Influence of Mixing and Fuel Composition on Emissions

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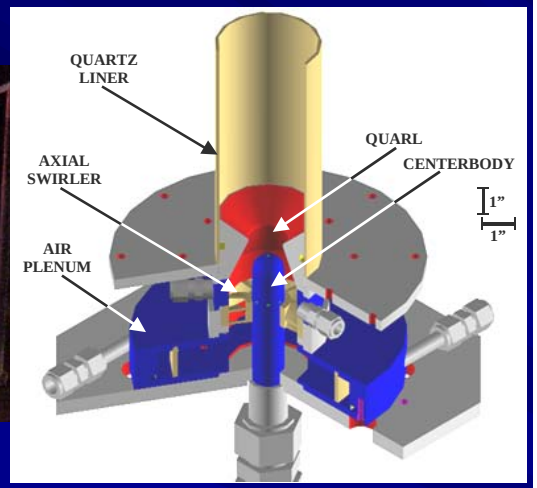
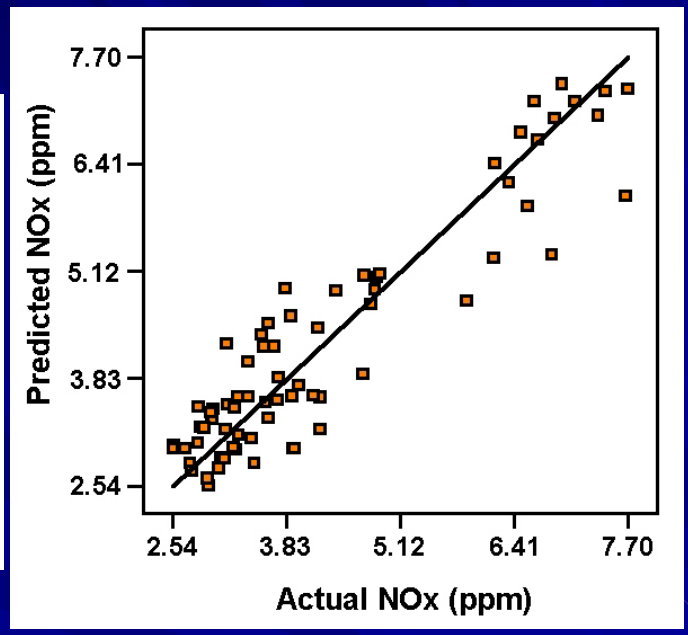
RESPONSE MODEL ($R^2 = 0.86$)

NOx [CODED] = 2.93A + 3.37B + 4.58C + 1.27AE + 0.58BD + 0.33CD + 1.58CE + $1.12AE^2$ + $1.69BE^2$ + 0.54ADE + 0.56BDE + 0.79CDE

A: NATURAL GAS
B: ETHANE GAS
C: PROPANE GAS
D: % PILOT
E: % CENTERBODY





- **Lean premixed combustion is effective for emission reduction**
  - **More sensitive to perturbations including fuel gas composition variability**
- **UC Irvine developed model relating fuel/air mixing and fuel composition to emissions**
  - **Altering fuel distribution is a strategy to accommodate fuel composition changes**
- **Results were used by 3 OEM's, 1 combustion technology developer and 1 user to help make decisions on how to handle the impact of LNG on combustor stability, and in the case of California installations, on how to respond to regulatory issues**
- **As LNG is used in increasing quantities from more sources the variability of fuel gas should be more widespread, and manufacturers are likely to use this data in redesigning combustors to handle it.**