A Comparison of the 2005 NATA Inventory with the Draft 2008 National Emissions Inventory

2010 Emissions Inventory Conference

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Background

- The 2005 NATA inventory started with the 2005 NEI, but has diverged from it because:
  - States and others provided comments on the 2005 NATA emissions inventory via the review process
  - Data collected in support of the Risk and Technology Review and other efforts
  - Data from the above efforts was folded into the 2005 NATA inventory, but not into the 2005 or 2008 NEI (unless data submitters included the updated information in their EIS submissions)
- Both the NATA and NEI inventories contain HAPs and CAPs, even though only HAPs are modeled in NATA and thus the focus was on improving HAPs

Why does this Matter?

- We want the 2008 NEI to be as accurate as possible
- We plan to use the 2008 NEI for 2008 NATA / NAPA studies
- We want to carry forward the investments that were made in the 2005 NATA into the 2008 NEI wherever possible

Our Goals

- Perform a high-level comparison of the 2005 NATA point source inventory with the draft 2008 NEI point source inventory to identify major differences
- Identify whether updates to 2005 NATA are reflected in the 2008 NEI since it has the most recent state-submitted data
- Note differences in facility locations and configuration between the inventories
- Assess whether it would be possible to reconcile some of the differences in the facility configurations between the two inventories
- Understand how the reported emissions differ
- *Automate* the comparison as much as possible
- NOT to see which is better

Selection of States to Analyze

- Data submitted to EIS by June 1 was available
- A full national comparison was difficult because not all states submitted data by June 1
- Even for states that submitted data, some sectors or pollutants might still be incomplete
- Note: many additional states have worked to submit data since the window reopened in late July (this updated data will be available soon!)
- States with complete data as of June 1 that has not been updated analyzed here are: Colorado, Delaware, Kansas, Utah, West Virginia

Aspects of Comparison

- How are the pollutants included the same or different?
- How are the SCC coverages different?
- How accurate are the point locations in each?

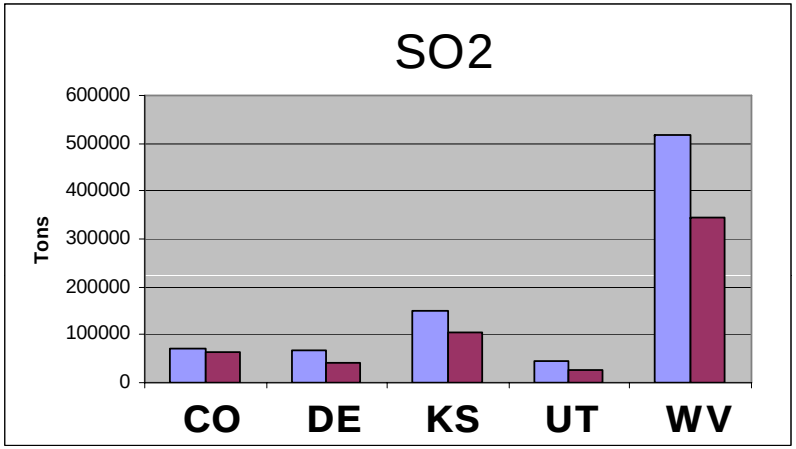
Planned Augmentation for 2008 NEI

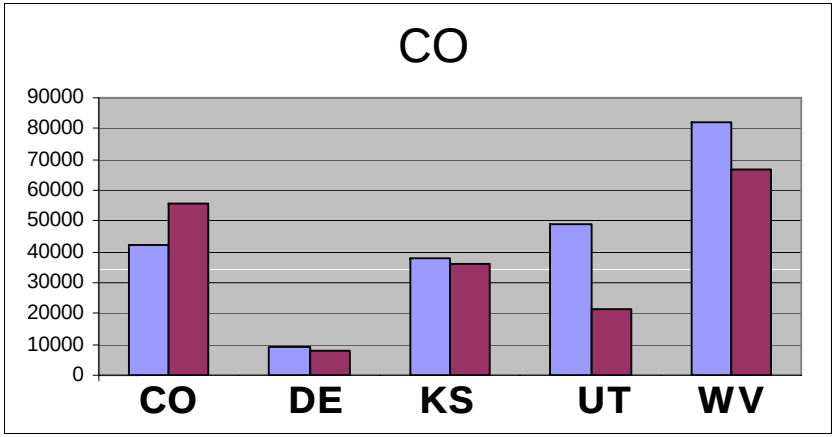
- The analyzed 2008 NEI data was not augmented
- It will be augmented – but only when corresponding data is not submitted by the responsible state or data submitter
- Probable types of augmentation:
  - Additional CEM-based data from CAMD
  - Additional types of PM emissions (e.g., condensibles, filterables if they were not provided)
  - HAP emissions from TRI
  - HAP data based on speciation profiles

