
Combustion and Post Combustion System Optimization

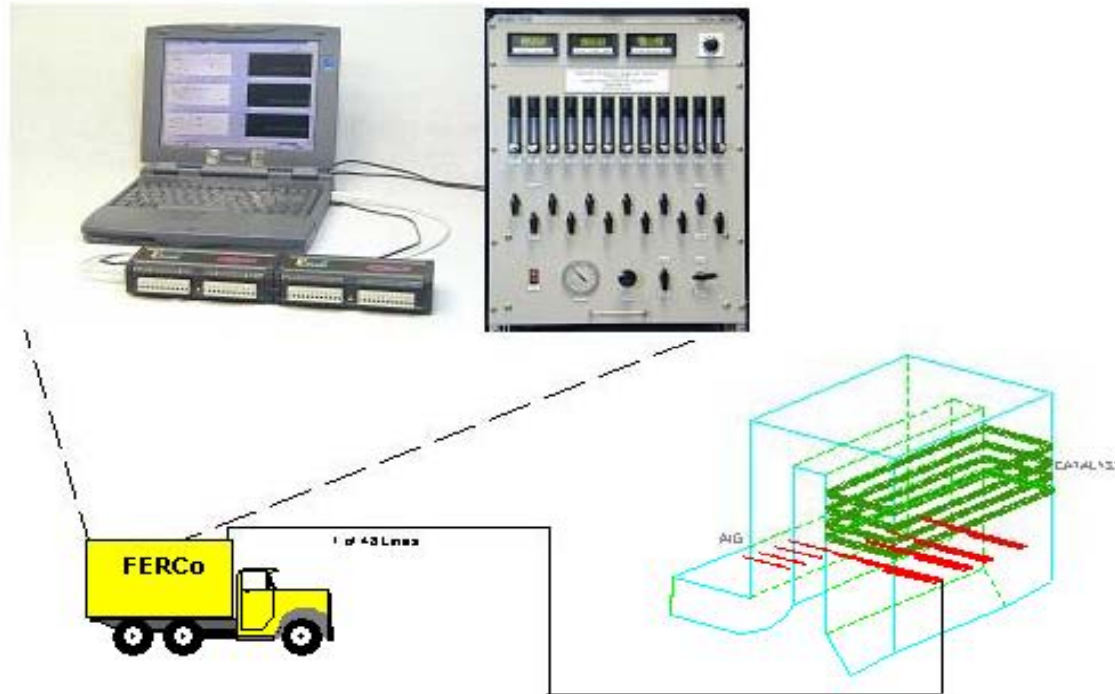
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Laguna Hills, CA**

**Cemtek 2012 Emissions Monitoring
Seminar & Training!**

September 13-14, 2012

Multipoint Instrumentation: FERCo'S MCDA



Traditional Point-by-Point

96 points x 2-3 minutes/point \Rightarrow 4-5 hours

MCDA

96 points x 5 min/12 pts \Rightarrow 40 minutes

SCR Performance Issues

- **NH₃/NO_x Maldistribution at Catalyst Inlet**
 - Very Important Operating Parameter
 - For GTs it is determined by a) velocity profile at the AIG, and b) Ammonia flow from the AIG lances
- **Velocity Maldistribution at the Catalyst Inlet**
 - Not very important in terms of performance
- **Catalyst Activity**
- **CEMs Relative Accuracy Tests & CEMs Measurements**
 - NH₃/NO_x Maldistribution generates NO_x maldistributions in the stack
 - Can impact RATA tests
- **Gas Sneakage**
 - Flue gas bypassing the catalyst can put compliance in jeopardy

Gas Turbine SCR AIG Tuning

- **Tuning is facilitated by installing a permanent sample grid at the catalyst exit:**
 - Not feasible to manually traverse a large combined cycle system for AIG tuning
 - Typically need 36-60 probes depending on AIG design
- **With permanent probes tuning can typically be done in one day**

