THE NON-SOLID FUEL PATHWAY FOR BOILER MACT COMPLIANCE

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WHY SHOULD YOU BE INTERESTED?

• You are directly affected - solid fuel (coal and biomass) industrial boilers and utility boilers < 25 MW located at Major HAP facilities (>10/25 tpy)
  • Traditional approach of install back-end AQC equipment can have issues
  • Rule uncertainty – Will target emission limits survive a legal challenge?
  • What if AQC is installed and the rule is struck down – Money well spent?
  • Remaining life of existing units vs. life extension vs. new solid fuel boilers – Are new unit emission limits technically feasible to meet?

• Your customers/clients are directly affected
  • Vendors for alternate generation technologies
  • Vendors of BOP equipment
  • Technical and economic feasibility studies

Compliance timeline clock has started ticking
THE NON-SOLID FUEL PATHWAY

• Convert existing boilers to Gas 1 or “other Gas 1” category units
  • Gas 1: natural gas, refinery gas
  • Other gas 1 fuel: < 40 μg/m³ of Hg and < 4 ppmv H₂S.
• Decommission existing solid fuel fired boilers and install new gas 1 fuel fired package boilers
• Install gas 1 fuel fired cogeneration systems (CHP) that utilize combustion turbines
• A combination of boiler gas conversion and cogeneration systems

Gas 1 units, other Gas 1 units and combustion turbines do not have to meet BMACT emission limits
NON-SOLID FUEL PATHWAY – OVERALL ISSUES

• Compliance schedule
• Compliance requirements
• Technical issues
• Economic issues
GAS CONVERSION STUDY ITEMS

- Determine permitting impacts
- Review the boiler and auxiliary equipment limitations
- Determine gas metering, cleanup equipment needs
- Determine the maximum practical gas load capability
- Evaluate modifications required to achieve current Boiler Maximum Continuous Rating (BMCR) with gas
- Develop estimated costs

Feasibility studies are critical
VISTA IS AN EXCELLENT TOOL TO STUDY GAS CONVERSION

- Gas co-firing and repowering modeling capability
- B&V has studied the following fuels using VISTA:
  - Natural gas
  - Bio-gas
  - Gasifier product gas
  - Refinery gas
  - Coke-oven
  - Blast furnace gas
  - Ethane and propane
- Vista used in 2GW of coal-gas conversion studies in the last year.
- Key results include:
  - Heat rate and efficiency.
  - Derate risk and equipment margins.
  - Emissions predictions
  - Maintenance differentials and equivalent availability changes.
  - Total fuel-related cost.
GAS CONVERSION - ESTIMATE OF CAPITAL AND OPERATING COSTS

• Estimate of capital costs for the repowering
  • Major equipment (including boiler modifications)
  • BOP and construction costs
  • Indirect costs

• Estimate of incremental O&M costs
  • Vista™ model results
  • Typically include:
    • Differential fuel cost
    • Potential environmental credits
    • Reduction in AQCS sorbent and catalyst materials
    • Differences in auxiliary power requirements.
    • Impacts to potential unit output
    • Maintenance requirements for non-essential equipment

An accurate pro forma analysis is required
COGENERATION BENEFITS

Key Metrics

- Efficiency
- Reliability
- Environmental
- Economic

Benefits

- Less fuel and less transmission losses
- Operate independent of outside grid issues
- Less fuel burned per each unit of energy output
- High efficiency and hedge against unstable energy costs

CHPs are ideal where thermal loads are high and electricity costs are > $0.07/kW-hr avg.
COGENERATION – CHP STUDY ITEMS

• Current thermal and power requirements
• Price prediction of gaseous fuels
• Price paid for purchased peak and non-peak power
• Capital costs
• Electrical interconnections and capability to put surplus power back on to the grid
• Reusing existing steam turbines
• Number of units and space issues
• Duct firing and HRSG/OTSG selection
• Integration with existing power and steam infrastructure
• Government incentives for implementing CHP systems – EPA’s CHP Partnership

CHPs dramatically improve plant efficiencies
CHP DEVELOPMENT STAGES

• Qualification
• Level 1 feasibility analysis
• Level 2 feasibility analysis
• Procurement, and
• Operations and Maintenance
RECOMMENDED STEPS

- Determine MACT applicability
- Gather intelligence on your facility
- Develop compliance flowcharts and checklists
- Explore feasibility of back-end control (traditional AQC) and front-end fuel conversion and CHP technologies
- Conduct economic analyses
- Set internal deadlines and finalize strategy
- Agency interaction and execution of strategies

Proven steps to ensure Owner/Contractor collaboration
QUESTIONS?

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