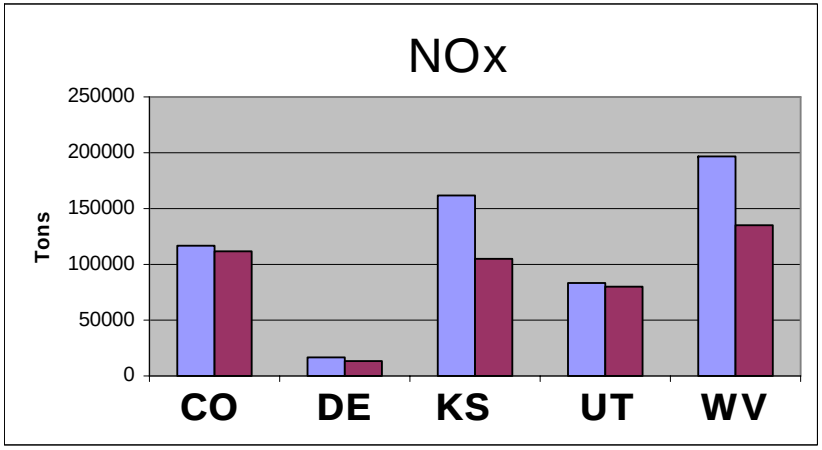
Differences in Pollutant Coverage and Included Sources

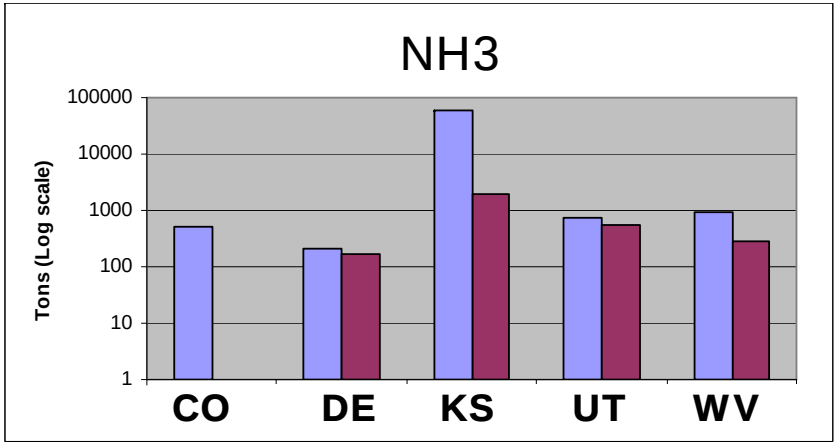
- NEI contains some GHGs
- Some pollutant codes that were used in NATA05 have been retired in NEI08 (esp. for HAP compounds)
- NATA05 had been augmented to include 7 PM species but NEI08 contains only the PM species submitted by states (varies)
  - NATA05: PM10-FIL, PM10-PRI, PM25-FIL, PM25-PRI, PM-CON, PM-FIL, PM-PRI
- Some sources have moved from point to area sources (e.g., Animal feedlots in KS)

