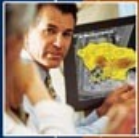


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## Case Study: EPA's Mandatory Reporting of Greenhouse Gases Gap Analysis

November 2009



# EPA's Final Mandatory Reporting of Greenhouse Gas Emissions Rule (40 CFR 98)



# Plant Description

- Large Wet Corn Milling Plant
- Five Production Areas plus Maintenance
- Subject to GHG Rule
  - ◆ No longer categorically included (food processing is reserved)
  - ◆ Included since >25K CO<sub>2</sub>e from combustion
  - ◆ Not a listed source
  - ◆ Only required to report emissions from stationary combustion (Subpart C)



# Subcategories Considered

- Subpart P – Hydrogen Production
  - ◆ Reforming of gas to make hydrogen generates CO<sub>2</sub>
  - ◆ Source category only includes facilities that produce hydrogen for sale
  - ◆ Currently, all hydrogen either used to make products or vented to atmosphere
  - ◆ In future, will sell H<sub>2</sub> that vents to atmosphere
  - ◆ Will make plant a listed source meaning subcategories other than combustion required



# Subcategories Considered

- Subpart D – Electricity Generation
  - ◆ Co-gen plant and CFB boiler have steam turbines
  - ◆ CFB boiler replaced co-gen plant and other small boilers as primary steam source
  - ◆ Potential for selling electricity exists
  - ◆ Would make plant a listed source
- Subpart U – Misc Uses of Carbonate
  - ◆ Limestone injection to CFB boiler
  - ◆ Sorbent usage covered in Subpart C
  - ◆ Use soda ash, but it is not calcined
  - ◆ Not a category that subjects you to rule (but if become a listed source then would need to include)



## Subpart C - Combustion

- ~650 MMBtu/hr Combined Cycle Co-gen Plant (~500 MMBtu/hr GT + ~150 MMBtu/hr DB) – natural gas
- ~1,000 MMBtu/hr CFB boiler (with limestone injection in fluidized bed) – coal/coke, etc
- Several small boilers
- Dryers and heaters
- Many misc?



# Subpart C - Combustion

- Isolated Sources that had O<sub>2</sub> or CO<sub>2</sub> CEMS
- Discussed/Developed Approach for Remaining Sources
  - ◆ Site meeting with all production units represented
  - ◆ Arrived with preliminary inventory of emission sources based on permits and EI
    - Differences prior to arrival in permits vs EI
    - Discussions clarified some differences but lead to conclusion that some combustion units at site not identified (stationary engines, gas-fired heaters...exempt from permitting and possible emissions reporting)



# Subpart C - Combustion

- Finalized Inventory of Combustion Sources
  - ◆ Walked gas line to make sure all sources included
  - ◆ Considered all engines not connected to gas lines
- Documented GHG CO<sub>2</sub> calculation Tiers (1 to 4)
  - ◆ Considered HHV data availability (Tier 1 vs Tier 2 for <250MMBtu)
- GHG Data
  - ◆ Fuel usage - inconsistent annual rates
  - ◆ HHV data availability

