TVA's Experience with SO_3 Mitigation

Technical Presentation

Reinhold Environmental NOx Round Table

01/23/2006

Current Operating Experience

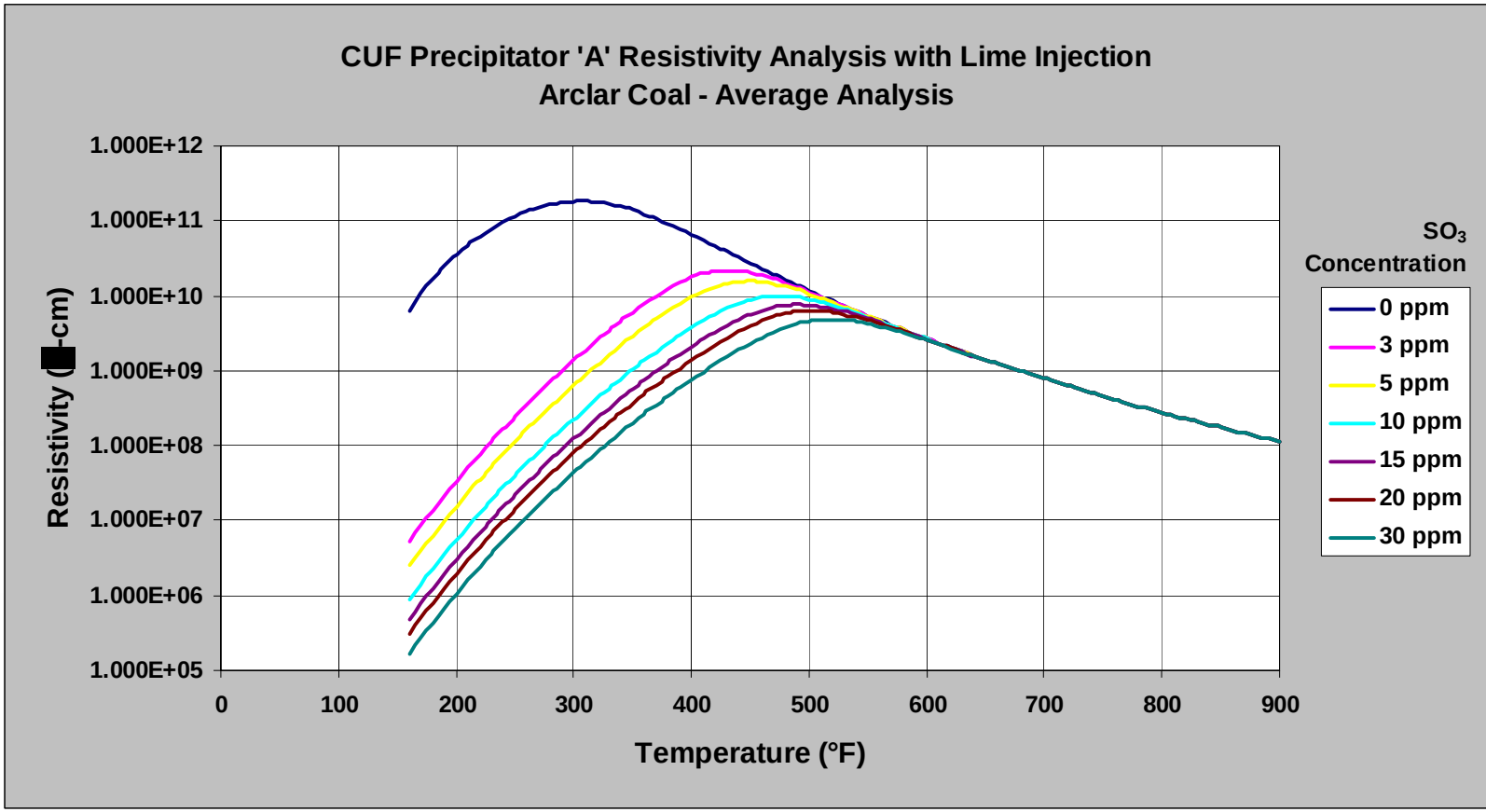
- WCF 7 – Operating Ozone Season with SBS Ahead of APH
- WCF 8 – Operating Year Round with Lime Downstream of APH
- CUF 1-2 – Planning to Install Lime Downstream of APH by October 2006
- PAF 1-2 – Tested Lime Downstream of APH (SO3 Control Decision on Hold)
- All other units being evaluated with FGD Installation