Summary Results for Major Pollutants



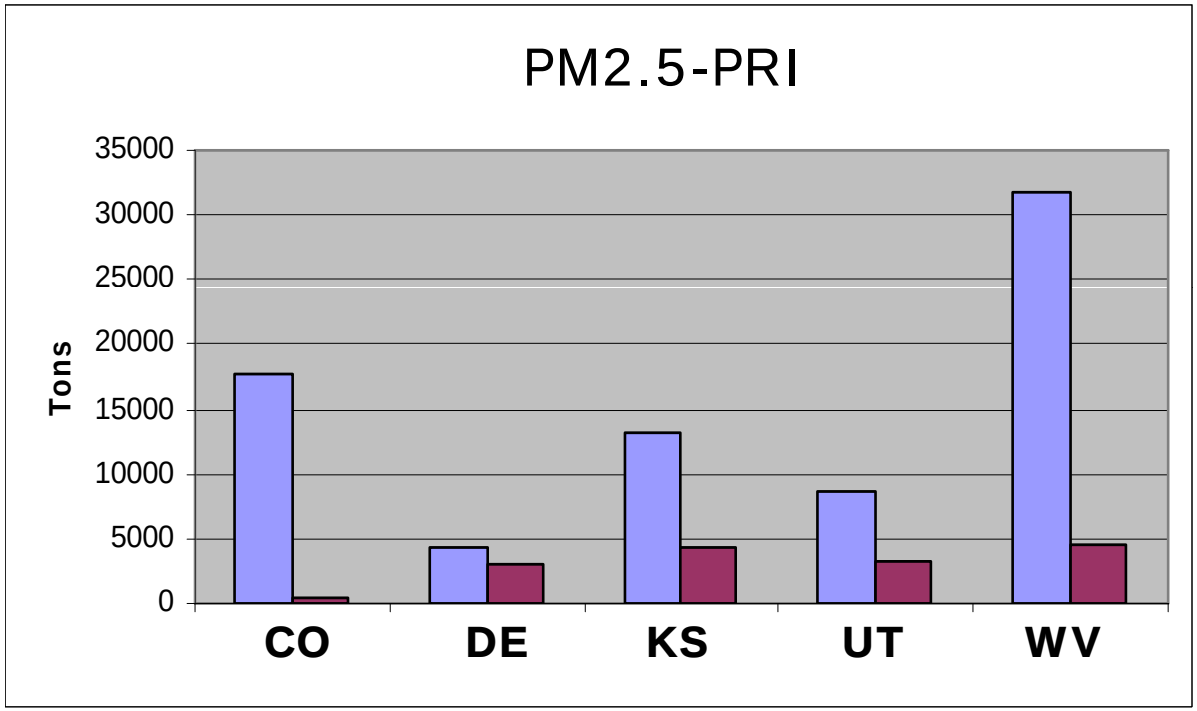






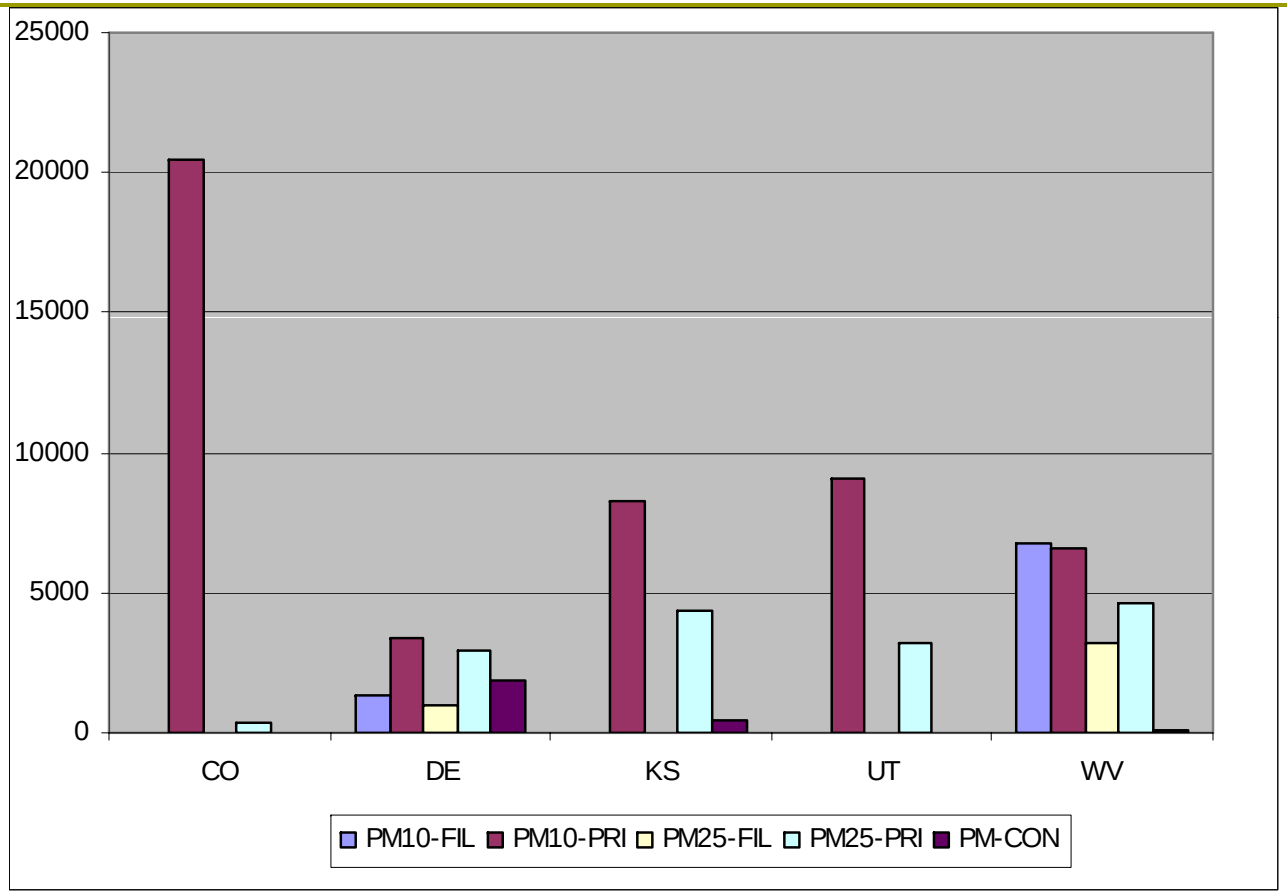
Left bars: NATA 05 (06/10), Right bars: NEI 08 (06/10)

Differences in PM



- At first glance, it seems that there are substantial reductions, but there are methodological differences
- Not all states submit same PM species (five types can be submitted)

Examples of How PM is Submitted



- Augmentation of the NEI helps to smooth out the differences in submitted species, but relies on assumptions

