

Effects of More Stringent Ambient Standards for Ozone and PM_{2.5} on New and Existing Industrial Sources

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Hot Topic Hour:

Impact of Ambient Air Rules for PM_{2.5} and Ozone

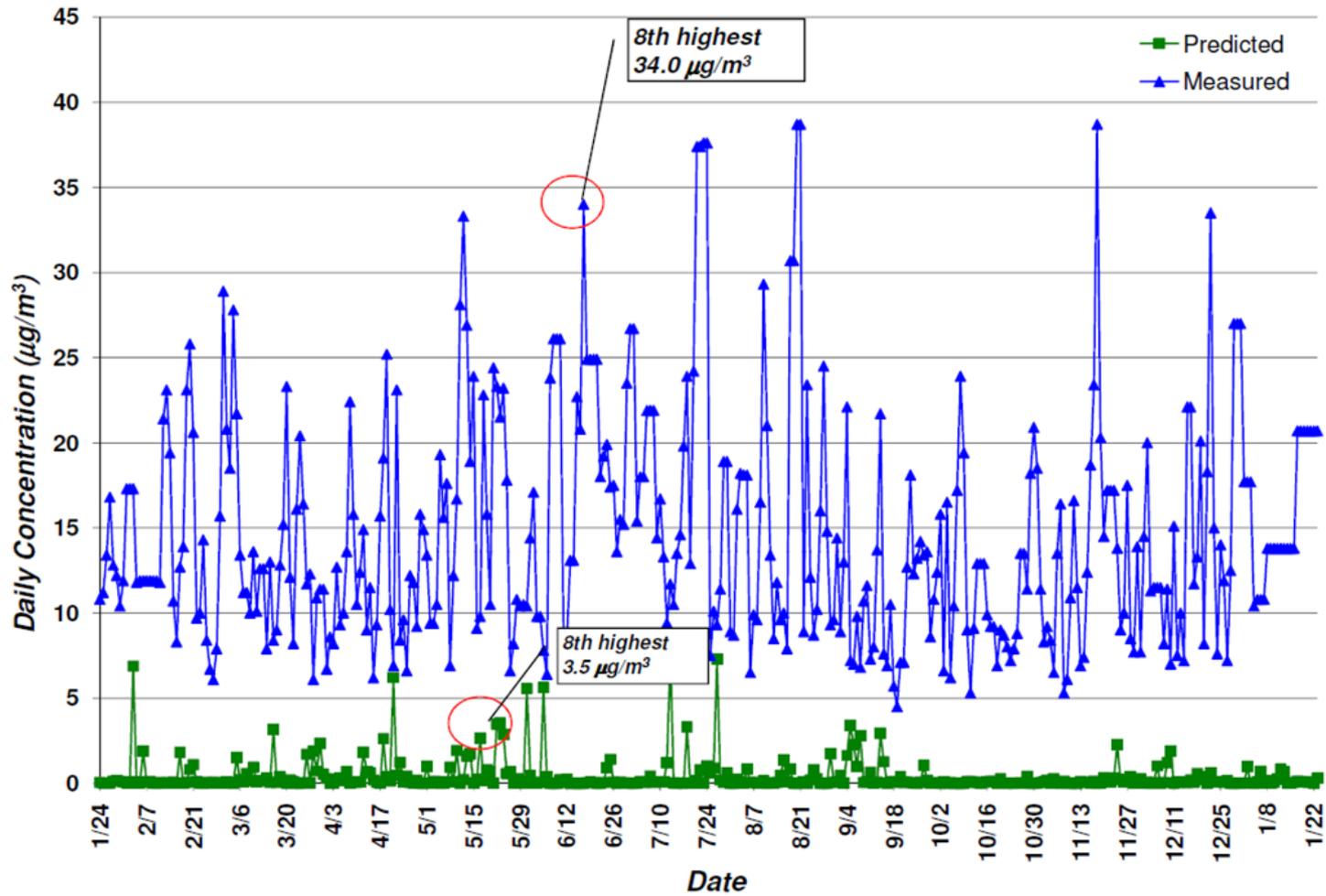
Outline of Presentation

- **Dispersion Modeling Procedures for PM_{2.5}**
- **Forthcoming PM_{2.5} NAAQS Changes**
- **Dealing with PM_{2.5} Nonattainment Areas**
- **Forthcoming Ozone NAAQS Changes**
- **Dealing with Ozone Nonattainment Areas**

