the playing field by relying on existing, cost-effective technology and will institutionalize best practices that are already in place in some states and in use by several companies.
- The technologies and best practices allow operators to capture and sell natural gas that currently escapes into the air, threatening public health and wasting a valuable resource.
- These technologies will allow the industry to save nearly 30 million dollars per year even as they cut their emissions

# Power Plant Mercury and Air Toxics Rule



- On March 16, 2011, EPA proposed Mercury and Air Toxics Standards, *the first national standards* to reduce emissions of toxic air pollutants from new and existing coal- and oil-fired power plants
- Proposed rule reaffirms the 2000 “appropriate and necessary” finding
- Standards will reduce emissions of:
  - Metals, including mercury (Hg), arsenic, chromium, and nickel
  - Acid gases, including hydrogen chloride (HCl) and hydrogen fluoride (HF)
  - Particulate Matter
- Proposed standards create uniform emissions-control requirements based on proven, currently in-use technologies and processes
- Compliance time line set by Clean Air Act: up to 4 years (3 years plus an additional year if granted by the permitting authority)

# Power Plant Mercury and Air Toxics Rule



## Requirements for Coal-Fired Units

- ▶ Mercury: numeric emission limit would prevent 91% of mercury in coal from being released to the air
- ▶ Acid gases: HCl emission limit as a surrogate for all acid gases; alternatively, SO<sub>2</sub> can be monitored as a surrogate
- ▶ Non-mercury metallic toxic pollutants such as arsenic and chromium: numeric emission limit for total PM as a surrogate, with alternate surrogate of total metal air toxics
- ▶ Organic air toxics (including dioxin): Work practice standards, instead of numeric standards, due to low-detected emission levels. Would ensure optimal combustion, preventing dioxin/furan emissions

## Requirements for Oil-Fired Units

- ▶ Acid gases: Require numerical emission limits for HCl and HF
- ▶ Metal air toxics: Numerical emission limits for total metal air toxics (including Hg) with individual metal air toxics as alternate.
- ▶ Organic air toxics (including dioxin): Work practice standards, instead of numeric standards, due to low-detected emission levels. Would ensure optimal combustion, preventing dioxin/furan emissions.

# Boiler MACT and CISWI Reconsideration



- Issues identified by EPA
  - Full load stack test requirement for carbon monoxide coupled with continuous oxygen monitoring
  - Dioxin emission limit and testing requirements
  - Data considered in setting emission limits may not fully reflect comments received
  - PM standards under GACT for existing area source oil-fired boilers
- Issues identified by Industry
  - Dioxin and CO limits
  - New source limits and HAP testing
  - PM limits for some biomass boilers
- EPA issued a stay on May 18, 2011
- We are working expeditiously on the reconsideration
- Reconsideration proposals will be issued November 30, 2011

# Petroleum Refinery Sector Rulemakings



- 150 domestic refineries
- Taking an integrated approach across the sector to coordinate MACT and NSPS requirements
- Sector NESHAP and NSPS
  - Proposal: December 10, 2011
  - Final: November 10, 2012

Pollutant	2005 Emissions (TPY)
NO <sub>x</sub>	146,185
SO <sub>2</sub>	247,239
VOCs	114,852
HAP	14,000
PM <sub>2.5</sub>	30,333