Summary of Observations

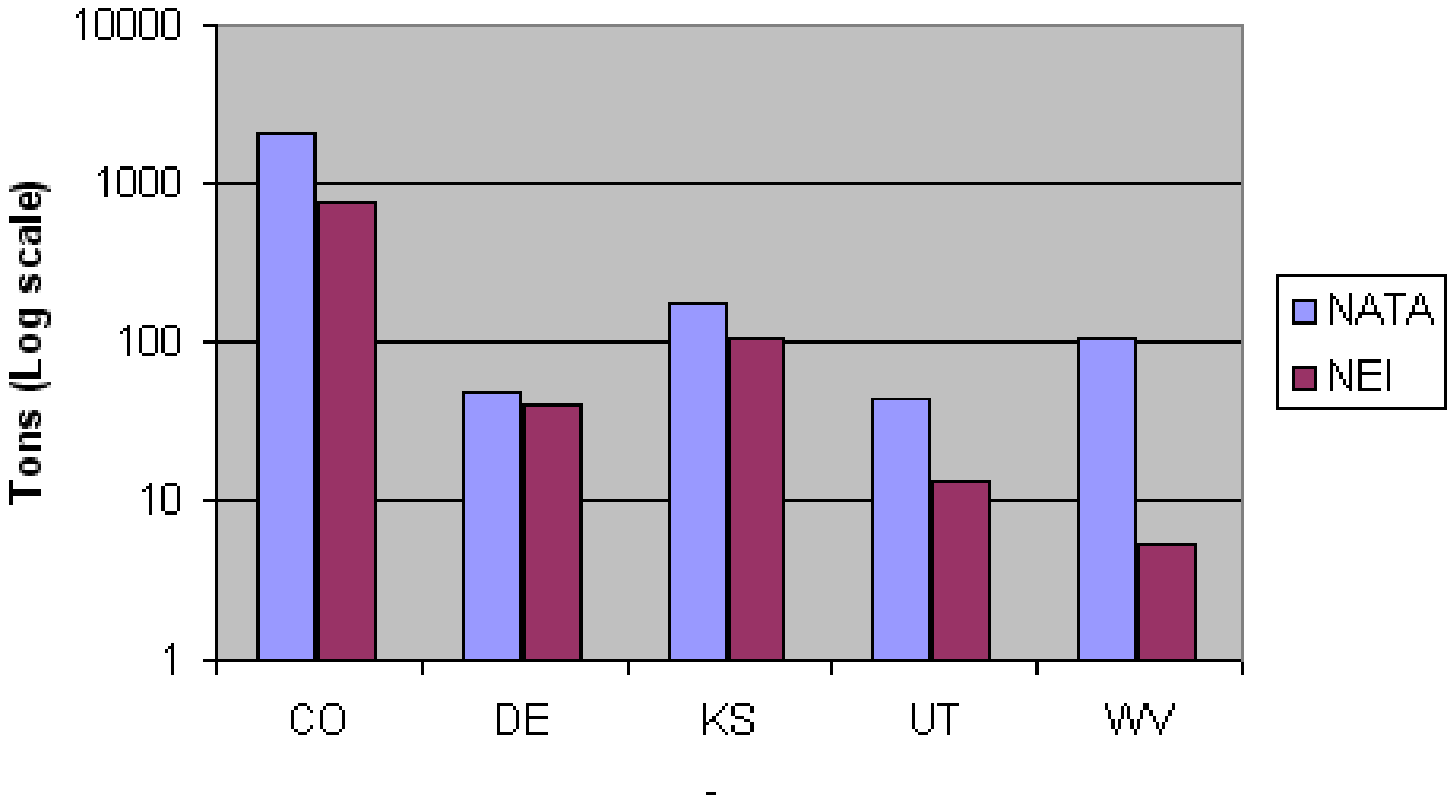
- Submitted pollutants for PM are not consistent (2.5 vs. 10; PRI vs FIL vs CON): hard to compare
- Point source NH3 not submitted for some states
- Substantial increases in CO for some states (UT)
- Large decreases in SO2 in some states (CO, UT, WV, …)
- Not all states submit toxics and NEI is not yet augmented with toxics from TRI or speciation factors

HAP Pollutants Reported

- In an effort to simplify reporting and consolidate data, many HAP compounds were retired for 2008
- The toxic portion of compounds was retained to support risk analysis
- Fewer pollutants are tracked as a result
- As of 9/6/10, 28 states submitted HAPs

State	NATA 05	NEI 08
CO	176	113
DE	168	161
KS	180	134
UT	186	43
WV	218	46

Comparison of Benzene Emissions



- Some substantial differences are noted for this HAP
- Reasons for this need to be examined further

SCC Coverage

- The NEI 08 point source inventory has emissions for 335 SCCs that do not appear in the NATA 05 point inventory
  - SCCs with the most emissions are airport/ aircraft related that used to be in the nonpoint inventory
  - Others with non-negligible emissions are for industrial processes from various categories
- NATA 05 has emissions for 830 SCCs that do not appear in the NEI 08 (06/10 version)
  - The majority of these are industrial processes and waste disposal
  - Some SCCs have been retired in NEI 08
  - Others may have moved to nonpoint