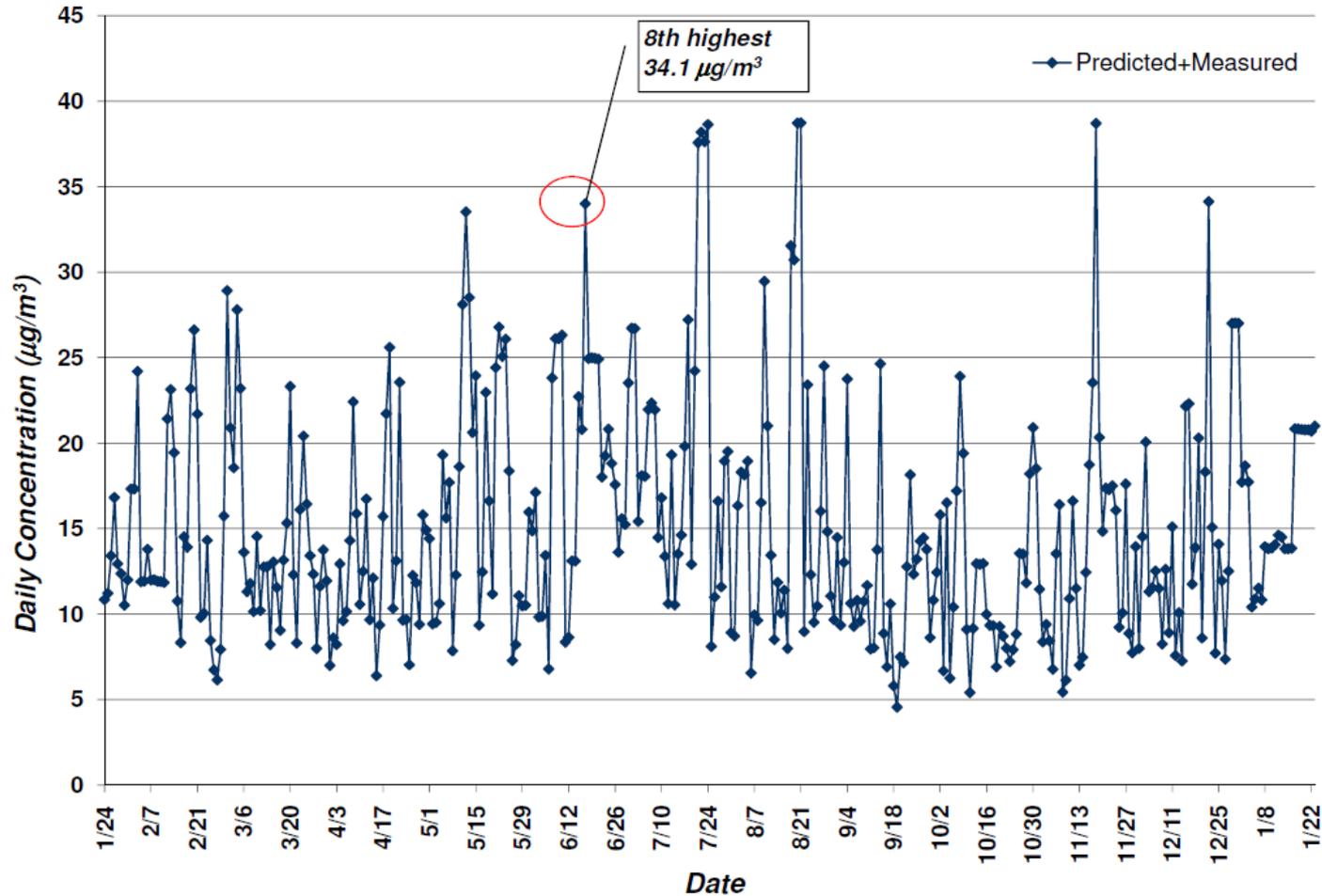
Modeling Procedures for PM_{2.5}

- Short-range models only deal with direct PM_{2.5} emissions
- AERMOD does not simulate secondary PM_{2.5} formation
- EPA does not currently have a recommended dispersion model to predict secondary PM_{2.5}
- Method for summing modeled project impact and background monitoring data can be refined
 - Conservative approach adds peak background for each day modeled
 - Refined approach adds concurrent actual daily background to daily modeled impacts