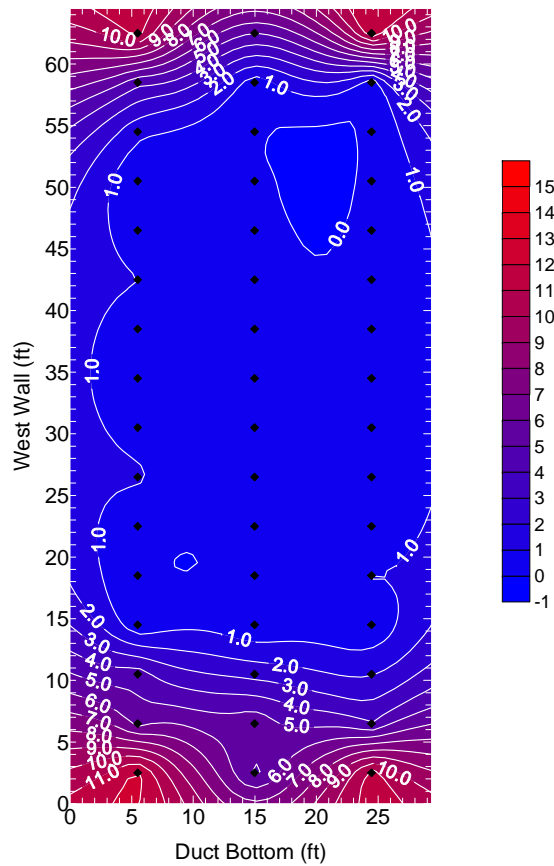


 IFFERCo



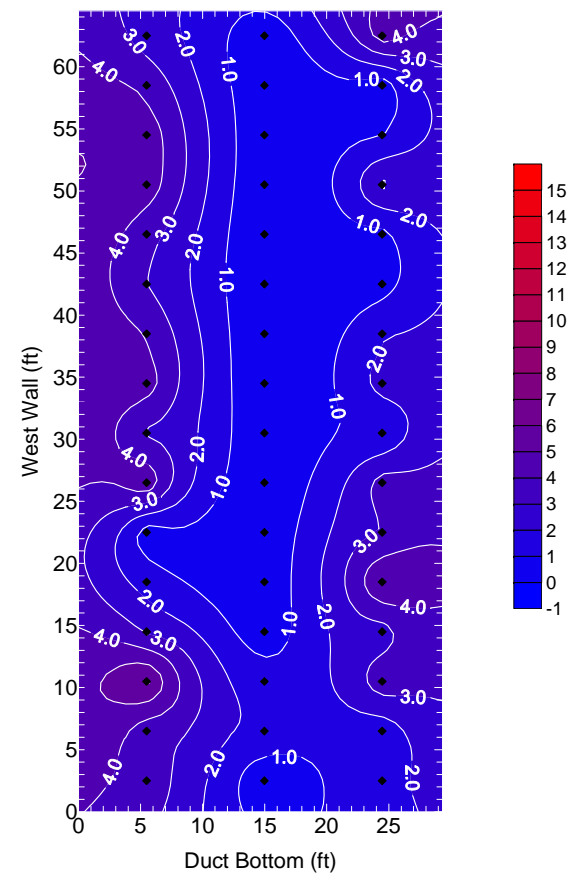
Tuning Example

