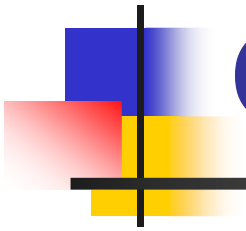

Compliance Issues

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August 4, 2011

How keep coal?

- Significant issues relative to retaining existing coal firing capability that push toward conversion to gas firing:
  - Coal cost- very high and increasing- driven apparently by mining restrictions and exports
  - Need for higher quality coal with specifications on Cl, Hg, S, Btu, Moisture, STA, etc., will further restrict available supplies and increase costs
  - Loss of operator and support staff expertise, and limited maintenance and capital creep budgets
  - Uncertainty relative to environmental requirements going forward; air, CCB, GHG

Is Nat Gas the answer?

- But balanced against that driver is future of natural gas:
  - Fracking regulation impacts
  - Electric utility shutdown of old coal firing capacity and installation of NGCC units- major impact on demand, availability, and price, especially regionally and locally
  - LNG exports from US into high price world markets and impact on pricing

National Impact?

- So what might the resulting balance of energy resources be in the US for industrial energy and electricity production and how might that impact future economic cycles and national security?
- How can higher efficiency such as CHP be justified and implemented?

NAAQS Impacts

- Seeing significant impacts of new 1 hour NO2 and SO2 NAAQS
- These impact the ability to install new equipment and modify existing equipment
- Can also impact ability to implement energy assessment opportunities, compounding problems relative to PSD/NSR issues with modifications
- Imposition of LAER can further increase costs and thereby limit actions/improvements
- Compounding factors include varying permitting approaches and requirements by states, example-biomass
- GHG BACT impacts?

D/F

- Major concerns remain relative to D/F emissions-
- Will our arguments convince EPA to move to work practice approach?
- Potential final limits?

HAP Emission control issues

- What are existing unit actual emissions?
- What control performance can really be achieved?
  - Physical limitations
  - Load, flue gas, temperature variations
  - Fuel quality variations
  - Major difference between D/F control performance on waste in Europe and coal/biomass/liquid/Gas2 in the US
  - Interaction between multiple sorbent injections and injection rates and resulting emissions impacts
  - Appears that actual testing will be required in many cases in order to determine approach, sorbent, feed rate required

Dry sorbents

- If DSI is the control of choice for many applications both for industrials and utilities, what will that demand do to the availability and price of sorbents?

Boiler improvements

- Boiler control optimization and improved operation a likely path to reduced CO (and other) emissions and better overall efficiency, but will be unit specific.

Compliance issues

- Relative to compliance, how to determine, have available, and use worst case fuel for performance tests?
- Recognize that ongoing compliance will likely require routine fuel analysis to show no higher concentrations than during compliance testing.
- How do normal fuel quality/quantity fluctuations impact emissions controls?

Just a thought

- If DSI is used in many cases for compliance and collateral SO2 emissions reductions do not occur as assumed by EPA for Boiler MACT with use of scrubbers, what is the impact on EPA projected benefits, noting that they did not quantify actual benefits due to HAP reductions?