

Reinhold Environmental Ltd.



2009 NOx-Combustion Round
Table & Expo Presentation

February 9 & 10, 2009, Cleveland, OH

GETTING THE "MOST" FROM YOUR SCR

February 10, 2009

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Environmental Equipment Performance



2009 NOx-Combustion/PCUG
Conference



Getting the “MOST” out of your SCR.

What is the “Most”

- Lowest Emission rate / Highest removal rate
- Meeting target NOx levels



Good NH_3/NO_x Molar Ratio

- This gives highest potential for removal of NO_x
- Most efficient use of NH_3 to meet target NO_x levels
- Lowest amount of NH_3 slip
- Most room for control swings
- Assists with trouble shooting down the road



What is the NO_x Profile to the SCR?

Does it change with load or mill arrangement?

Type of Mixing

- Whole Duct mixing
- Zone mixing
- Straight-line
- Hybrid

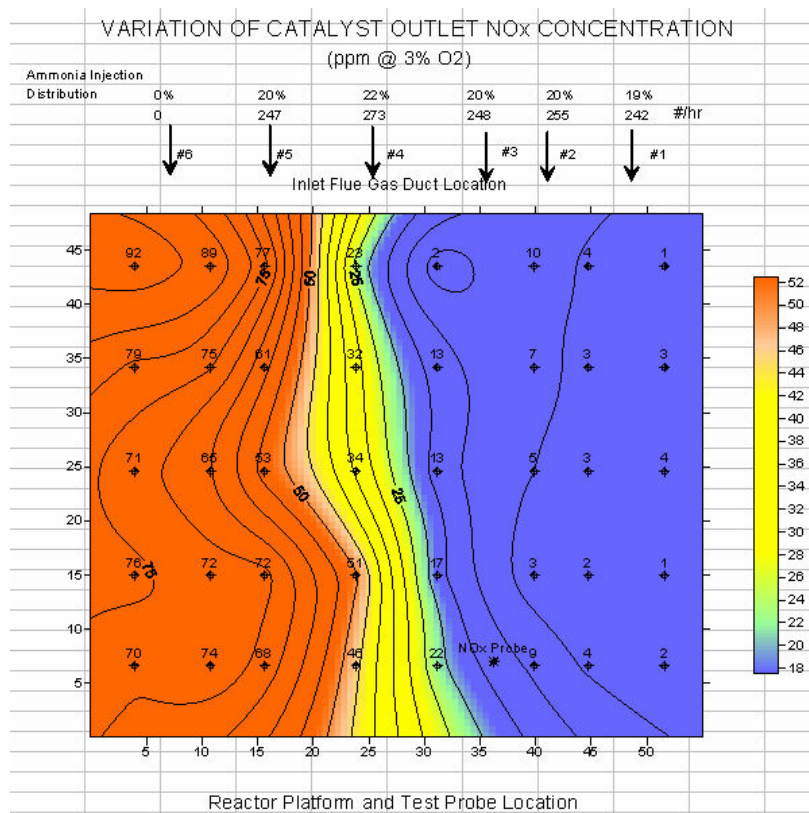
NH₃ System Tuning

Adjusting the NH₃ injection so that the NH₃ profile in the SCR matches the NO_x profile sent to the SCR from the steam generator.

This is accomplished by measuring the residual outlet NO_x of the SCR, then adjusting the NH₃ injection valves until the residual outlet NO_x is as even as possible