The Problem Is Blue

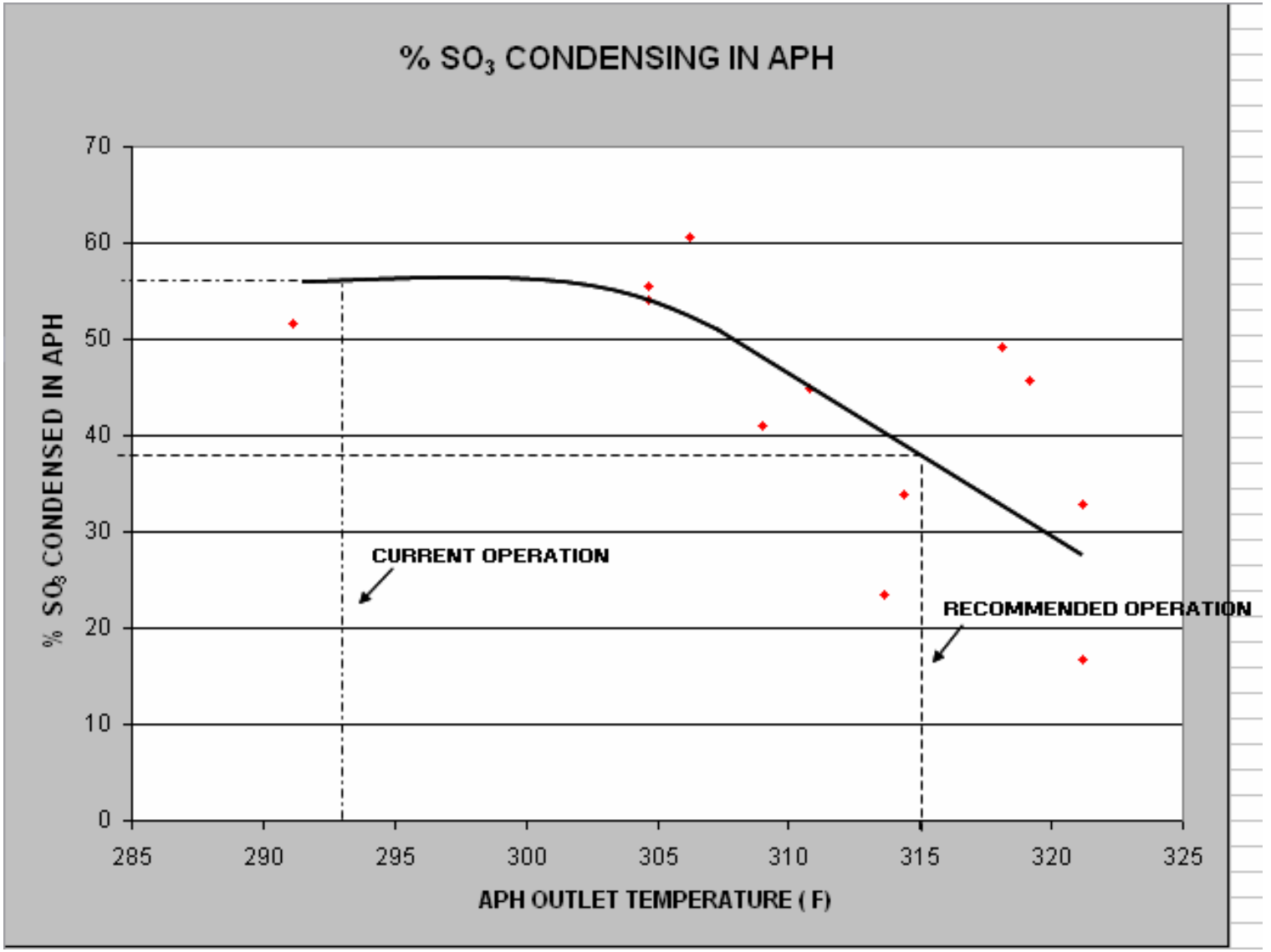
Problems from Additives in Retrofit Applications