As Found



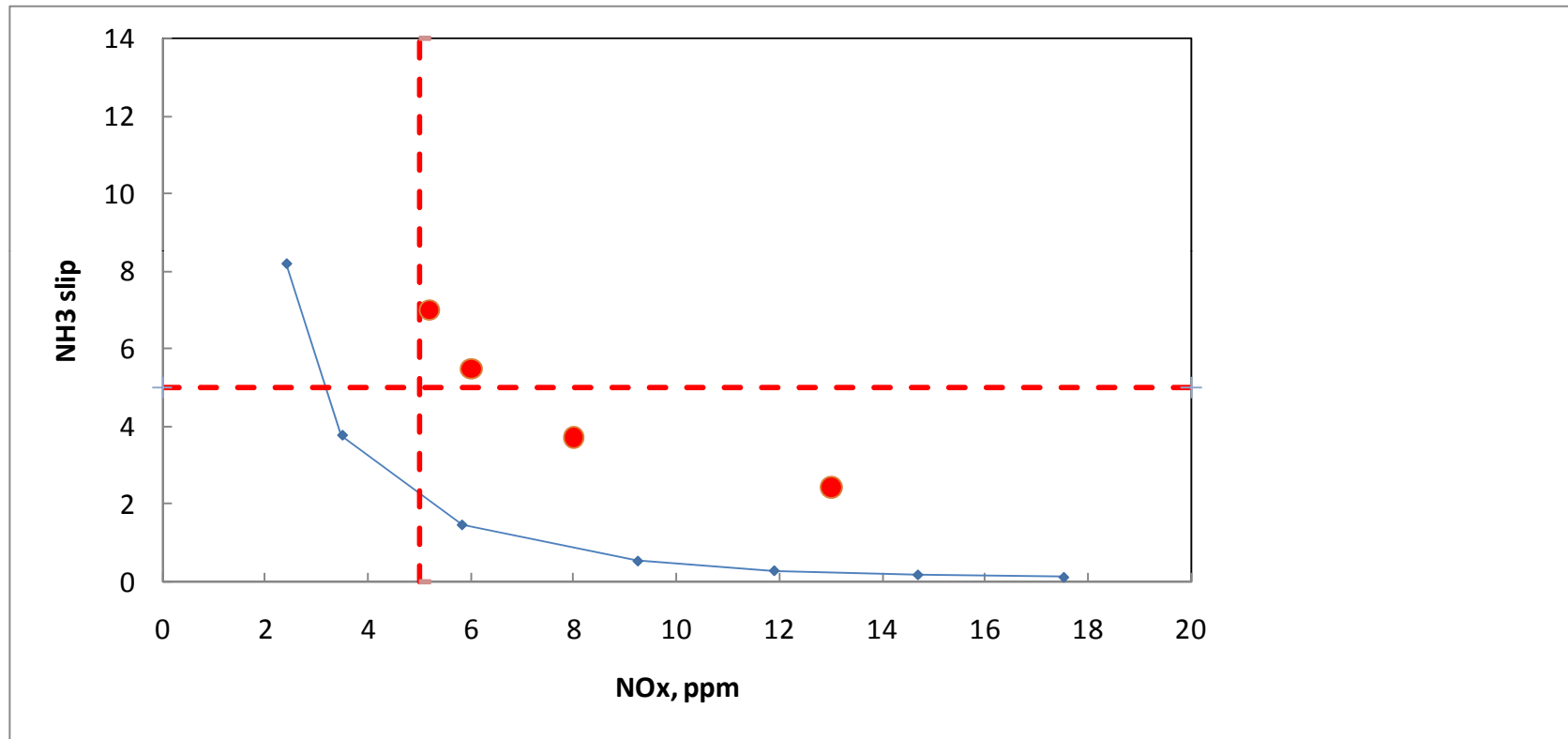
RMS = 163%

Tuned

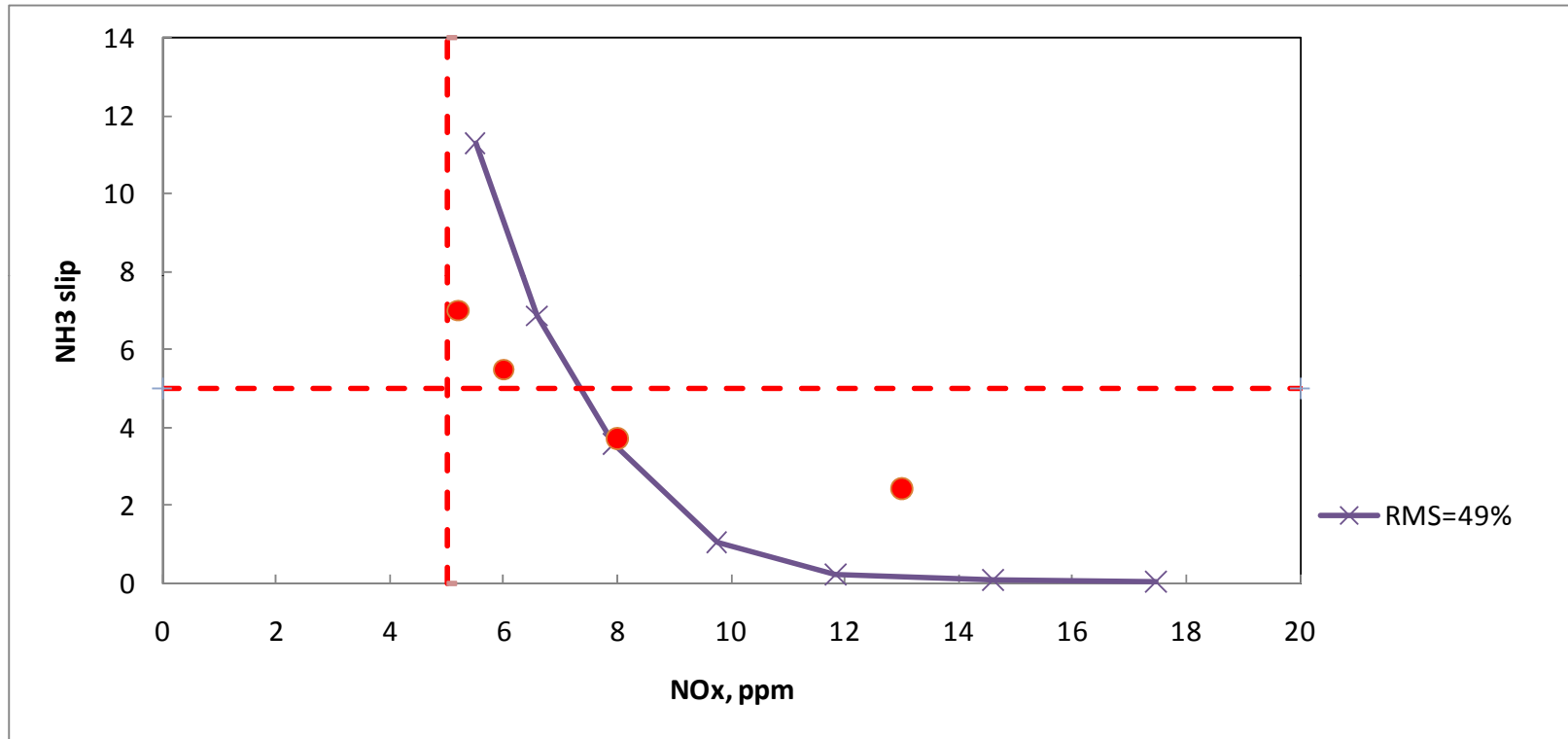


