REINHOLD ENVIRONMENTAL Ltd.

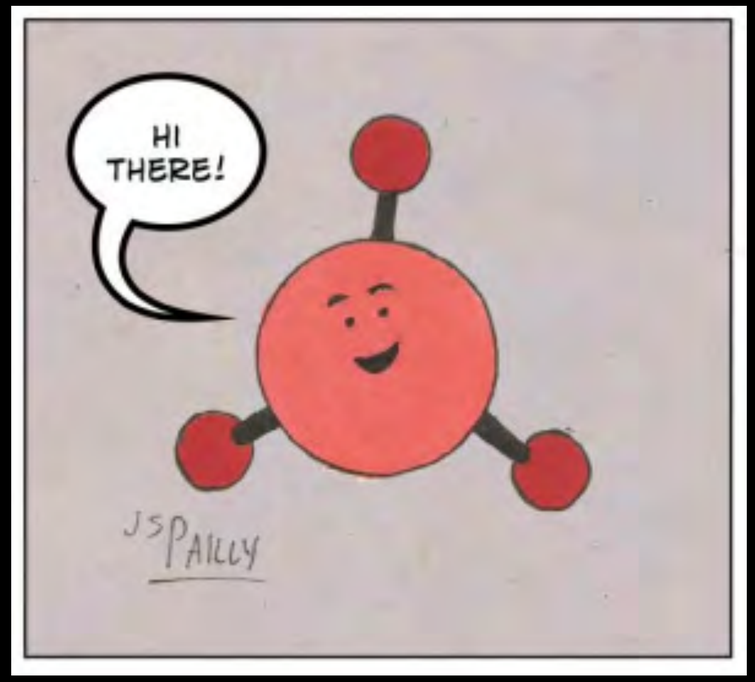
2017 NOx-Combustion-CCR Round Table Presentation

February 27 & 28, 2017, in Cleveland, OH / Hosted by FirstEnergy

Tuning Your SCR

With FTIR

It’s 10 pm. Do you know where your ammonia slip is?



CleanAir®

Background

Catalysts have finite life, and effectiveness decreases over time.

All SCR tuning methods have limitations.

We want to maximize the value of our diagnostic investments.

Background

Ammonia injection is intended to decrease NO_x concentrations.

Atoms are not created or destroyed in the SCR.

Sometimes ammonia reacts with the wrong molecule.

Background

8,760 possible operating hours in a year.

Even when offline, temperatures and “dirtiness” can happen.

How often do you check your SCR’s performance?

Tuning Methods

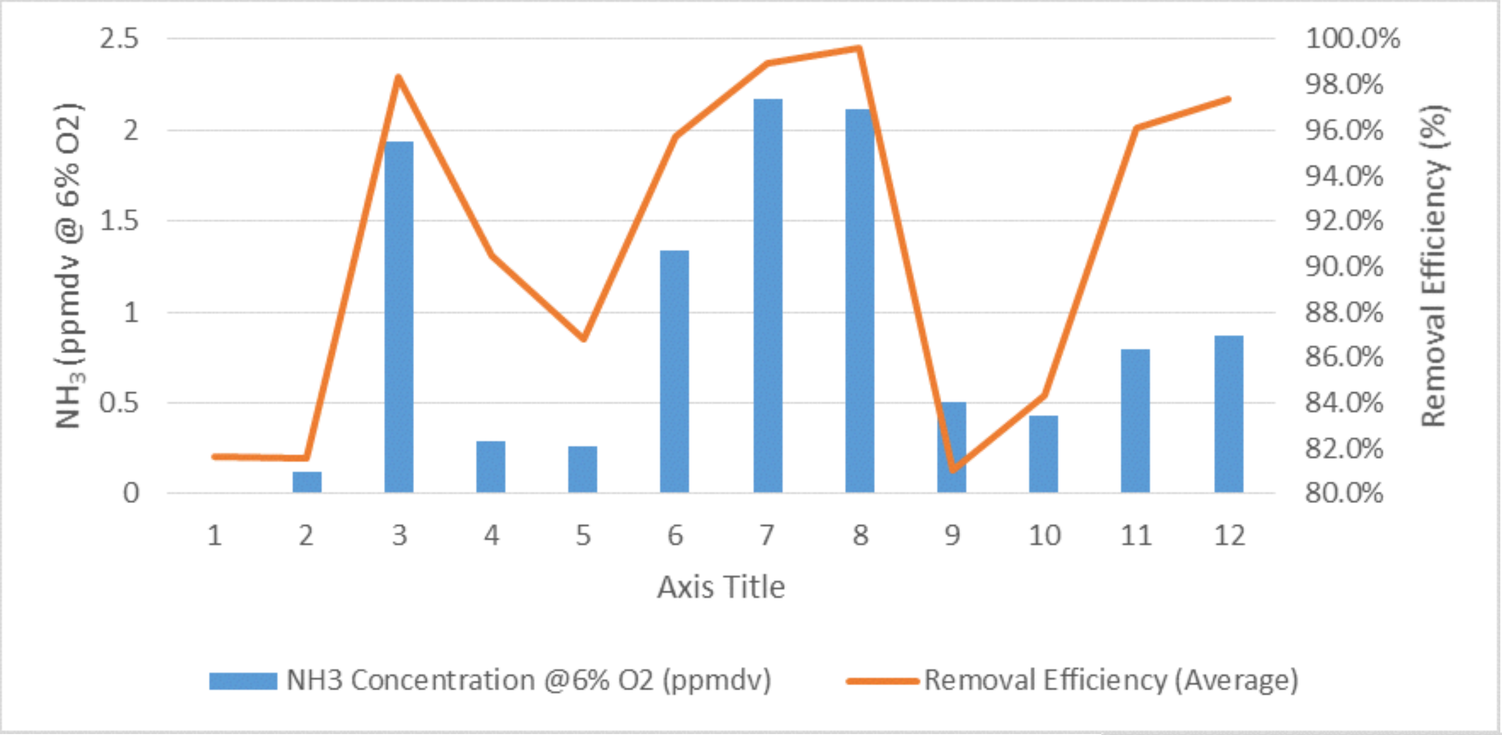
Grid testing (flue gas flow, temperature, MASS, CEMS, etc.)