- Resistivity in Existing Electrostatic Precipitator
- Fly Ash Sales
- APH Fouling
- Duct Deposition

Fly Ash Resistivity

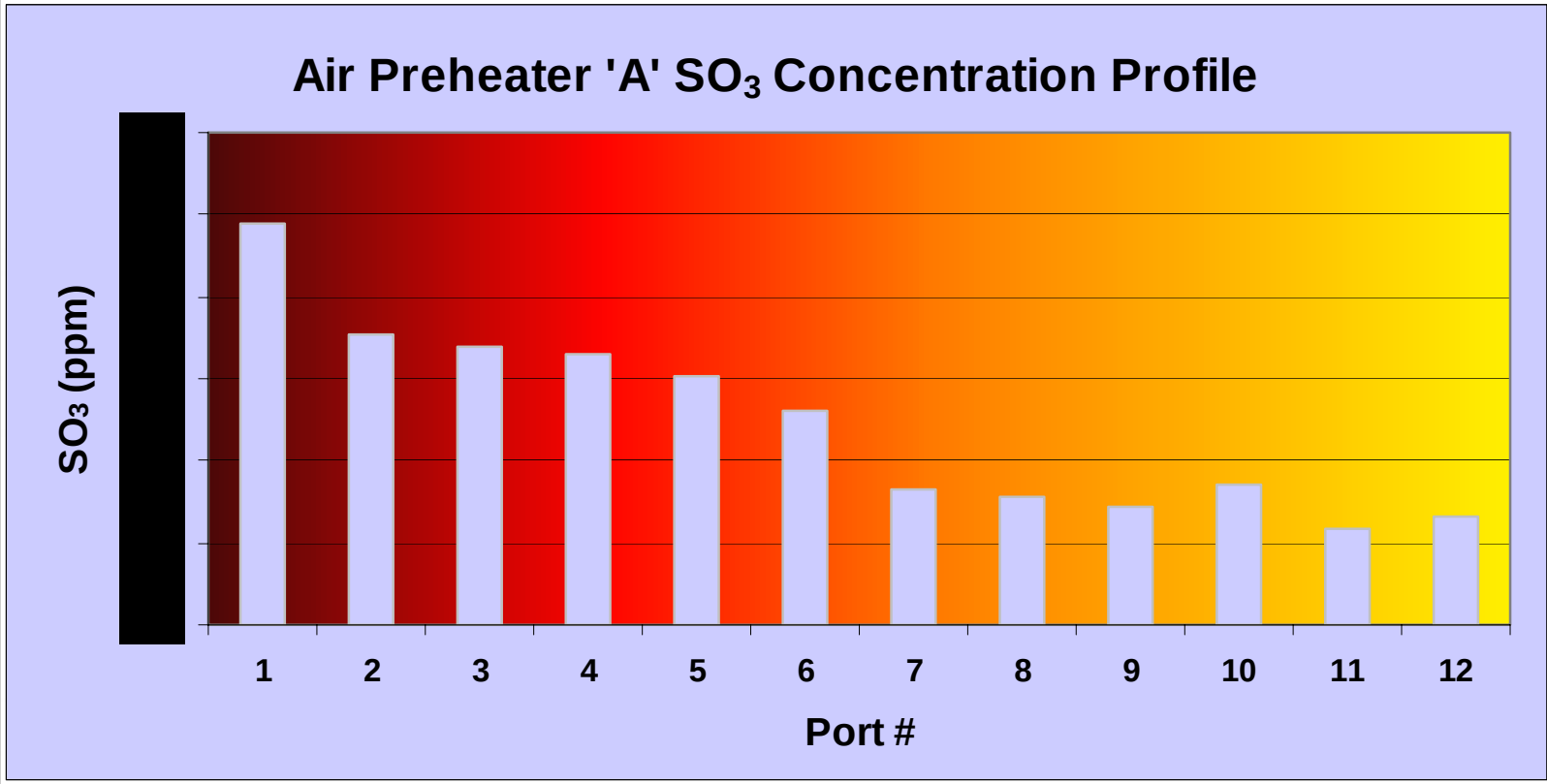


