# Updates on: Quantification of Mercury Emissions from Large Point Sources in the Southeastern U.S. during NOMADSS

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## Outline

- I described my point source identification procedures previously
- Today I will focus on coal-fired power plant (CFPP) sources
  - Will compare two U.S. Hg emissions inventories
    - TRI and NEI (defined below)
  - Will compare measured and inventoried Hg emissions

#### Comparison of U.S. Hg Emissions Inventories Two different inventories: •Toxics Release Inventory (TRI) •National Emissions Inventory (NEI)

	Inventory	
Attribute	TRI	NEI
Agency	EPA	EPA
Data source(s)	Industry reports	EPA analysis augmented by industry reports*
Frequency	Annual	Tri-annual
Most recent year	2012	2011

\*Explained further below for CFPPs

#### TRI- vs. NEI-based CFPP Hg Emissions (in 2011)



TRI tends to predict higher Hg emissions for CFPPs than NEI
Several of the largest CFPPs also differ largely between inventories
CFPPs we sampled span most of range in inventoried emissions

#### **Explanation for Discrepancies between Inventories**

- Emissions calculation methods differ
- For the 2011 NEI, many EFs were derived from EPA test data:
  - Hg EFs were measured directly for a small subset of CFPPs
    - ~25% of plants were tested
  - Test data were binned by boiler + coal + control(s)
  - Mean Hg EFs were determined for each bin
  - Up to ~80% of un-tested CFPPs were mapped to test bins
    - Bin-averaged Hg EFs were applied
  - Hg emissions for remaining un-tested CFPPs were:
    - taken directly from the TRI
    - or otherwise re-calculated for the NEI

#### Measured vs. Inventoried CFPP Hg/CO<sub>2</sub> Ratios



• Minus BBS, measured Hg ERs were well correlated with NEI-based EFs

- Measured values for BBS >> NEI-based values
- Measured and TRI-based values were not correlated

# **Explanations for Measurement-Inventory Discrepancies**

- Short-term emissions variability (insufficient data to address)
- EPA's bin-averaged EFs perform poorly for some facilities
- Plant operations changed between inventory years and 2013
   TRI:
- Short-term emissions variability
  - Inventory-based Hg/CO<sub>2</sub> ratios represent annual means
- Plant operations changed between inventory years and 2013
  - Complete 2013 TRI data are not yet available

#### NEI:

- Short-term emissions variability
  - As above for TRI-based values
  - Emissions distribution captured differently by EPA and C-130

• EPA's bin-averaged EFs perform poorly for some facilities

• Recall that a small sample of CFPPs (~25%) were tested

## Explanations for Measurement-Inventory Discrepancies Case Study: Big Brown Station



Plant operations changed between inventory years and 2013?
TRI data suggest little change in Hg emissions from 2011 to 2013

(Data for 2013 are preliminary)
Inventory discrepancies have existed for a long time

EPA's bin-averaged EFs perform poorly for some facilities?

Hg EFs in the BBS bin range over 2 orders of magnitude

# Summary

- Two Hg emissions inventories differ significantly for many CFPPs
  - Differences relate to inventory formulations
- Overall, NEI predicts actual emissions better than TRI
  - An important exception is Big Brown Station
    - Differences likely relate to EPA's EF calculation methods
- Results are relevant to other hazardous air pollutants (HAPs)

Goals for further analysis

- Explain differences among observed and inventoried Hg EFs for all CFPPs sampled
- Make recommendations for incorporating inventory data uncertainties into HAP emissions models
- Define priorities for future work to address improving HAP emissions inventories

THANKYOU