Reporting Emissions from Stationary Combustion - Best Practices and Lessons Learned

Obadiah Bartholomy

Sacramento Municipal Utility District

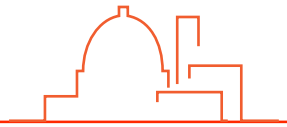
SMUD

SACRAMENTO MUNICIPAL UTILITY DISTRICT

The Power To Do More.

Sacramento Municipal Utility District

- Provides electric service to 1.3 Million residents of Sacramento County
- Charter member of CCAR
- 1st entity to report and complete verification under the GRP
- Reported 2002 to 2007 emissions with CCAR
- Reported 1990 to 2005 emissions to EIA 1605b



SMUD
SACRAMENTO MUNICIPAL UTILITY DISTRICT
The Power To Do More.

SMUD Stationary Combustion Sources

- Large Stationary Combustion
  - 500 MW N.G. Combined Cycle Plant
  - 3 Cogeneration N.G. Combined Cycle Plants
  - 3 N.G. Peaking Plants
- Small Stationary Combustion
  - One Central Plant Boiler
  - 17 backup generators

Reporting Options for Large Sources

- Revenue Metering for Natural Gas
  - Preferred for SMUD because we have a gas pipeline with redundant metering for all major sources
  - These meters are associated with $, so there is a strong incentive to keep them well calibrated
- CEMS Data
  - Covers major sources for SMUD
  - CO2 Calculated for N.G. plants based on a fuel-totalizer
  - Fuel totalizer also calibrated, though data quality appears to be lower

Differences between Data Sources

- Typically 1 - 2%, with CEMS generally higher
- Largest differences were 8% at a single source and 5% at another source
- Some differences resolved due to reporting algorithms in CEMS reporting
- Some differences built into 40 CFR Part 75 calculations

Cogeneration Reporting

- SMUD owns 3 N.G. Combined Cycle cogeneration plants, 56, 120 and 160 MW
- Steam is sold to industrial partners
- All direct emissions are reported by SMUD
- Indirect emissions associated with steam (~10% of direct emissions) are subtracted out of our electricity deliveries metrics

Efficiency Method for Cogeneration Reporting

- Efficiency method estimates an efficiency of an imaginary boiler, back-calculates associated N.G. and resultant CO2
- Straightforward to implement, relatively accurate, and does not create any perverse incentives
- Requires knowledge of steam sales, (MMBTU) and natural gas input into facility

Co-Firing With Biogas

- SMUD co-fires one N.G. Combined Cycle plant with biogas from the Sacramento Wastewater Treatment Plant
- CEMS data does not distinguish between biogenic and non-biogenic emissions
- Fuel metering, and fuel heat content and makeup knowledge are necessary for accurate accounting

Best Practices

- CEMS vs. Fuel Revenue Meters
  - It is important to assess the data quality for both data types
  - Understand the calibration requirements for the different meters
  - Understand the implications if a meter is out of calibration, and what systems are in place to identify this situation
  - Once you pick one method, stick with it (if possible)
  - Check your backup source of data before your certifier

Best Practices Cont'd

- Cogeneration Reporting
  - Efficiency method is recommended, though is not the only option
  - Metering of steam temperature and pressure to calculate steam BTU's necessary
  - Assumptions for efficiency should approximate a state of the art boiler
- Biogas Co-firing
  - Make sure you have appropriate fuel metering and diagnostics
  - Don't assume CEMS will get it right

Other Issues?