APH Fouling – Condensed Acid

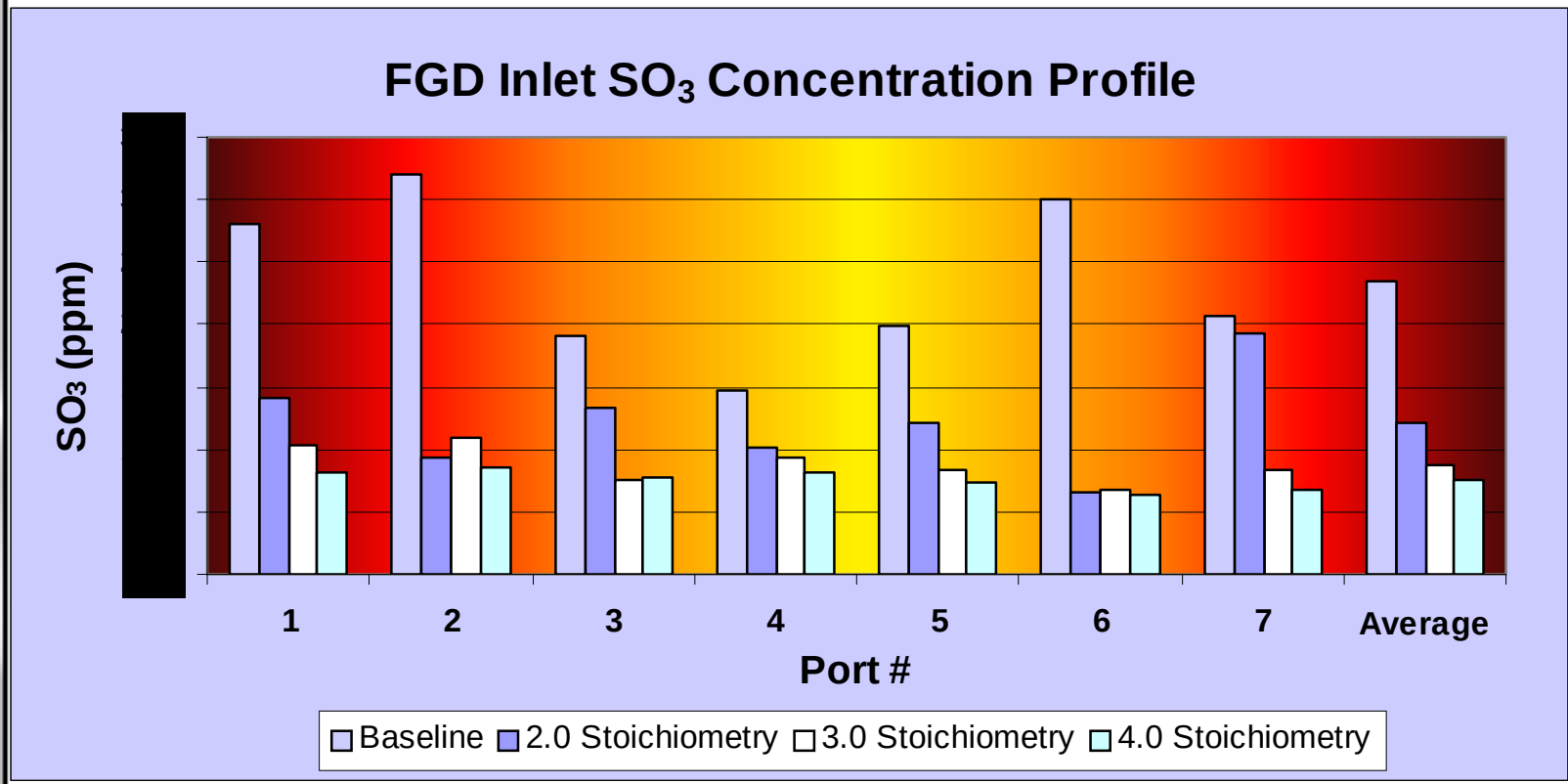


APH Fouling / Duct Deposition

- Entrainment Velocity, Pick Up Velocity
- Know Acid Dew Point