CTM-027 for ammonia concentration determination.

Stack CEMS data.

But…

Each tuning method only tells part of the story.



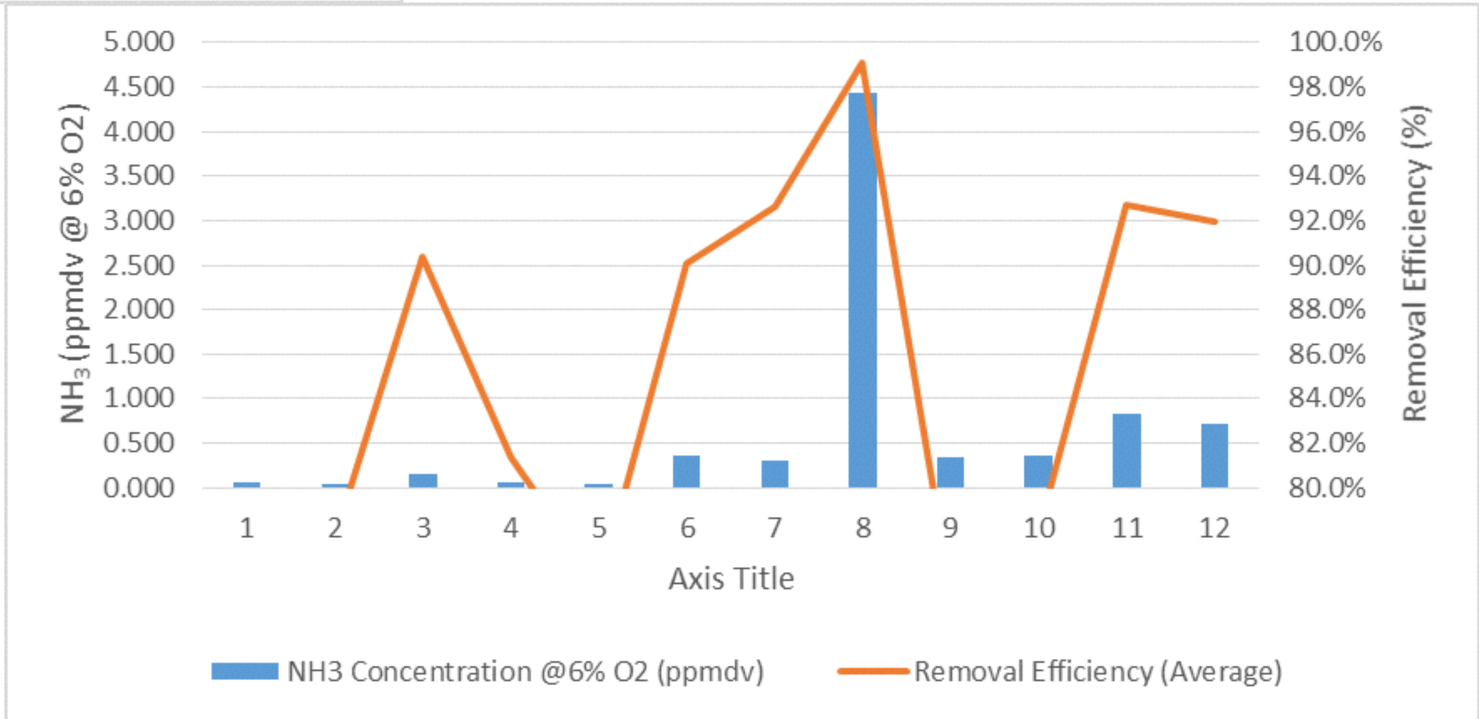