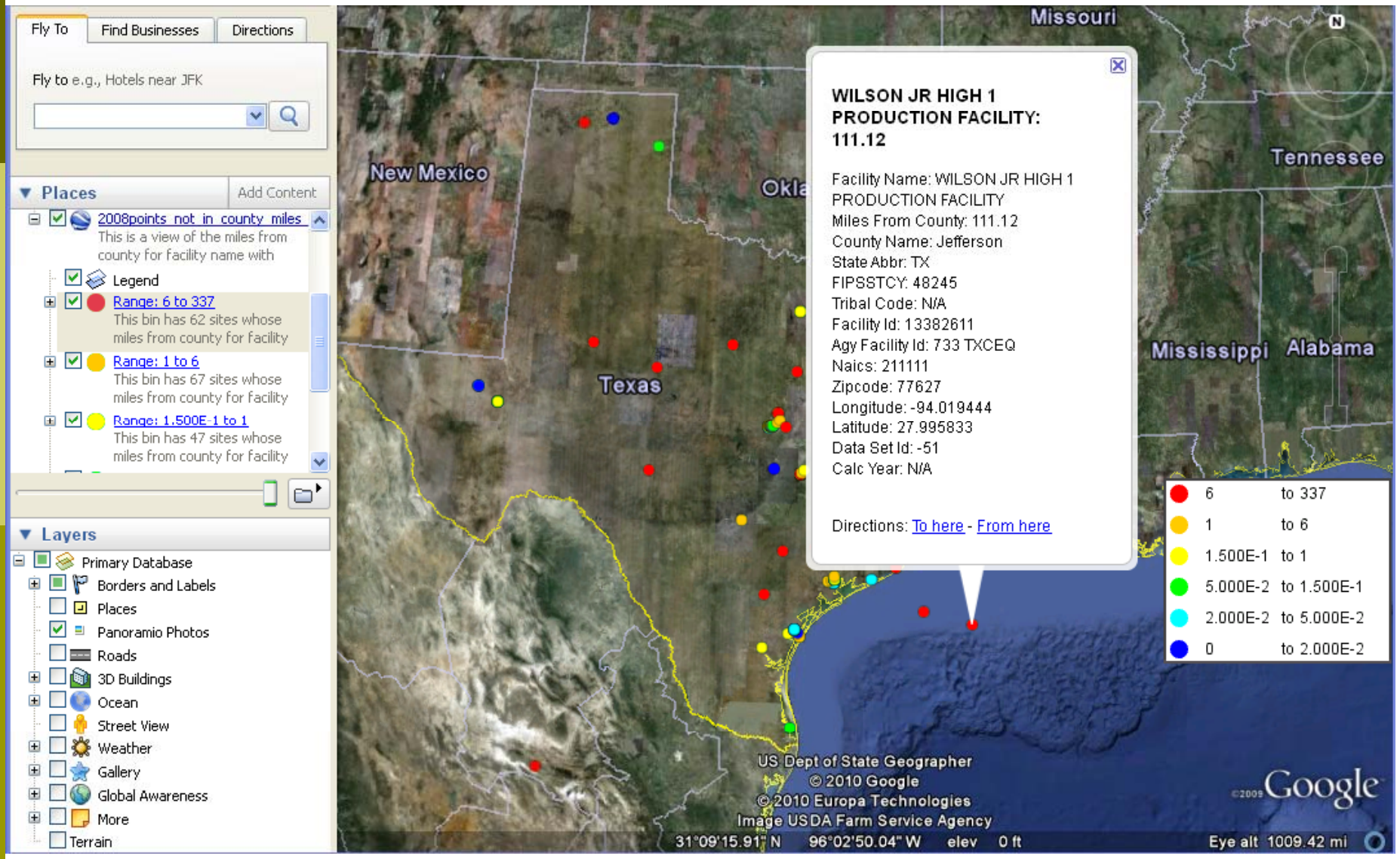
Methods for Comparison

- Both inventories were loaded into the Emissions Modeling Framework
  - Both had over 3.5 million records!
- QA steps (i.e., queries or summaries) were performed and results stored within the PostgreSQL database
- The queries were saved for reuse with new data when it becomes available
- Summaries were copied into Excel for further comparisons and to create plots
- Special geographic queries were performed with PostGIS to determine the distance each point was from its specified and results visualized