RMS = 82%

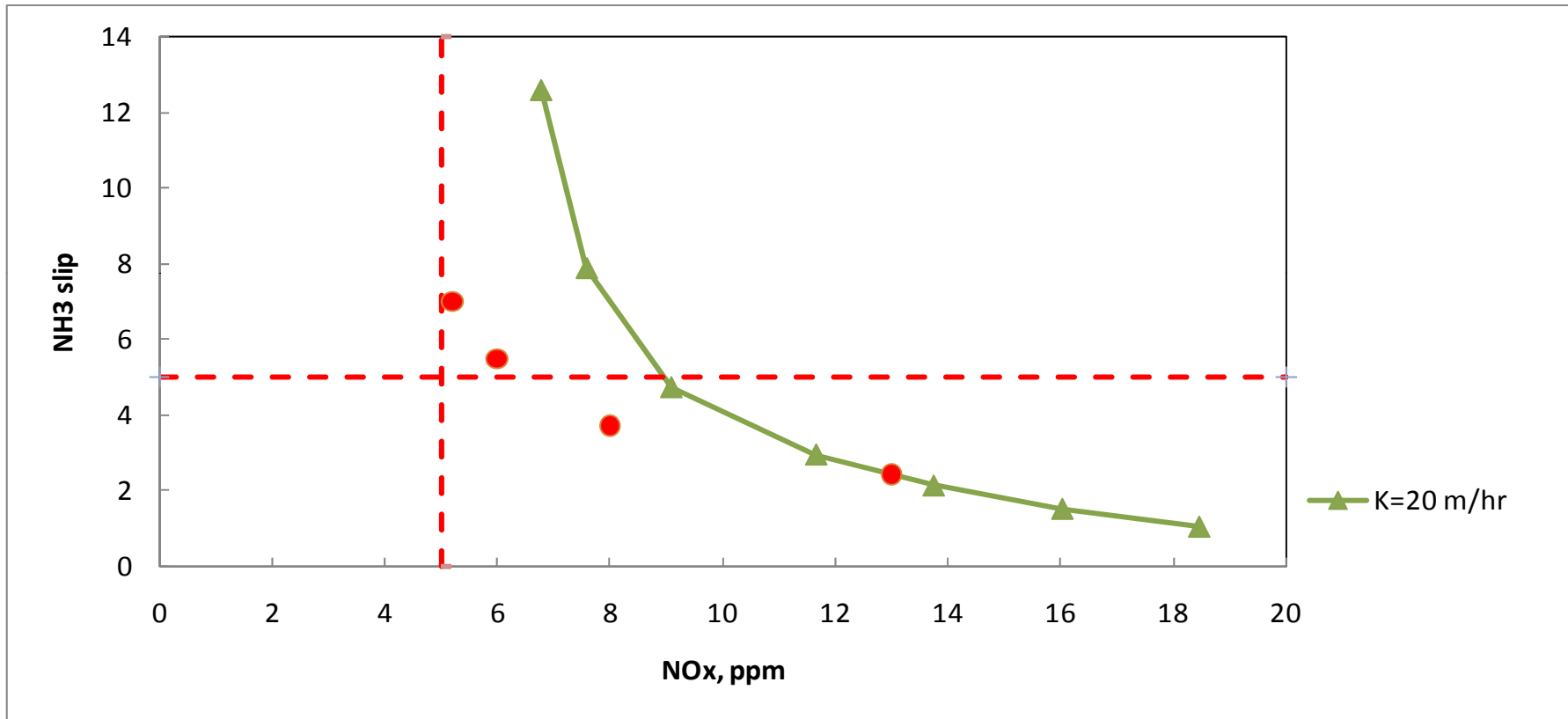
SCR Process Model Indicates Compliance



