Investigation of Mercury and Methyl Mercury Discharges from Flue Gas Desulfurization (FGD) Systems

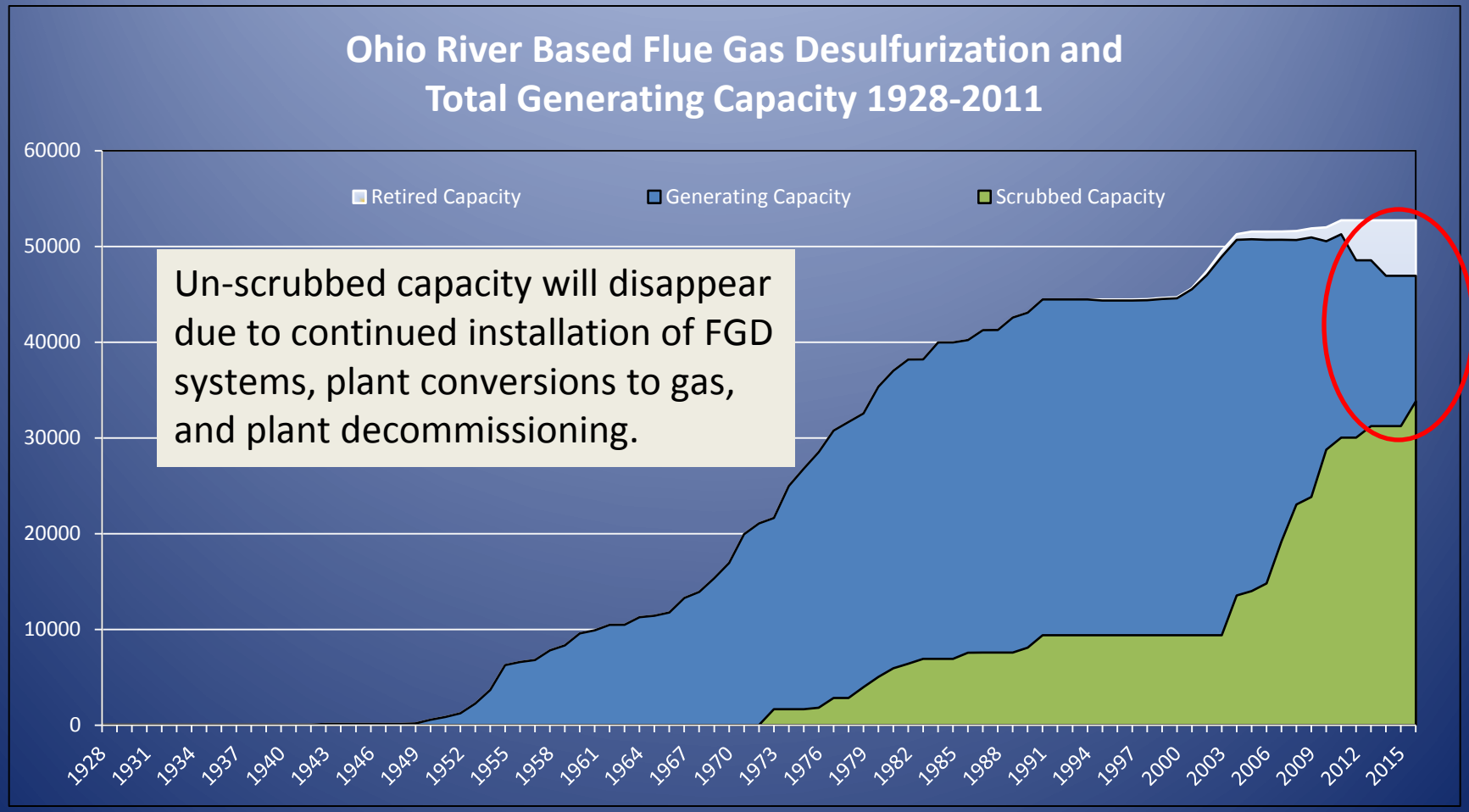
Agenda Item 18
ORSANCO Technical Committee Meeting
February 12-13, 2014

FGD Monitoring

- Four sample events (quarterly) at four coal-fired power plants
  - 3 with FGD systems, 1 without (FGD now online)
  - Sample points: intake, FGD WW, final effluent

