Reconsideration of the 2008 Ozone NAAQS: Policy Implications of Key Scientific and Technical Uncertainties as Suggested by EPA's Updated Regulatory Impact Analysis (RIA)

Presentation for CASAC Ozone Review Panel

February 18, 2011

Stuart Sessions, Environomics Inc.

On behalf of American Petroleum Institute

Summary of Presentation

- EPA's RIA says benefits may not exceed the costs for lower NAAQS
- Proposed NAAQS is broadly unattainable
- Ozone morbidity benefits are very small
- EPA's estimated benefits are driven by mortality assumptions
- Mortality benefits are highly uncertain, particularly in view of assumptions about Policy Relevant Background (PRB) ozone
- EPA greatly underestimates costs of attaining lower NAAQS
- Significant negative economic impacts for lower NAAQS

EPA's RIA Shows Benefits of Lower NAAQS May Not Exceed Costs

EPA's Estimated Annual Benefits and Costs for Ozone Primary NAAQS Alternatives*

(in billions of 2006$ per year in 2020)

	Alternative Standards				
	0.075 ppm	0.070 ppm Proposed - Hi	0.065 ppm	0.060 ppm Proposed - Lo	0.055 ppm
Benefits	$6.4 to $15	$11 to $31	$19 to $53	$30 to $87	$45 to $140
Costs	$7.6 to $8.8	$19 to $25	$32 to $44	$52 to $90	$78 to $130
Net Benefits	$-2.4 to $7.4	$-14 to $12	$-25 to $20	$-60 to $35	$-85 to $62

* At 7%/yr discount rate. Benefits range reflects 6 ozone mortality studies and 2 for $PM_{2.5}$. Cost range reflects 2 approaches.

- Wide ranges of uncertainty in EPA estimates of benefits, costs and net benefits
- Benefits are overestimated: ozone mortality is uncertain, extreme sensitivity to assumptions involving Policy Relevant Background, PM co-benefits may be double-counted, and ozone NAAQS should not be justified based on PM co-benefits
- Costs are underestimated using EPA methodology
- Net benefits generally decline for more stringent NAAQS alternatives (e.g., judged by midpoint of EPA's range, median among all 168 benefit and cost combinations, etc.)

EPA's Benefit Valuation is Driven By Mortality Assumptions

Categories of EPA Estimated Annual Benefits for Some Ozone NAAQS Alternatives
(in billions of 2006$ in 2020 at 7% discount rate)

	Alternative Standards*		
	0.075 ppm	**0.070 ppm**	**0.065 ppm**
Ozone morbidity benefits	$0.07	$0.21	$0.38
Added categories of benefits			
Ozone mortality benefits**	$0.66 to $3.0	$2.2 to $10	$4.0 to $18
$PM_{2.5}$ co-benefits -- morbidity	$0.43	$0.79	$1.3
$PM_{2.5}$ co-benefits -- mortality***	$5 to $13	$9 to $23	$14 to $37
Subtotal of added benefits	*$6.4 to $15*	*$11 to $31*	*$19 to $53*
Total Benefits	$6.4 to $15	$11 to $31	$19 to $53
Costs, for comparison	$7.6 to $8.8	$19 to $25	$32 to $44

* EPA did not present fully broken-out benefits estimates for NAAQS at 0.060 and 0.055, so these are omitted from the table
** Range shown is from Bell et al (2004) to Levy et al; from EPA's lowest estimate to the Agency's highest
*** Range shown is from Pope et al to Laden et al; from EPA's lowest estimate to the Agency's highest

- Ozone morbidity benefits are very small
- A large share of estimated benefits is due to assumed premature mortality from ozone – but causation has not been demonstrated in the literature.
- The largest share of estimated benefits is due to co-control of $PM_{2.5}$, and >90% of these $PM_{2.5}$ benefits involve assumed premature mortality. (PM is being regulated separately.)