Unit A

Identical Parallel Units

Outlet testing done simultaneously

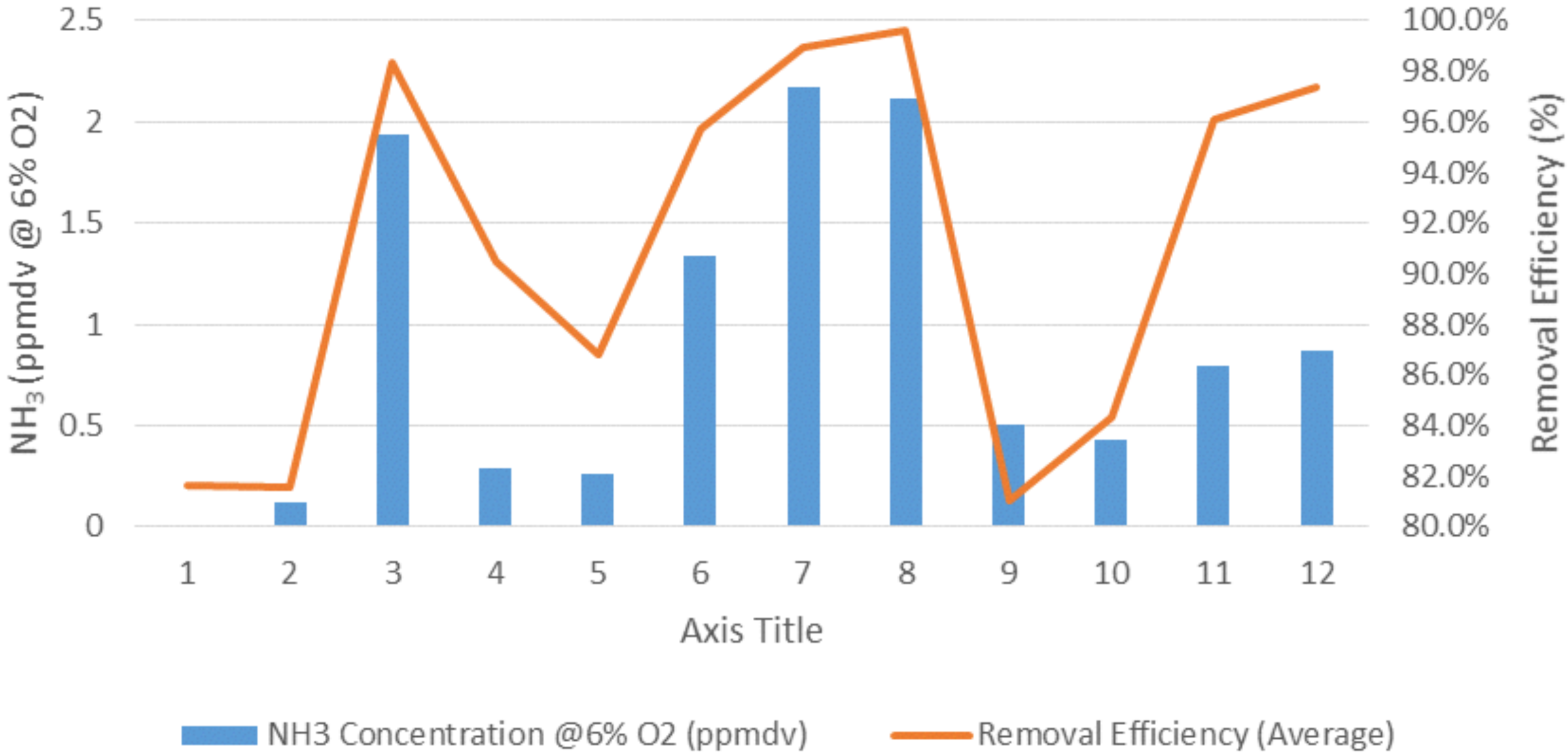
Same Ammonia Injection

Similar flows, temperatures