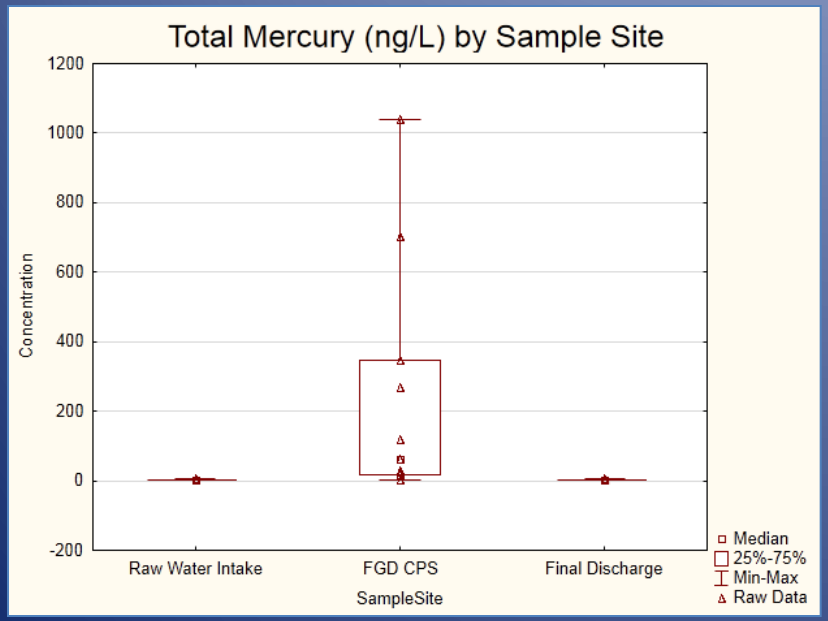
- Analytical parameters:
  - Filtered total Hg
  - Unfiltered total Hg
  - Filtered methyl Hg
  - Unfiltered methyl Hg
  - Selenium
  - Bromide
  - Dissolved Organic Carbon
  - Dissolved Sulfate
  - Chlorophyll
  - pH/Specific Conductance

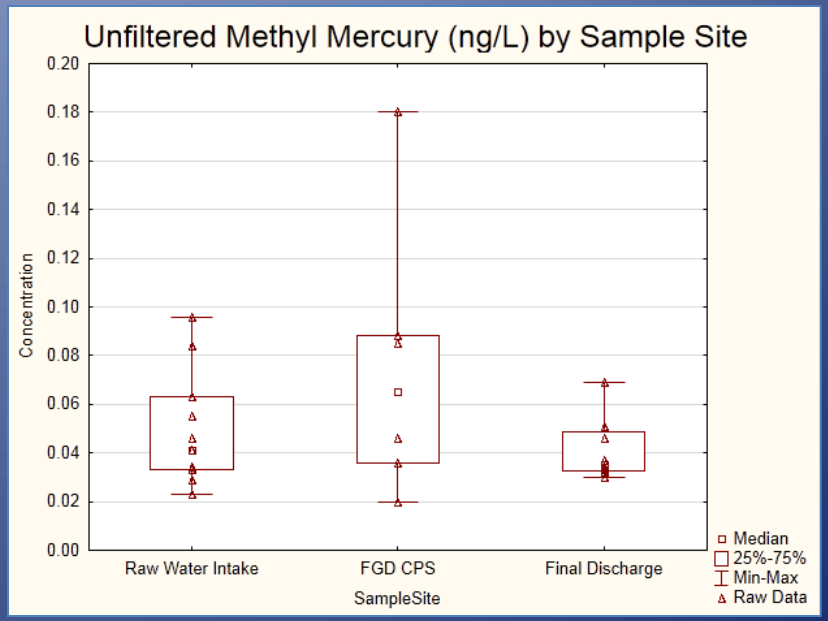
Ohio River Scrubbed Generating Capacity



FGD Sampling Results

- Hg concentration in final effluent equal to that in Ohio River intake
- Methyl mercury not increased in effluent





Net Mercury Discharge

Total Hg in grams/day:

Plant	Raw Water Intake	FGD CPS	Final Effluent	Net Inc/Dec
Plant 1	0.139	0.111	0.144	0.005
Plant 2	0.069	1.522	0.040	-0.029
Plant 3	0.053	0.020	0.048	-0.006
Plant 4	0.122	NA	0.233	0.111

Intake mass calculated using volume of sampled discharge (not including cooling water)

0.111 g/day = 0.089 lbs/year

- **Mercury taken in from the Ohio River is nearly equal to mercury discharged**
- **Net decreases seen at the two newer plants**
- **Resulting increase in Ohio River concentration from 0.111 g/day discharge at harmonic mean (45,300 cfs) flow:**
  - **1.0 pg/L**
  - **1/12,000th of WQC**

Bromide

- Not detected in Ohio River intake water (at 1.0 mg/L PQL)
- Detected in all FGD WW samples and half of final effluent samples
  - All samples at 2 plants, not at all in non-FGD plant
- Plants with detections averaged 3.9 mg/L in discharge (Ohio conc. ~0.03-0.06 mg/L)
  - 0.0033 mg/L increase in Ohio River at harmonic mean

Conclusions

- Bromide is discharged by FGD systems, higher than Ohio River concentrations but not with great impact.
  - Does not address bromide disinfection impacts if occurring on the Ohio

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- Total mercury discharged is similar to concentrations in Ohio River intake water.
- Methyl mercury concentration not increased from raw intake to final effluent.
- Results indicate mercury sequestered by FGD systems is effectively captured in solids and later secondary clear water ponds and not discharged to the Ohio River.

Next

- If approved, document will be made available via ORSANCO website.