Ozone Mortality Benefits are Highly Uncertain

- EPA uses “Policy Relevant Background” (PRB) in calculating ozone reduction benefits
  - PRB is ozone level that would occur absent man-made emissions in North America
  - Ozone reduction benefits are calculated down to PRB levels
- EPA previously used remote monitors to estimate PRB; 40 ppb used in 1997 standard
- EPA now using GEOS-CHEM model to estimate PRB; it predicts PRB to be 15 - 35 ppb
- Ozone mortality benefits are extremely sensitive to assumed PRB -- these benefits nearly disappear if PRB is assumed at 40 ppb instead of GEOS-CHEM model predictions

Effects of PRB Assumptions on Ozone Mortality Benefits

	Statistical Deaths/yr Using EPA GEOS-CHEM PRB Model	Statistical Deaths/yr Assuming PRB at 40 ppb Instead	% Reduction in Ozone Mortality if PRB at 40 ppb
Atlanta	6.5	0.3	95%
Cleveland	37.4	4.3	88%
Detroit	37.9	1.8	95%
Houston	22.7	1.5	94%
Los Angeles	38.5	0.1	99%
Sacramento	11.0	0.2	98%
St. Louis	4.4	0.3	93%

[1]Risks estimated using risk specific coefficients from Bell et al. 2004, at exact attainment of the 0.084 ppm NAAQS, average of 2002 and 2004 data (CRA, 2007)

- Increases in PRB with projected increases in Asian emissions between 2001 (year of GEOS-CHEM modeling) and 2020 (base year for RIA estimates) will substantially reduce ozone mortality benefits even if PRB is estimated based on modeling

EPA Underestimated Costs of Meeting Lower NAAQS

(In billions of 2006$ per year in 2020)

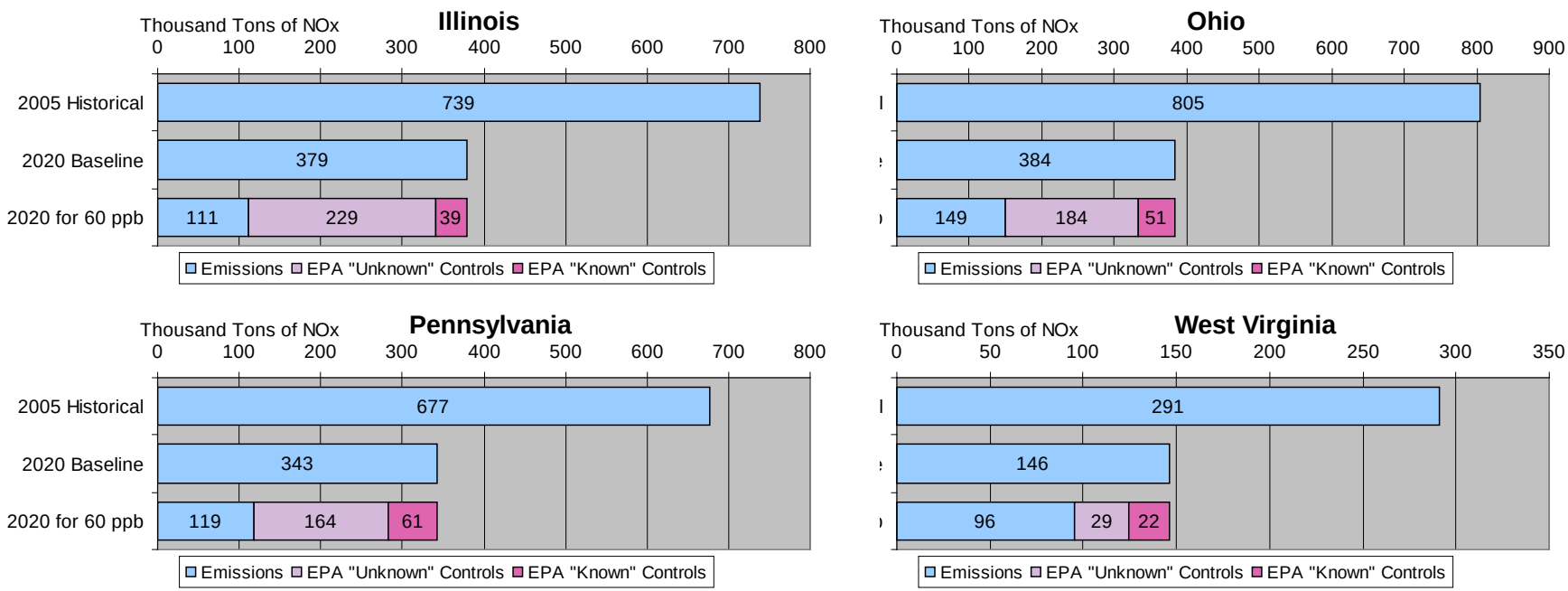
	Alternative Standards				
	0.075 ppm	0.070 ppm Proposed - Hi	0.065 ppm	0.060 ppm Proposed - Lo	0.055 ppm
1. Modeled costs for known controls	$2.5	$3.3	$4.5	$4.5	$5.1
2. Extrapolated costs for unknown controls	$5.1 to $6.3	$16 to $22	$27 to $39	$47 to $85	$73 to $122
Total National Costs (excluding So CA)*	$7.6 to $8.8	$19 to $25	$32 to $44	$52 to $90	$78 to $130