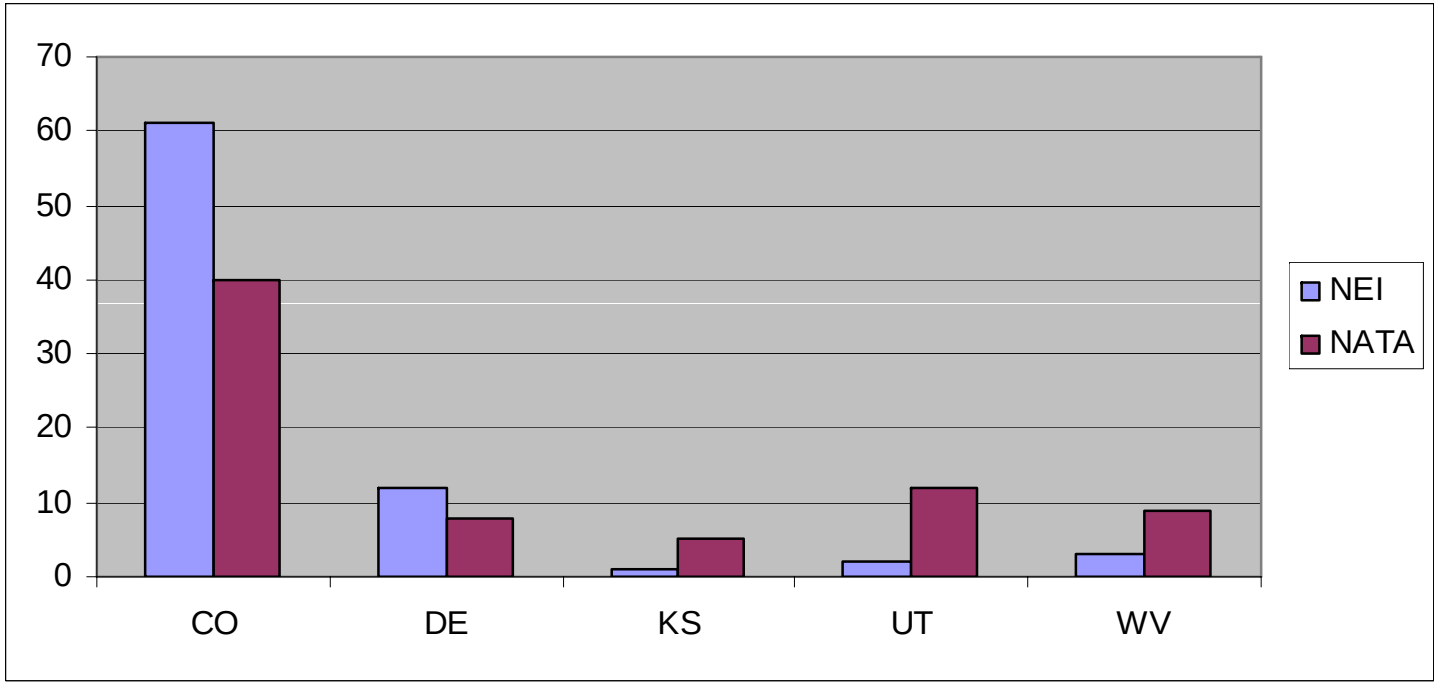
Use of KML Generator to Visualize Point Data

- Geographic point data and emissions summaries (e.g., plant, county, state) can be mapped with the KML generator tool
- Simple Java tool that supports creation of KML/KMZ files that can be visualized with Google Earth
- Points are colored according to a variable of interest (e.g., emissions, distance from county, stack height)
- Mouse over for high level info or click for details
- Developed as part of EMF project, but can be run without the EMF – download it from: www.ie.unc.edu/cempd/projects/emf/install/#NewFunctionality

Using the KML Generator for Point QA



Distinct Source Locations Outside of their Counties



- Summary
  - 5 states: June NEI=79; June NATA=74
  - All states: June NEI=1487; June NATA=1589
  - Statistics for each are similar, and neither is perfect

Future Directions

- EPA wants to better integrate HAPs and CAPs within the NEI so that the NEI can be used for multi-pollutant applications (e.g., 2008 NATA)
- Improve the facility configuration portion of the NEI (e.g., coordinates) to better support risk-based and other analyses
- Enhancements to EIS would be helpful to support incorporation of specialized datasets (e.g., selecting data across years to allow for composite inventories to be built with the 'best available' data for each industry)
- Additional comparisons of 2005 NATA (final inventory coming soon) with 2008 NEI are planned as part of the 2008 NEI QA and 2008 modeling platform development

Disclaimer

- These results are preliminary and do not represent the official opinion of EPA

- Any questions?