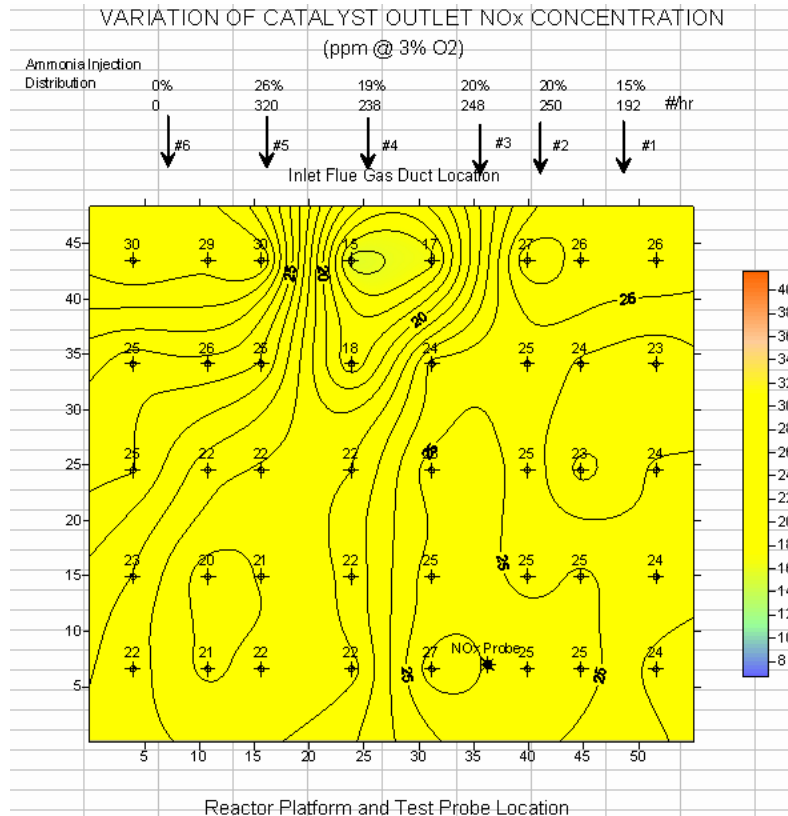
The Goal of Tuning NH₃ Systems

Make This



BBP Contract #: Project Name: AEP Unit: Amos 2 Reactor: R2
 Test: AM2 R2 071206 Test 4 Test Date: 07/12/06 Test Start Time: 1444 Test End Time: 1455
 Test Description: As found
 Test Inlet= 350 Test Outlet= 35 Removal= 90 Std. Dev= 10.23

Look Like This



BBP Contract #: Project Name: AEP Unit: Amos 2 Reactor: R2
 Test: AM2 R2 071206 Test 5 Test Date: 7/12/06 Test Start Time: 1638 Test End Time: 1648
 Test Description:
 Test Inlet= 350 Test Outlet= 24 Removal= 93.1 Std. Dev= 0.83