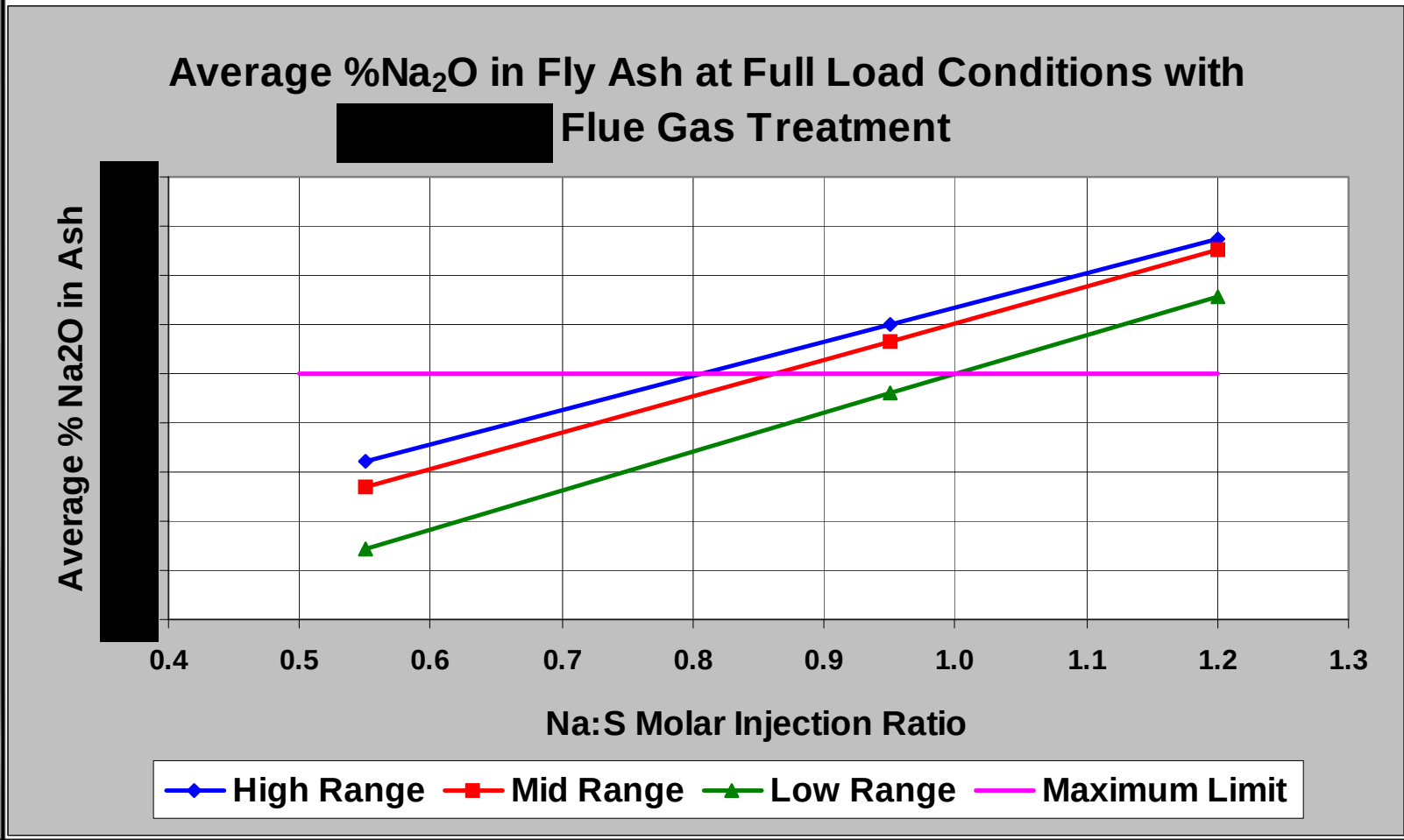


Testing


FGD Inlet SO3 Concentration Profile
SO3 (ppm)
1
2
3
4
5
6
7
Average
Port #
Baseline
2.0 Stoichiometry
3.0 Stoichiometry
4.0 Stoichiometry