PM_{2.5} - Computing Background plus Source Impact



PM_{2.5} Time Series of Concurrent Sum: Refined Approach



PM_{2.5} NAAQS Changes to be Proposed Early 2011

- Data source: CASAC Summer 2010 Policy Report
- Annual standard likely to be lowered from the current 15 $\mu\text{g}/\text{m}^3$ to a value in the range of 11-13 $\mu\text{g}/\text{m}^3$
- Proposed NAAQS due early 2011, final rule late 2011
- If 11 $\mu\text{g}/\text{m}^3$ is selected, then the 24-hour NAAQS could be lowered to from 35 to 30 $\mu\text{g}/\text{m}^3$
- % of PM_{2.5} monitoring sites nationwide for 2008 above:
 - 15 $\mu\text{g}/\text{m}^3$: 4.3%
 - 13 $\mu\text{g}/\text{m}^3$: 17.7%
 - 11 $\mu\text{g}/\text{m}^3$: 49.5%

Designation of Nonattainment Areas

- Counties adjacent to those with measured NAAQS violations can also be considered as part of (affecting) the non-attainment area
- With an annual $PM_{2.5}$ NAAQS of $11 \mu\text{g}/\text{m}^3$, large portions of the USA could be in nonattainment areas
- When designations become effective, then permit applications not yet issued are subject to nonattainment New Source Review
- $PM_{2.5}$ precursors subject to offsets would be direct $PM_{2.5}$, SO_2 (40 to 1 ratio), and NO_2 (100 - West or 200 - East to 1 ratio)

Resolving PM_{2.5} Nonattainment Areas

- State has to consider emission sources of PM_{2.5}, SO₂, and NO₂ in areas hundreds of km away in all directions
- Advanced regional models such as CMAQ or CAMx is involved, as well as possibly near-field models such as AERMOD or CALPUFF
- Culpability analyses can be done with Positive Matrix Factorization – receptor modeling to determine correlation between monitored PM species and source types
- On the books/on the way controls need to be considered

Resolving PM_{2.5} Nonattainment Areas, continued

- Many nearby sources are under pressure to reduce emissions to make progress toward modeled attainment
- As major point sources reduce emissions, mobile source emissions as well as uncontrollable dust emissions become more important categories to consider
- During the economic downturn starting late 2008, reductions in emissions have resulted in nonattainment monitors showing significantly lower concentrations – sometimes below the NAAQS!
- These opportunistic results should be carefully reviewed for insights in achieving attainment status