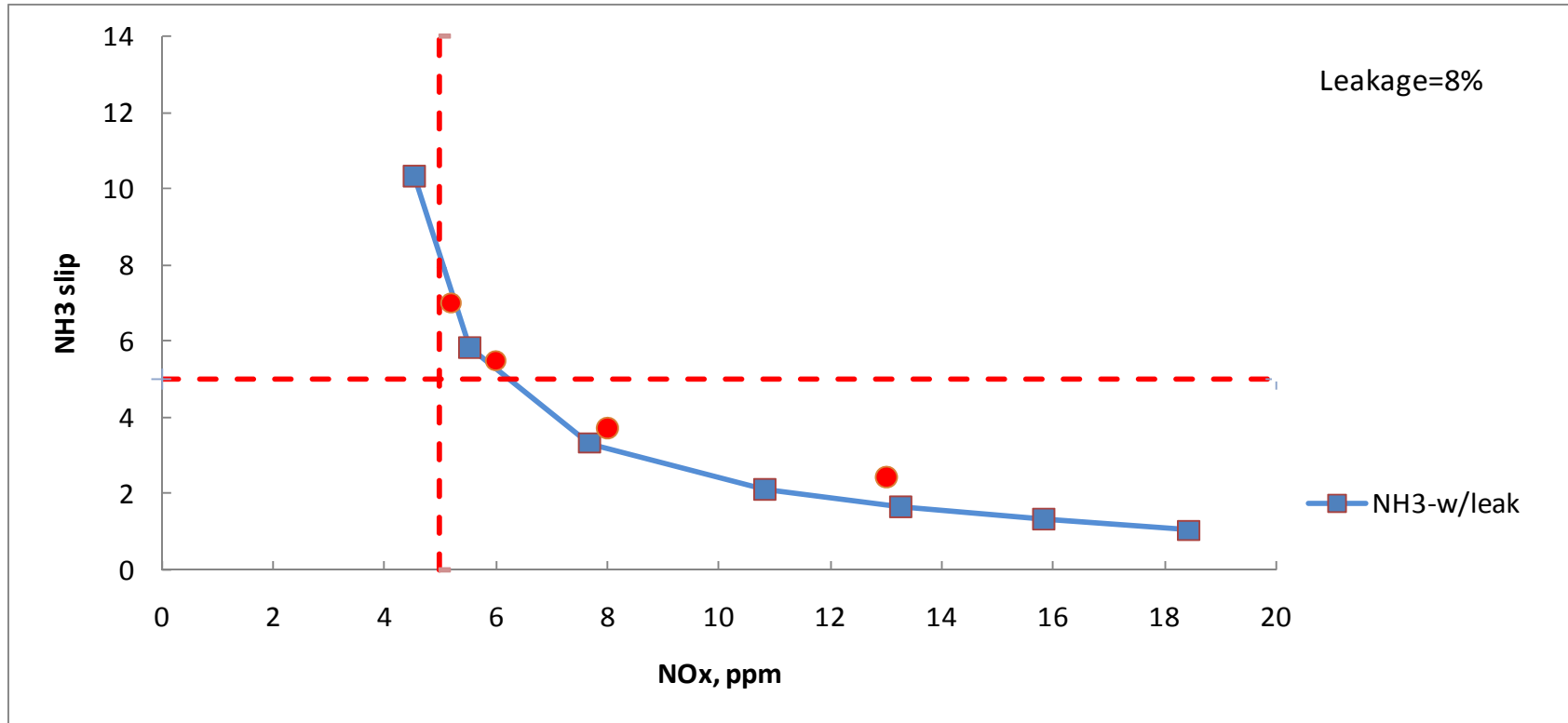
What Can Lead to Non Compliance: Poor NH3/NOx Distribution?