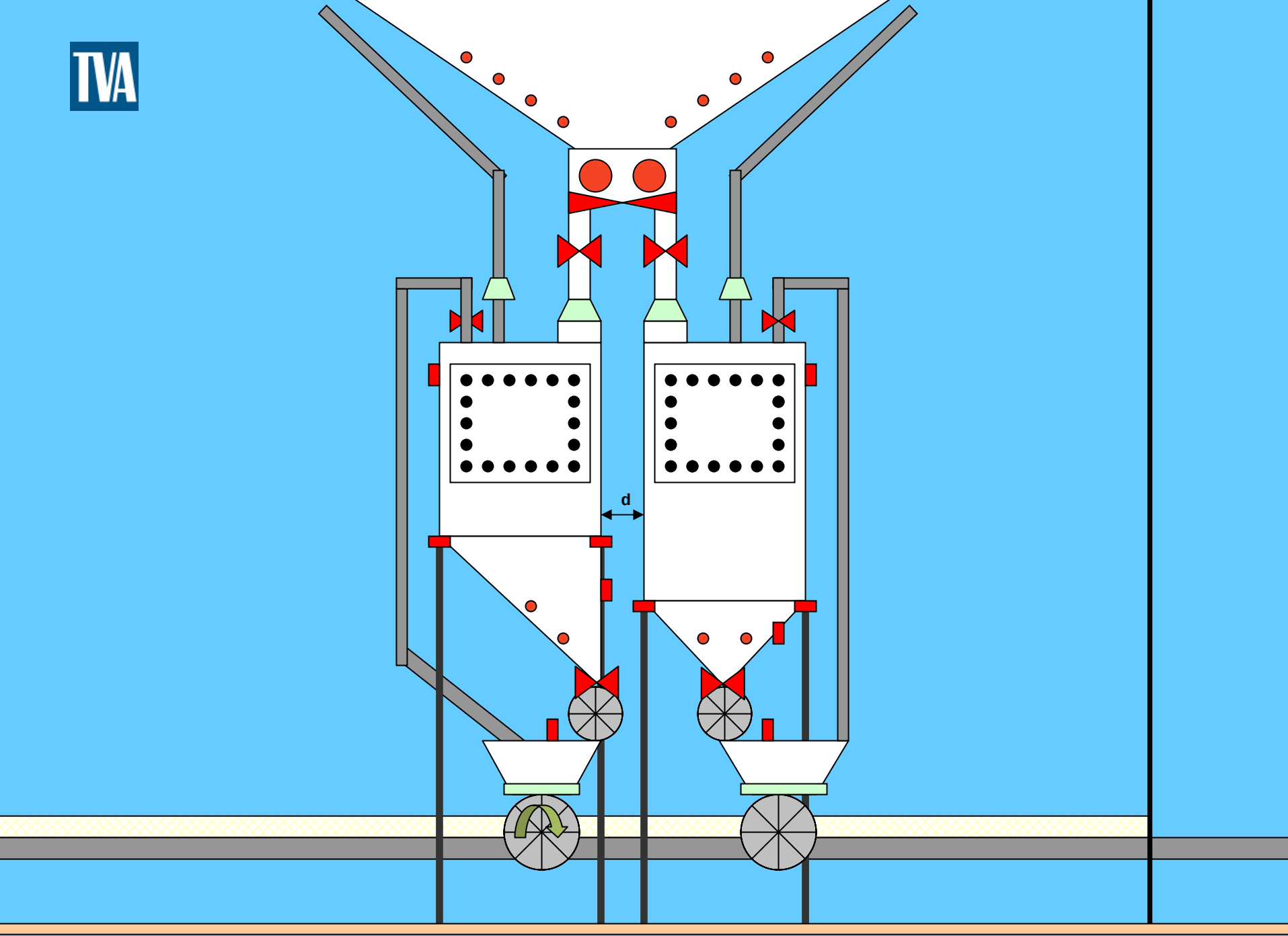
Fly Ash Sales

- Know your limits



Top 5 System Design Issues

- Dry Air for Aeration & Conveying
- Pipe Routing
- Material Feed
- Injection and Proper Dispersion
- Splitting Material