Unit	Fuels	Heat Input	Calculation Tier Required	Fuel Metering Capability	Notes	Fuel Sampling/ Analysis? (monthly or more frequent)
Hydrogen Plant	Natural Gas, Waste Heat	21.3 MMBtu/hr	Tier 2 - Group	x	Metered through ANR master meter	HHV - Monthly
CFB Boiler	Coal, coke, ag-byproducts, biomass, untreated waste timber, waste	996 MMBtu/hr	Tier 4 - CEMS	x	Solid fuels - weigh belt Natural gas - meter	HHV - Monthly (for solid fuel - from weekly composite samples)
Boiler #14	Natural Gas	187 MMBtu/hr	Tier 2 - Group	x	Metered through ANR master meter	HHV - Monthly
Boiler #11	Natural Gas	151 MMBtu/hr	Tier 2 - Group	x	Metered through ANR master meter	HHV - Monthly
Boiler 9	Coal		DECOMISSIONED			
Boiler 10	Coal		DECOMISSIONED			
Boiler 12	Coal		DECOMISSIONED			
Boiler #13	Natural Gas	99.2 MMBtu/hr	Tier 2 - Group	x	Metered through ANR master meter	HHV - Monthly
Duct Burner	Natural Gas	674 MMBtu/hr	Tier 4 - CEMS	x	Duct Burner meter	HHV, Carbon Content, MW
Turbine	Natural Gas	587 MMBtu/hr	Tier 4 - CEMS	x	GT meter	HHV - Monthly
Dew Point Heater	Natural Gas	1.57 MMBtu/hr	Tier 2 - Group	x	Metered through ANR master meter	HHV - Monthly



# Subpart C - Combustion

- Natural Gas Usage
  - ◆ NG meter at inlet to each bldg
  - ◆ NG meter for certain equipment (feed house, co-gen plant: both CT and DB, Refinery C, newer parts of plants)
  - ◆ Supplier plant NG meter
  - ◆ Company plant NG meter (in series with supplier meter)
    - Differences between supplier and company plant NG meter and sum of other meters – noise in transmitters, etc
    - ASPEN and company plant meter pretty close



# Subpart C - Combustion

- Natural Gas Usage (cont.)
  - ◆ Reform NG to generate hydrogen for hydrogen plant
  - ◆ Use supplier meter and deduct usage for co-gen and CFB boiler (sources with CEMS) and hydrogen plant, no calibrations required on supplier meter
  - ◆ Determine usage for co-gen and CFB boiler using dedicated meters, initial calibrations on flow meter recommended (Subpart A), no ongoing calibrations since aggregated units all Tier 2 even though co-gen and CFB Tier 4
  - ◆ No units larger than 250 MMBtu/hr other than co-gen and CFB boiler → aggregate for reporting
  - ◆ Fuel usage determination method for aggregated units NOT relying on common pipe aggregation approach. Detail approach in monitoring plan



# Subpart C - Combustion

- Solid Fuel Usage -coal and coke
  - ◆ Fuel measurements may not be needed since units have CEMS including exhaust flow monitor
  - ◆ CH<sub>4</sub> and N<sub>2</sub>O calcs require heat input
  - ◆ Heat input can be estimated directly from exhaust flow rate and F factors (Btu/scf)...F factor for coke?
  - ◆ Heat input can also be estimated from fuel usage and fuel HHV
    - Manual tallying of truck/rail receipts
    - 40/60 coal/coke blend
    - Main belt calibrated for total flow but blend in silos
    - Do not track after silos



# Case Study Conclusions

- Applying rule specifics not straightforward
- Minor gaps based on final rule
- Future Actions Required
  - ◆ Develop calculation details
  - ◆ Develop monitoring plan to describe approach to GHG reporting



# Compliance Strategies Learned

- Calculations and Emissions Data – Gap Analysis
  - ◆ Determine whether plant is a listed source that reports all subparts) or a non-listed source that reports Subpart C only
  - ◆ Review subparts – what processes must be evaluated?
  - ◆ If you need to report, must develop a plan:
    - What Tiers will be used and for which equipment?
    - Which equipment should be aggregated? Which ones qualify for common pipe configuration?
    - What fuel records need to be kept?
    - How to calculate emissions
    - What additional monitoring is needed



# Compliance Strategies

- Calibration Requirements – Gap Analysis
  - ◆ Plan for initial calibration (by April 1, 2010) and recurring calibration of flow meters, scales, etc. used to gather GHG data (fuel billing meters excluded)
  - ◆ Evaluate compliance with 5% accuracy requirements in the rule
  - ◆ Establish calibration procedures where required (based on applicable flow meter test method in rule, manufacturer's procedure or industry standard)



# Questions?

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