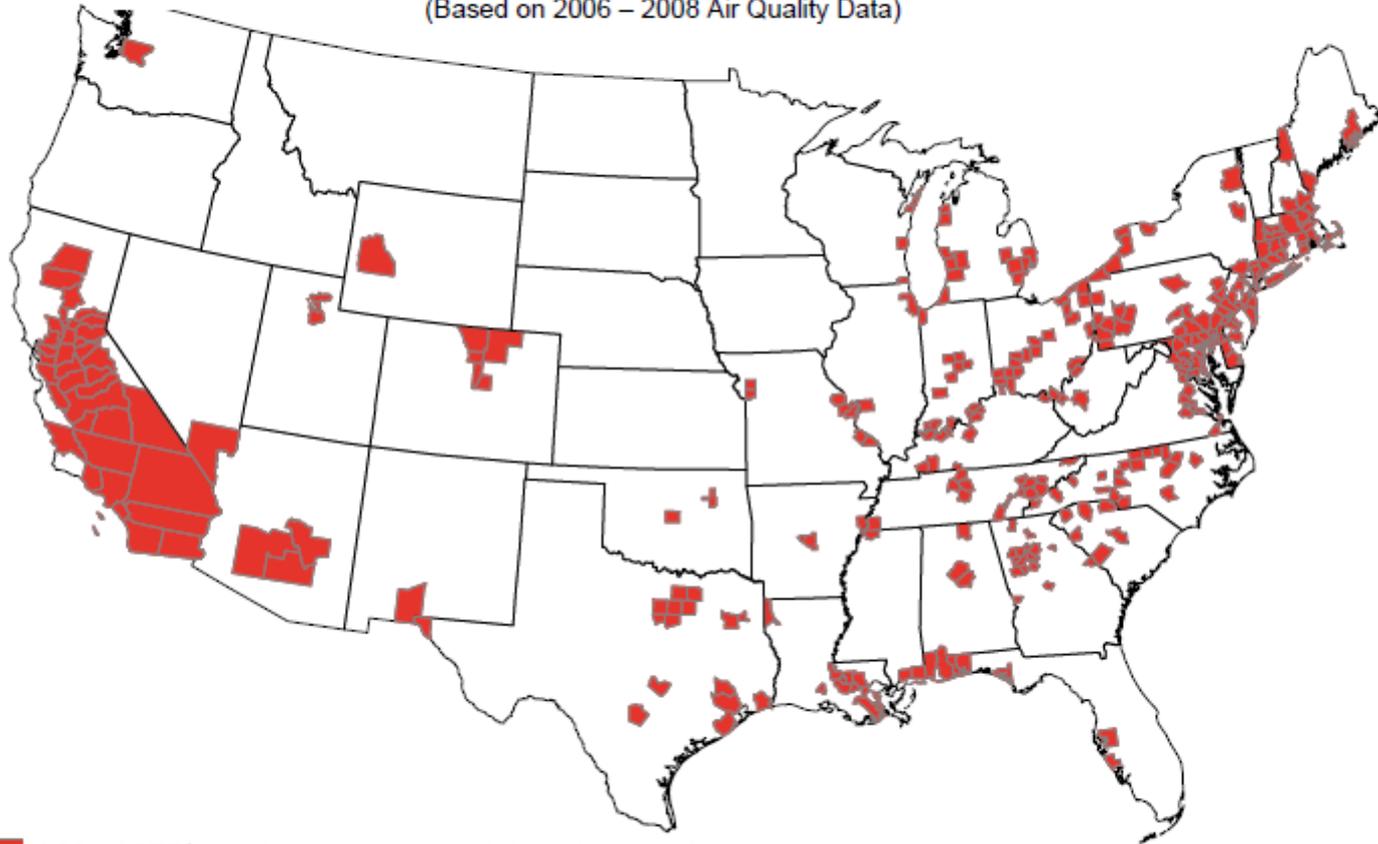
Forthcoming Ozone NAAQS Changes

- EPA is targeting a final rule on ozone NAAQS by 12/31/10
- Primary ozone NAAQS to be in the range of 0.060 to 0.070 ppm, based on the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations
- A new secondary standard (“W126”) accounts for cumulative effects of repeated ozone exposures on sensitive vegetation during the three months of the year when ozone concentrations are highest

Counties With Monitors Violating the March 2008 Ground-Level Ozone Standards

0.075 parts per million

(Based on 2006 – 2008 Air Quality Data)