Flow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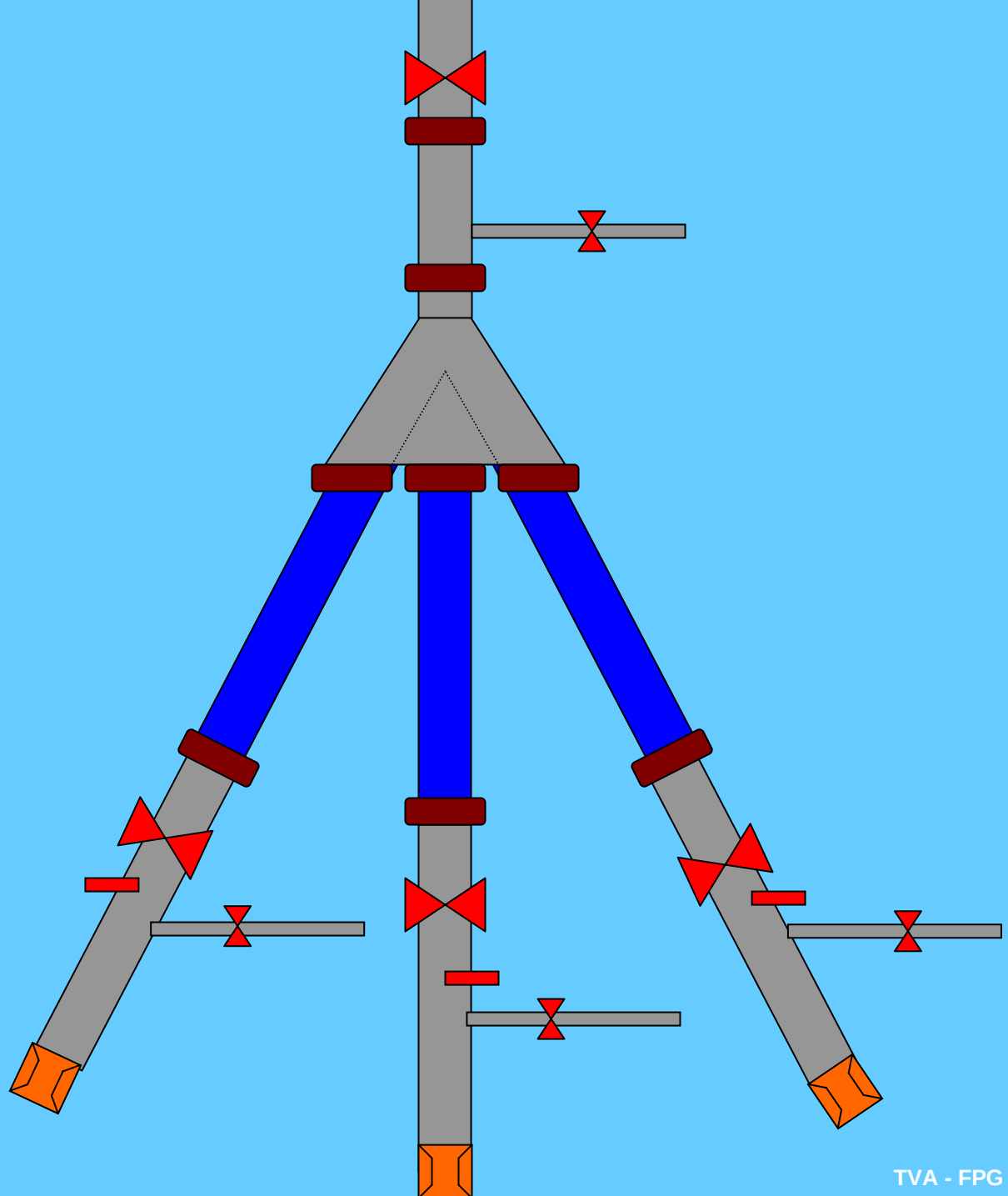
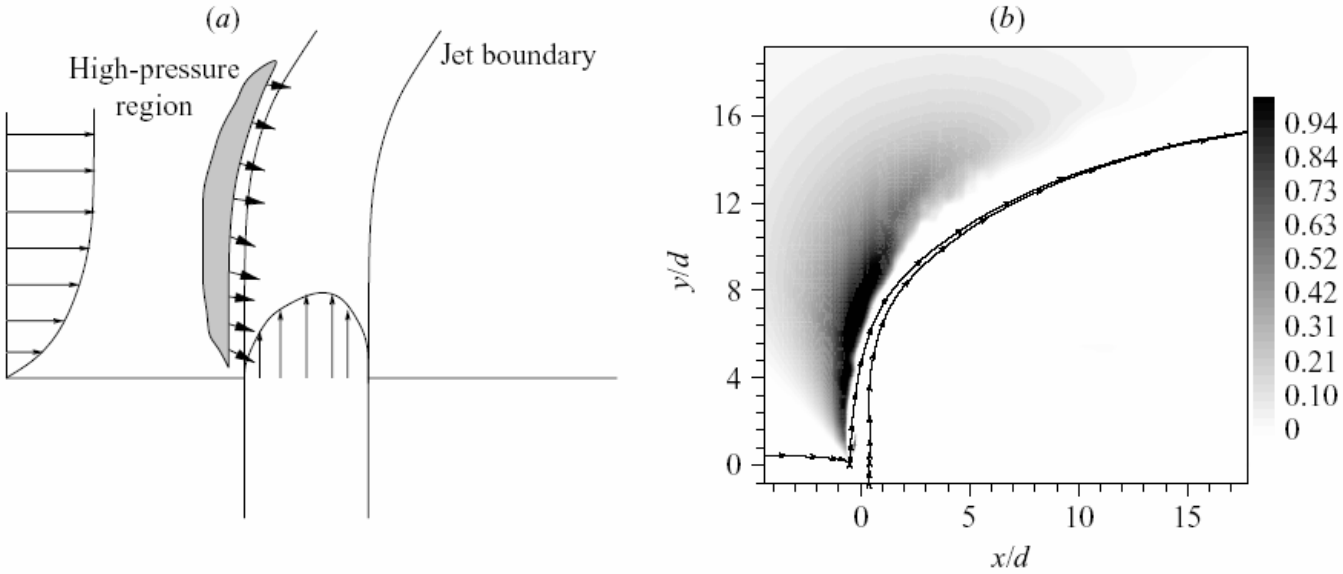
Pipe Route & Back to Back Bends



Duct Injection – Momentum Flux



Dry Air for Aeration and Conveying

- Many dry powders (lime & trona) are hygroscopic
- Single Worst Problem: Fouling of Convey Line, Splitters, & Injection Lances
- Recommend -40 °F dew point
- Recommend Twin Regenerative Dessicant
- Air Intake from Inside Blower Building
- May avoid costly field-installed pipe insulation