What Can Lead to Non Compliance: Low Catalyst Activity?



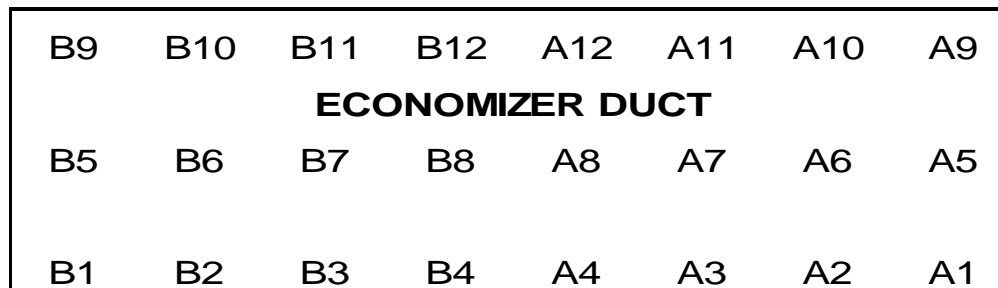
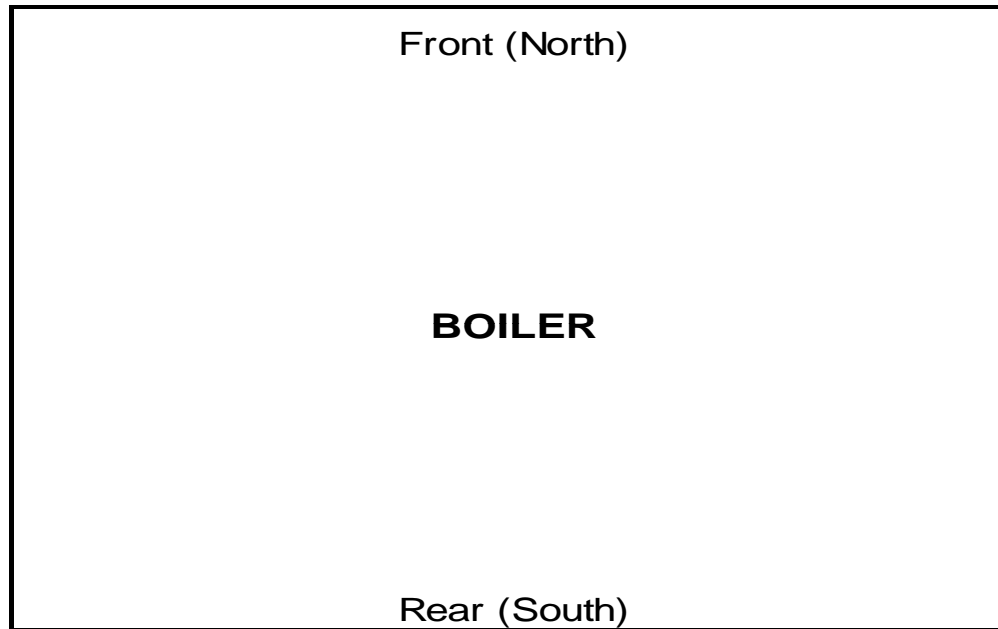
What Can Lead to Non Compliance: Leakage?