322 of 675¹ monitored counties violate the standard

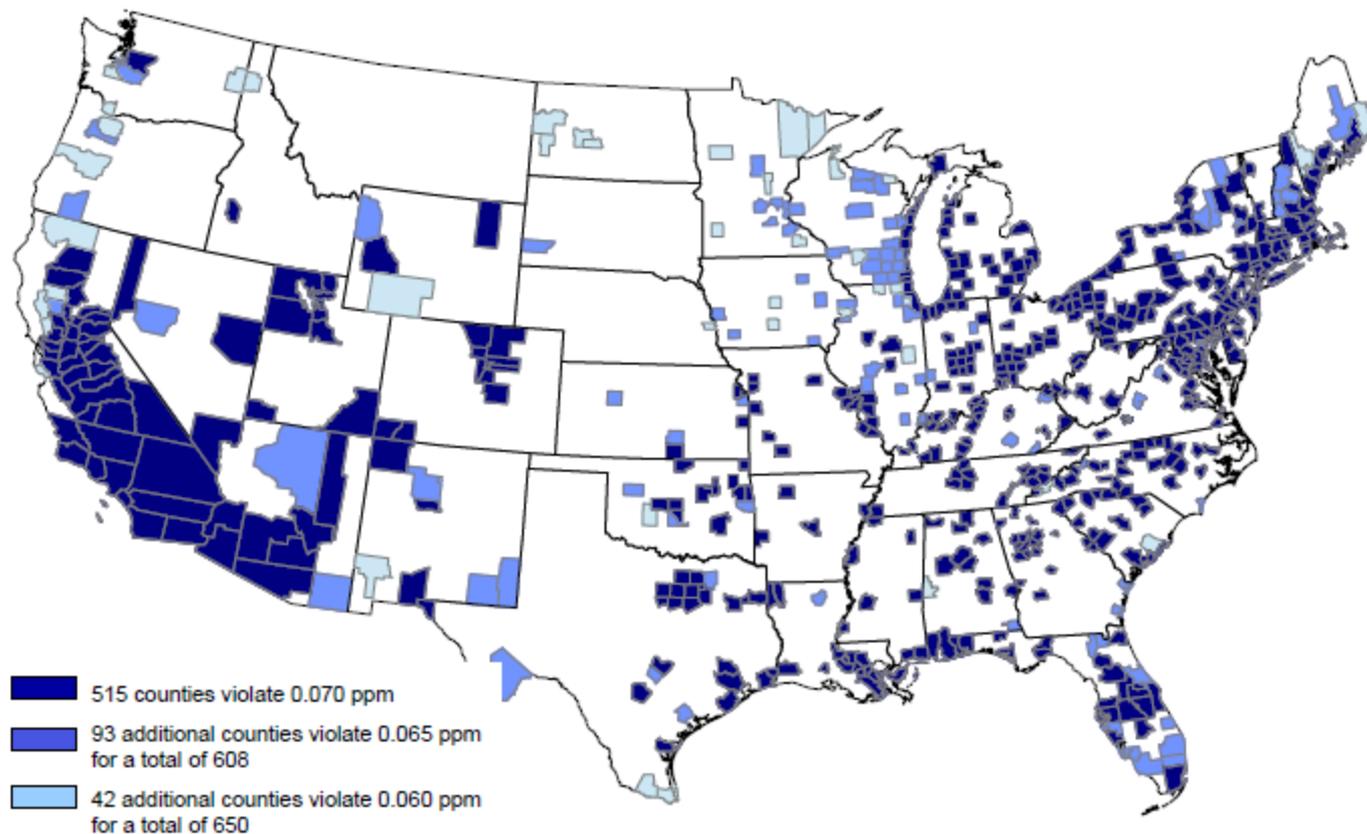
Notes:

1. Counties with at least one monitor with complete data for 2006 – 2008
2. To determine compliance with the March 2008 ozone standards, the 3-year average is truncated to three decimal places.

Counties With Monitors Violating Primary 8-hour Ground-level Ozone Standards 0.060 - 0.070 parts per million

(Based on 2006 – 2008 Air Quality Data)

EPA will not designate areas as nonattainment on these data, but likely on 2008 – 2010 data which are expected to show improved air quality.



Notes:

1. No monitored counties outside the continental U.S. violate.
2. EPA is proposing to determine compliance with a revised primary ozone standard by rounding the 3-year average to three decimal places.

Dealing with Ozone Nonattainment Areas

- EPA designation guidance will likely require that counties that are near violating monitors could be considered part of a nonattainment area
- This will substantially increase the number of counties to be designated nonattainment
- New designations possible by late 2011
- NSR projects in attainment areas must have permit granted before designations are effective to avoid Nonattainment NSR (NNSR)
- Additional monitoring sites to be deployed will likely detect more ozone NAAQS violations in the future

Dealing with Ozone Nonattainment Areas, cont.

- NNSR will be triggered at different thresholds, depending upon severity
- NNSR is triggered for new sources at 100 tons per year (tpy) and for existing sources at 40 tpy for marginal / moderate areas
- Trigger thresholds are lower with increasing severity of the nonattainment designation
- NNSR requirements including use of lowest achievable emission rate (LAER) technology and obtaining emissions offsets for precursors (NO_x and VOCs), with offset ratio dependent upon severity of nonattainment area

Dealing with Ozone Nonattainment Areas, cont.

- It will likely be difficult to find available NO_x offsets as more sources are controlled
- Best option for permitting is to internally offset emissions by netting out of NSR or NNSR for NO_x
- If NO_x offsets are available only from distant sources, then refined modeling may be necessary to show a net air quality benefit
- The same requirement would likely apply for dealing with PM_{2.5} NNSR

The background of the entire image is a photograph of a man standing in front of a large, snow-capped mountain. The man is wearing a blue and white plaid short-sleeved shirt and glasses. The mountain is covered in patches of snow and dark rock, with a dense forest of evergreen trees at its base. The sky is overcast and grey.

AECOM Environment

**environmental sustainability for the world's
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