# Integrated Sector-Based Approach: Petroleum Refinery Sector



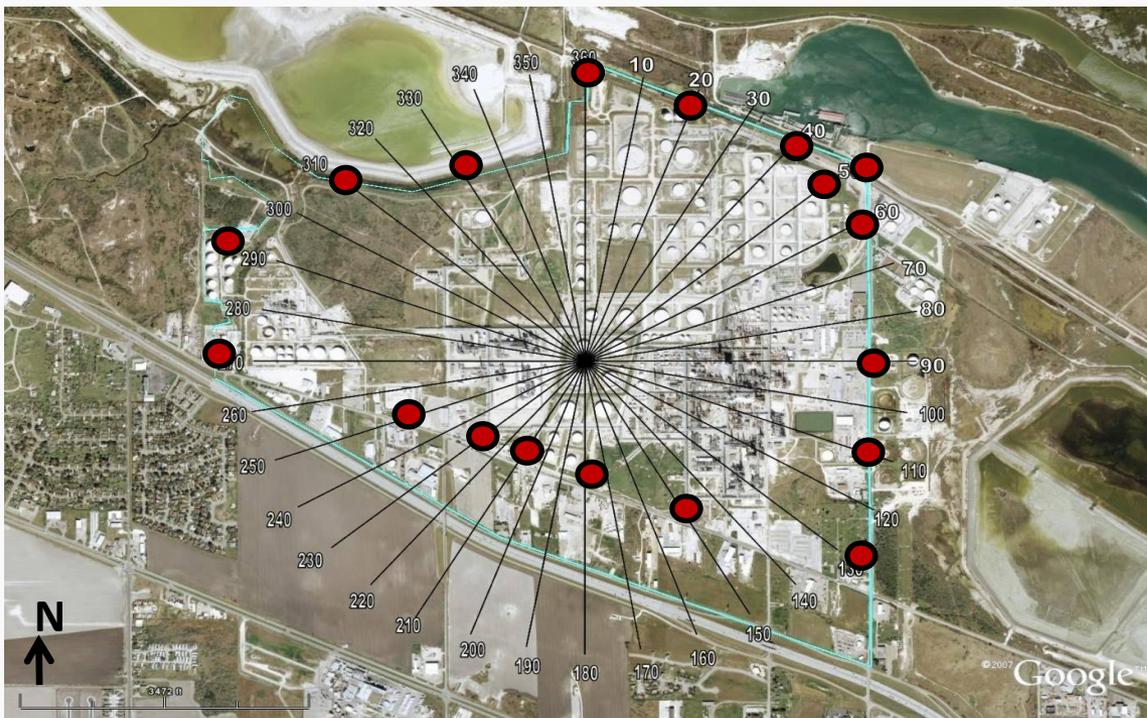
Emission Point	Current Regulations	Rulemaking Approach
Boilers	NSPS, MACT	MACT and NSPS amended
Process Heaters	NSPS	
Flares	NSPS, MACT	
FCCU, Reformer, Sulfur Plant	NSPS, MACT	
Process Vents	MACT	To be amended to reference the Uniform Standards
Heat Exchangers	MACT	
Wastewater	MACT, NESHAP, NSPS, CTG	
Storage	MACT, NESHAP, NSPS, CTG	
Loading	MACT, NESHAP	
Equipment Leaks	MACT, NSPS, NESHAP, CTG	

NSPS = New Source Performance Standards; MACT = Maximum Achievable Control Technology Standard; NESHAP = National Emission Standards for Hazardous Air Pollutants; CTG= Control Techniques Guidelines

# Fenceline Monitoring



- We are considering fenceline monitoring as a possible component of what we may propose for the NESHAP
- Locate passive samplers around the perimeter of each refinery
- If any concentration exceeds the action level, initiate tiered approach to positively identify facility contribution to risk
- If facility contribution to risk is unacceptable, initiate steps to reduce it



# Upcoming Chemical Sector Rulemakings



- Over 450 major source facilities emitting 15,000 tpy of HAP across entire sector
- Proposing NESHAP, based on risk and technology review, for:
  - Pesticide Active Ingredients (PAI)
  - Polyether Polyols (PEPOs)
  - Polymers and Resins IV (P&R IV)
- Court orders require proposal for portions of this sector by November 30, 2011 and a final rule by November 30, 2012



Pollutant	Emissions (tpy)
Methanol	3,139
Hexane	3,080
Toluene	1,324
Styrene	848
Benzene	661
Butadiene	629
Xylenes	531
Ethylene glycol	464

# Iron and Steel Sector Rulemakings



- Revision of the electric arc furnace (EAF) area source MACT rule
  - Compiling data collected from the information collection request (ICR)
  - Considering Hg emission limits with enhanced monitoring
  - Plan to propose revised rule in early 2012
- Consider listing EAFs as a major source for MACT standards
- Review NSPS for EAF and Integrated Iron & Steel
- Address remand of Integrated Iron & Steel MACT
- Evaluate Coke Oven residual risk