Coal Combustion Optimization

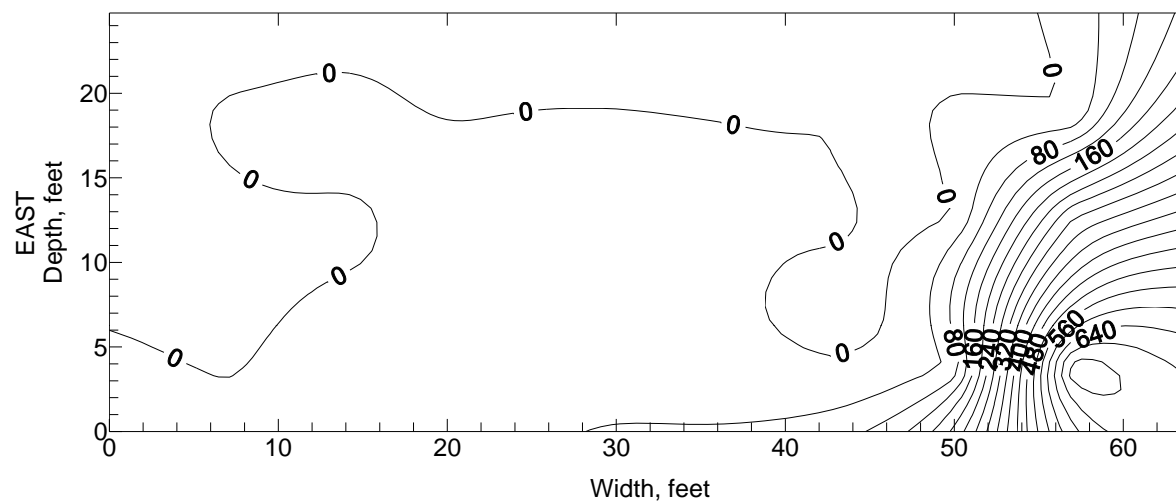
- Goals
 - Reduce O₂
 - Reduce CO
 - Reduce NO_x
 - Reduce Slagging/Fouling
- Approach
 - Need to look at gas profiles at the economizer Exit
 - O₂, CO, NO_x