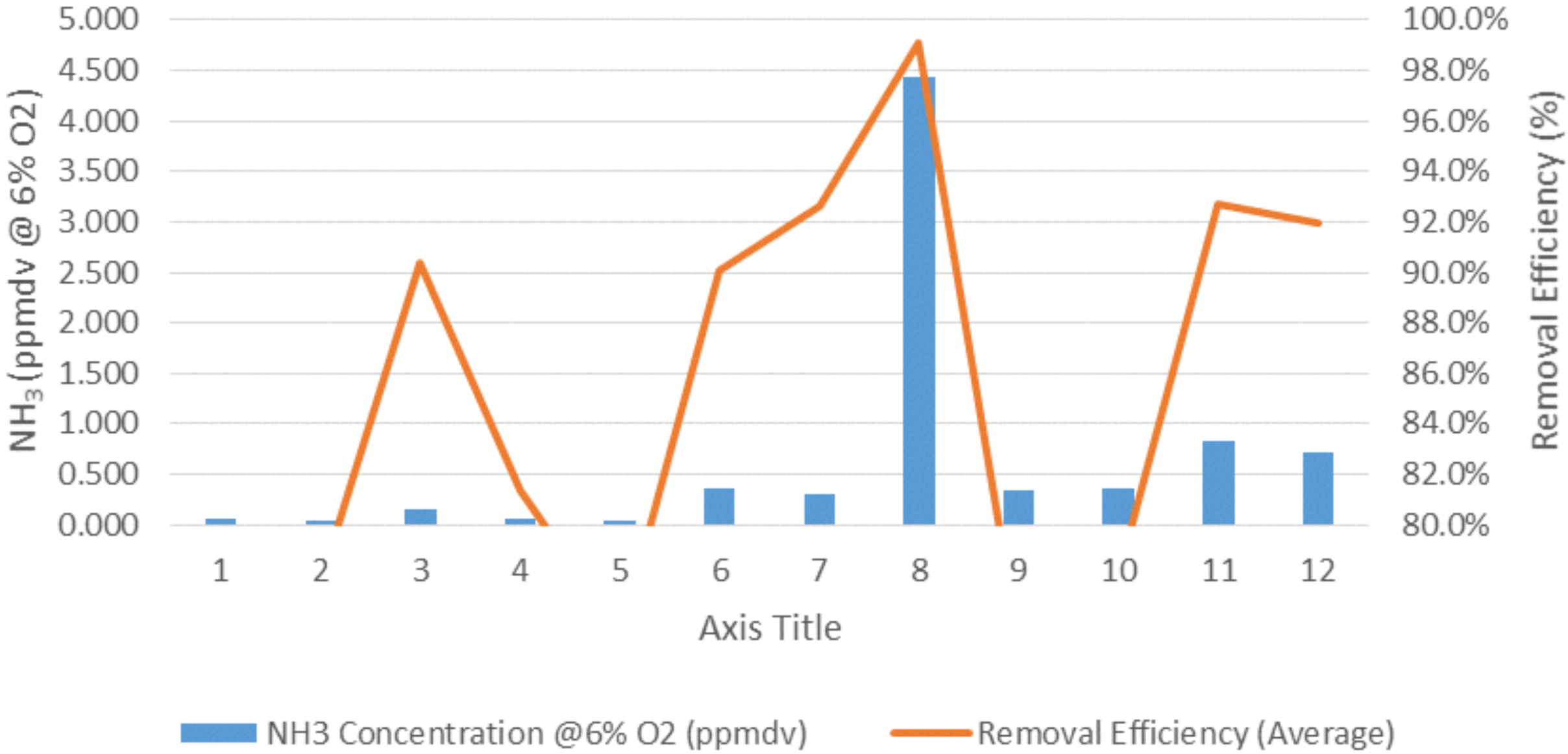
Unit B

Unit A



Good correlation where NOx removal efficiency and ammonia slip increase and decrease together.