* Southern California will not attain any of these alternative NAAQS by 2020 and is omitted from EPA's analysis

- Use of “all known controls” will reduce precursor emissions by 820,000 TPY
  - 1.4 million further TPY needed to attain 0.070; 4.2 million TPY needed for 0.060
  - Costs of these “known controls” top out at about $20,000 per ton
- EPA assumes that further, as-yet-unknown controls will be developed, cost-effective and deployed by 2020 to achieve these additional reductions
  - “Fixed cost” method assumes unlimited additional new controls at $15,000 per ton
  - “Hybrid” method assumes marginal costs increase slowly above $15,000/ton
- NERA/Sierra identified additional controls ranging from $4,000 to $300,000+ per ton
  - Total costs 5 to 10 times EPA estimates via “fixed cost” or “hybrid” methods
- Cost of NOx offsets has often been $15,000 - $150,000/ton in Houston/LA
  - Suggests EPA has significantly underestimated costs for additional controls

Lower NAAQS is Broadly Unattainable

- EPA made optimistic assumptions in estimating 2020 baseline emissions
- EPA then applied “all known controls” across wide geographic areas
- EPA’s results are still broad nonattainment in 2020 for any lower NAAQS. Of 661 counties with monitors: 61 would not attain 0.070 ppm and 385 would not attain 0.060
- Many major metropolitan areas will require an “Extreme” classification to avoid economic and business sanctions for failure to submit an approvable SIP to EPA
- Attainment will require reductions far beyond “all known controls”. Example States:



Source: NERA analysis of EPA data in Docket No. EPA-HQ-OAR-2007-0225

Significant Negative Economic Impacts From Lower NAAQS

- NERA/Sierra performed economic analyses for 11 States for 0.060 ozone NAAQS
  - Used EPA's 2020 baseline, reductions needed to attain, costs for known controls
- Three key differences from RIA methodology:

  1) Some additional "known controls" were identified and applied in simulating attainment

  2) More realistic approach used for estimating the costs of as-yet-unknown controls

  3) Attainment costs used as input to REMI model to estimate economic effects

Aggregate Conclusions Across 11 States -- Impact of NAAQS at 0.060 ppm in 2020

Measure	Impact of 0.060 NAAQS relative to 0.084	
	Absolute	Percentage
Employment/jobs	-1,452,000	-4.1%
Gross regional product (in billion $/yr)	-132.4	-3.6%
Disposable income (in billion $/yr)	-74.9	-2.2%
State tax receipts (in billion $/yr)	-10.7	-1.9%

Conclusions

➔ Do not change the standards now

➔ EPA should maintain current 2013 ozone review schedule

- The benefits of a lower ozone NAAQS are highly uncertain
  - Ozone mortality is likely overestimated and is highly uncertain
  - Low modeled PRB over-states benefits
  - Ozone NAAQS should not be based on PM co-benefits

- Costs of attaining potential ozone standards are dramatically underestimated

- A lower NAAQS will greatly increase non-attainment areas, preventing business expansion and negatively affecting jobs

➔ A lower NAAQS will not have significant benefits and will have very significant costs and adverse economic impacts