Example

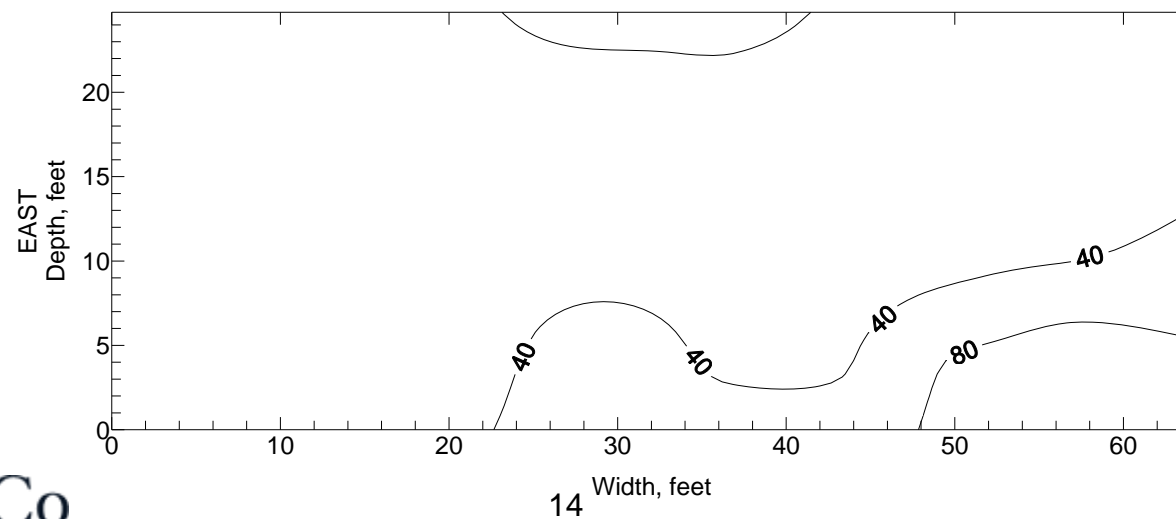


Example

As Found

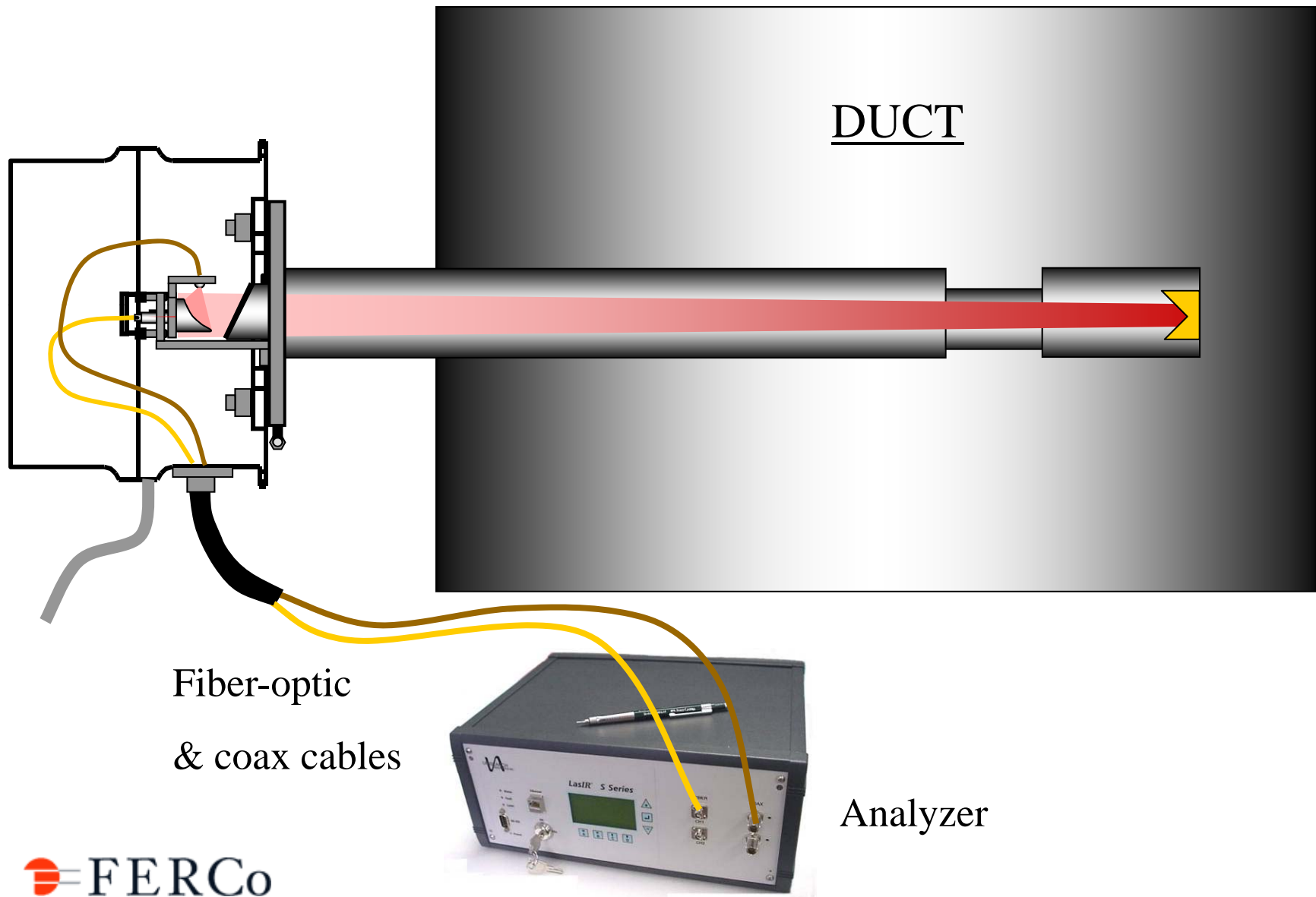


Tuned



IN-SITU NH₃ PROBE

Dual-Pass (Mono-Static) In-Duct Configuration



In-Situ NH₃ Probe Components



NH₃ measurement section

PDA w/cooler

In-Situ Test Data