Unit B



Unclear correlation between NOx removal efficiency and ammonia slip.

What Was the Difference?

Similar flows, temperatures, O_2/CO_2

Same ammonia injection rates

Was the catalyst bad on Unit B?

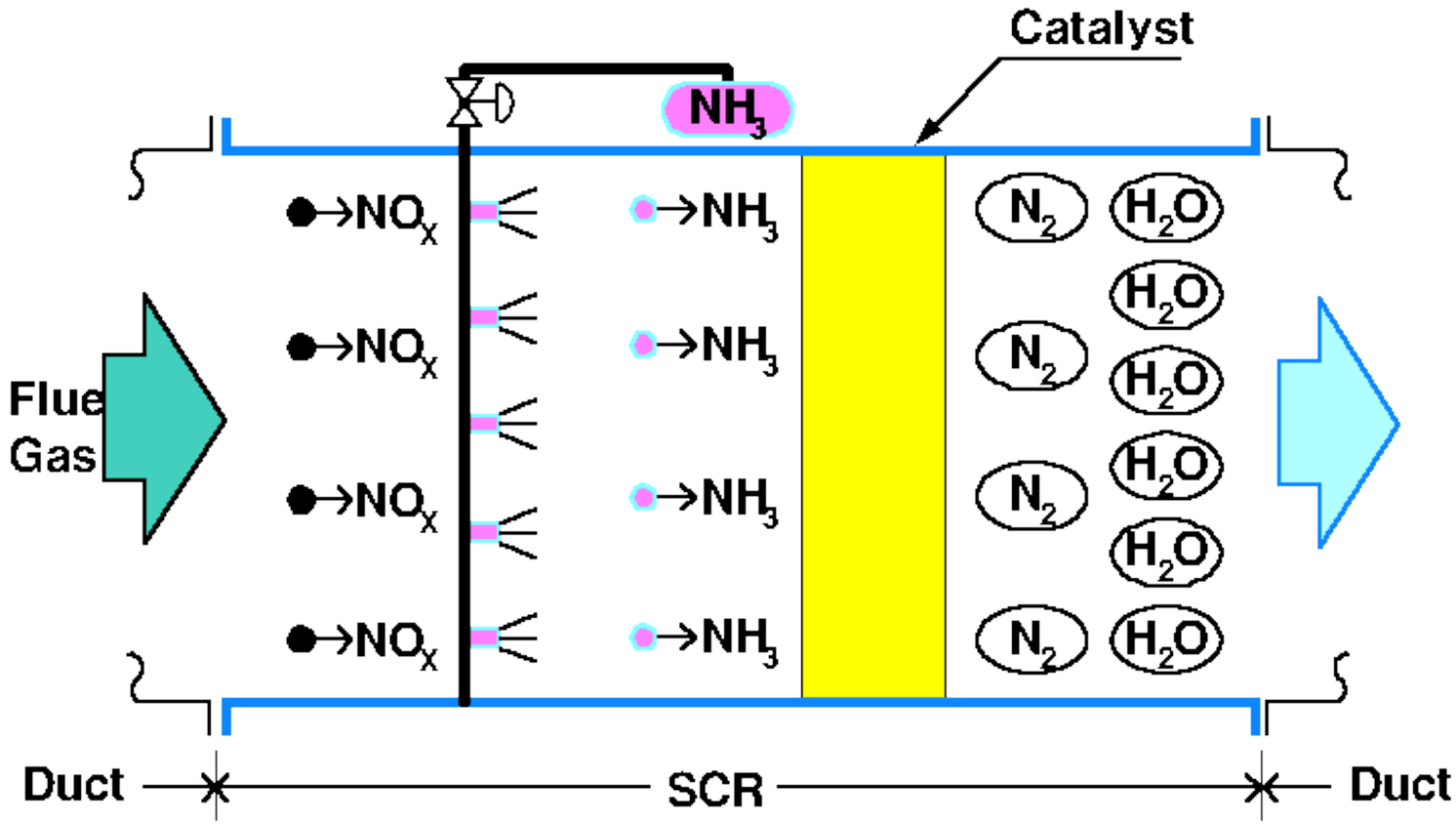
What Was the Difference?

How can you have low ammonia slip and low NO_x reduction?

What other parameters can we measure?