Pollutant	2005 Emissions (TPY)
PM <sub>2.5</sub>	14,210
Metal HAP	377
Coke oven emissions	390

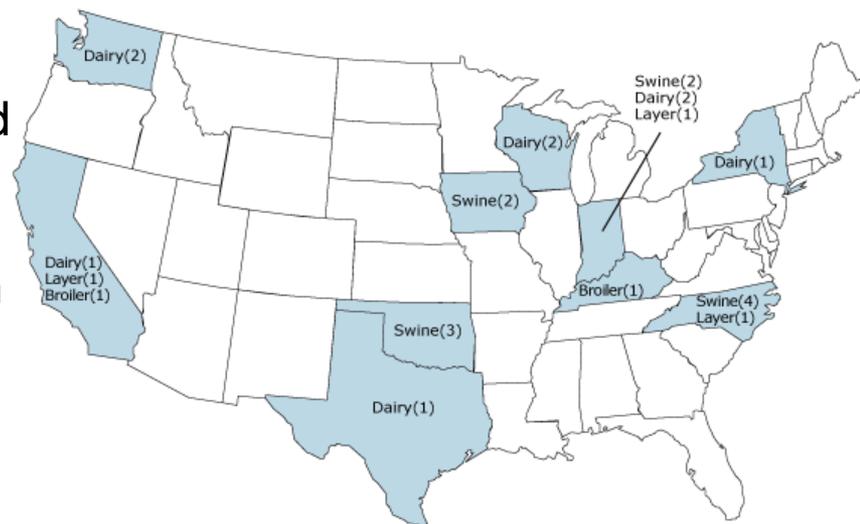
# National Air Emissions Monitoring Study



## Background

- 2-year, industry-funded study coordinated by Purdue University with EPA oversight
- 24 sites in 10 states were monitored from 2007-2010
- Study gathered emissions data for PM ( $PM_{10}$ ,  $PM_{2.5}$ , TSP),  $NH_3$ ,  $H_2S$  and VOCs
- Data will be used to develop emission estimating methodologies for broiler, egg layer, swine and dairy AFOs

Monitoring Site Locations



## USDA collaboration

- Members from Natural Resources Conservation Service and Agriculture Research Service have taken part in the development of the methodologies

# National Air Emissions Monitoring Study



- All stakeholder groups requested to be involved in the emissions estimating methodologies related to the ongoing work in NAEMS
- Responding to these concerns, OAR has requested EPA's Science Advisory Board (SAB) to review the draft emission estimating methodologies (EEMs)
- SAB Schedule
  - September 1, 2011, SAB published a Federal Register Notice (FRN) announcing a request for nominations of experts for SAB's AFO review panel (Volume 76, No 170)
  - Nomination period closed September 22, 2011
  - Afterwards, SAB will post the list of candidates on their website
  - The public will have 21 days to comment on this list
  - Anticipate finalizing panel membership by November/December 2011 with first meeting occurring January 2012
  - EPA's goal is to finalize all four EEMs in Summer 2012
    - Issues identified by the SAB may impact the schedule

# National Air Emissions Monitoring Study



- SAB Process
  - OAR will send draft methodologies to SAB panel for review
    - Panel will have a minimum of 30 days to review the drafts prior to the meeting
  - Draft package will be released publicly, concurrent with submittal to SAB
    - Public will have the opportunity to comment to both OAR and SAB
  - Multiple meetings may be held to adequately address the four animal species
  - SAB panel reports their findings to full SAB committee
  - SAB issues final letter of recommendations to OAR
  - OAR will incorporate SAB's recommendations and issue the final emissions estimating methodologies
- General information concerning the EPA Science Advisory Board can be found at <http://www.epa.gov/sab>.
  - Additional questions and concerns should be addressed to:  
Mr. Edward Hanlon, SAB Designated Federal Officer  
Phone: (202) 564-2134; Email: [hanlon.edward@epa.gov](mailto:hanlon.edward@epa.gov)