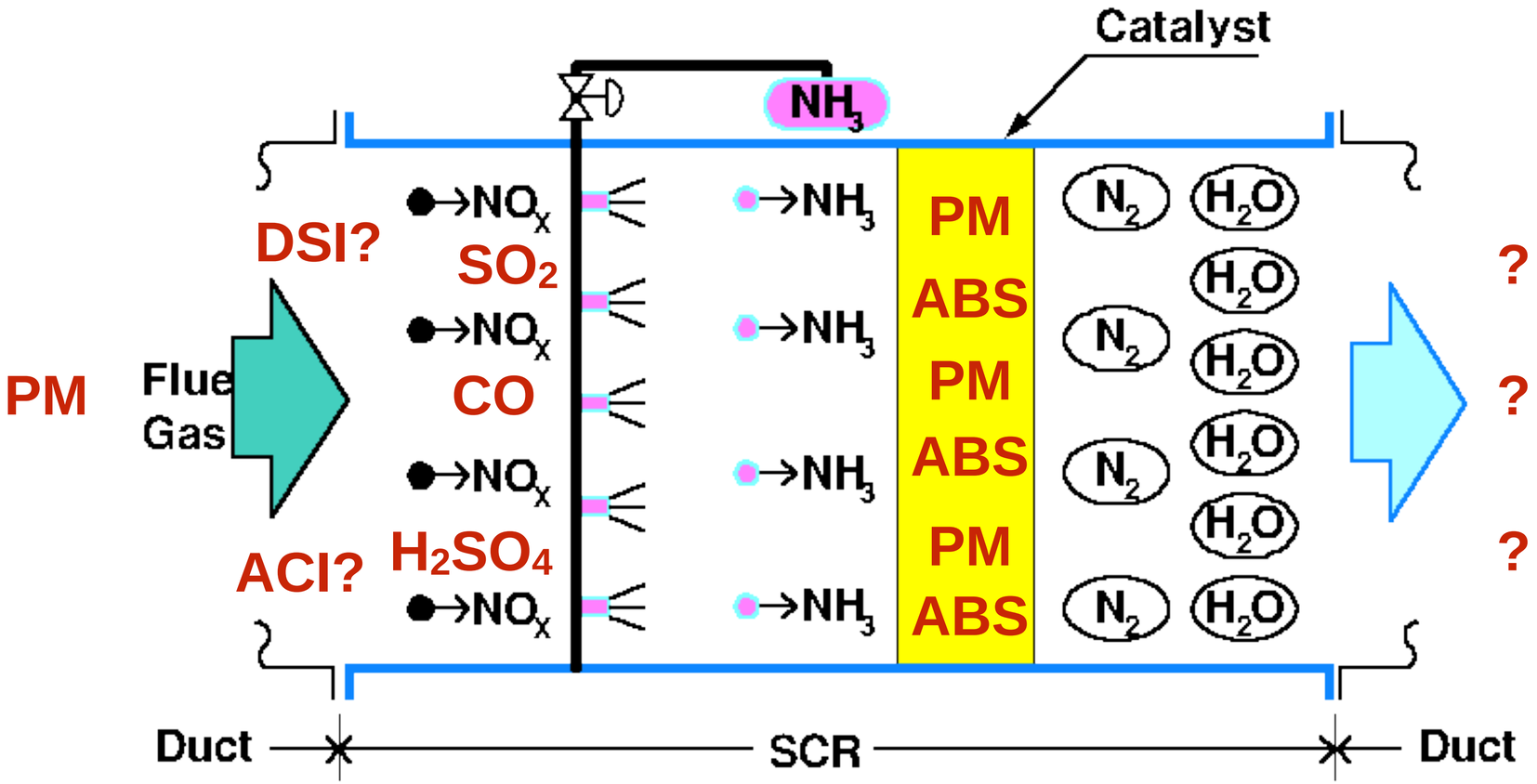
Does any of this make sense?

Traditional SCR Concept



NO_x and ammonia react at the catalyst and become N_2 and H_2O

(Slightly More Real) SCR Concept



Multiple flue gas constituents and ammonia react at the catalyst and become N_2, H_2O, and other.

FTIR Tuning

FTIR gives real time analysis of most gas-phase components in the flue gas.

Direct compound measurement to decrease bias.

Kill three birds with one stone.

Conclusions

Current tuning methods are fine, but with limitations.

We can leverage diagnostic investment to be a benefit for us.

Life is complicated.

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