AEP SCR Testing System



NH₃ in ash measurement

NH₃ Slip Monitors

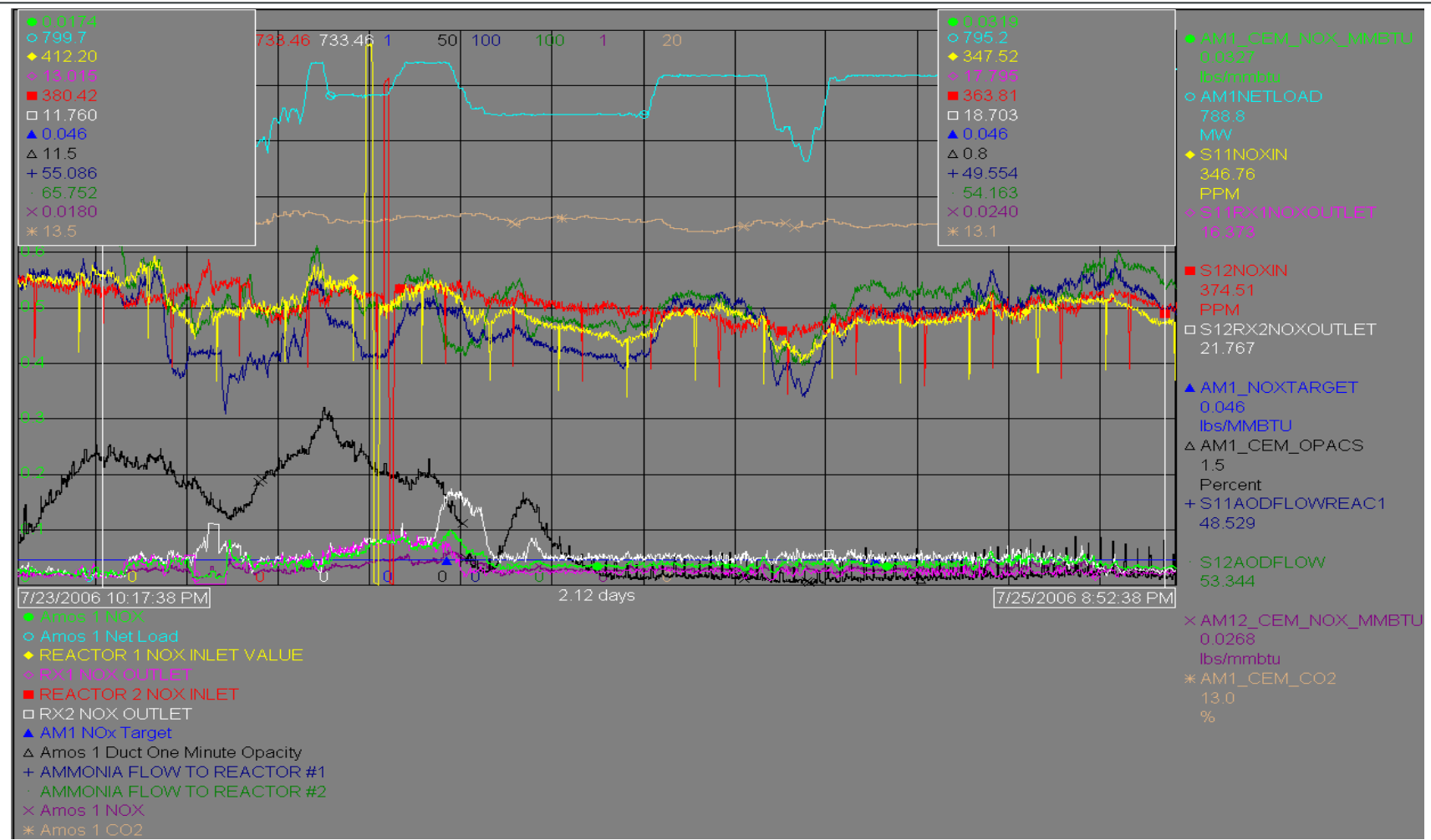
NH₃ in sluice water

ABS monitors

Air Heater dp

Opacity

Opacity



NH₃ in ash measurement

NH₃ Slip Monitors

NH₃ in sluice water

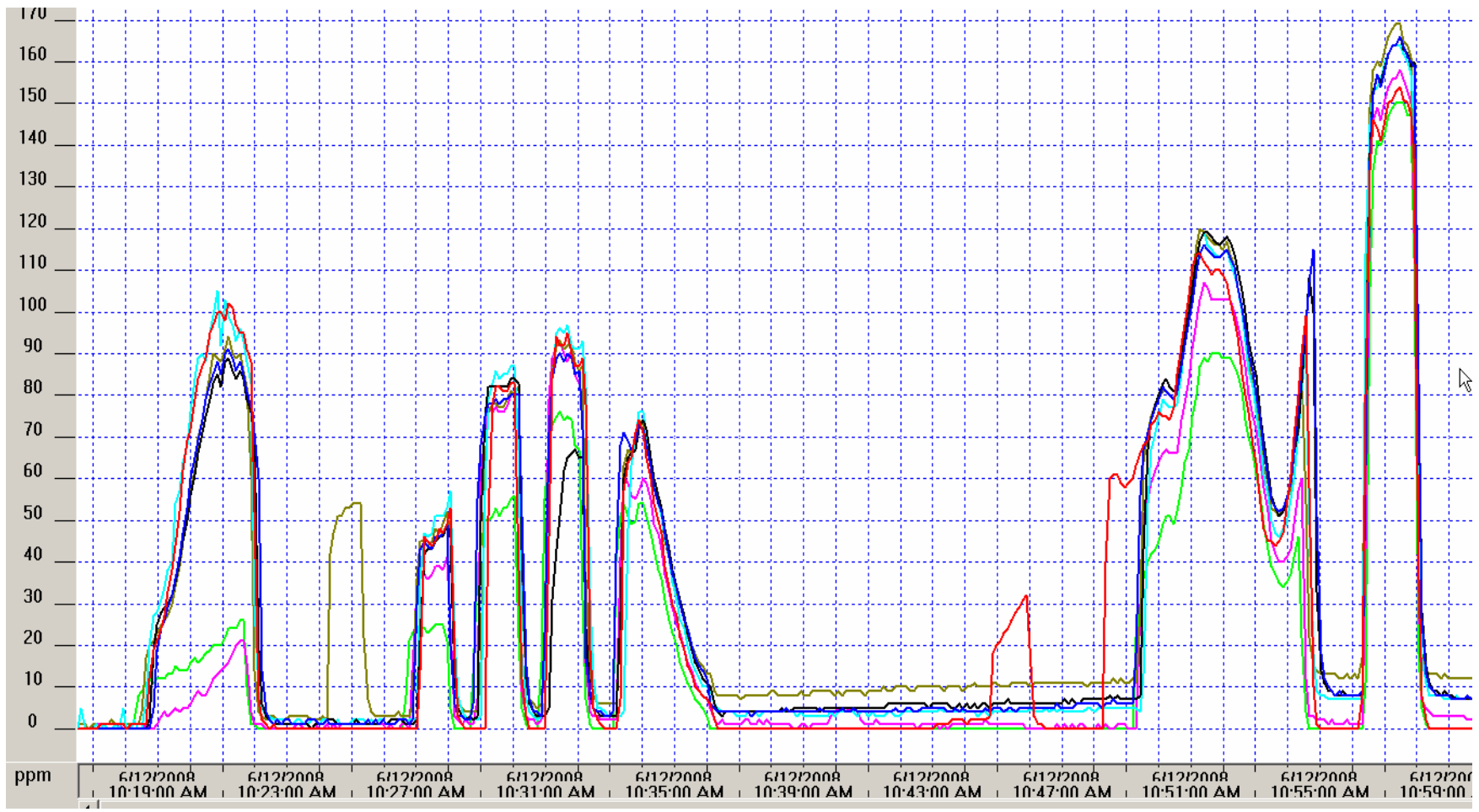
ABS monitors

Air Heater dp

Opacity

NO_x Controls

NOx Control Example



NH₃ in ash measurement

NH₃ Slip Monitors

NH₃ in sluice water

ABS monitors

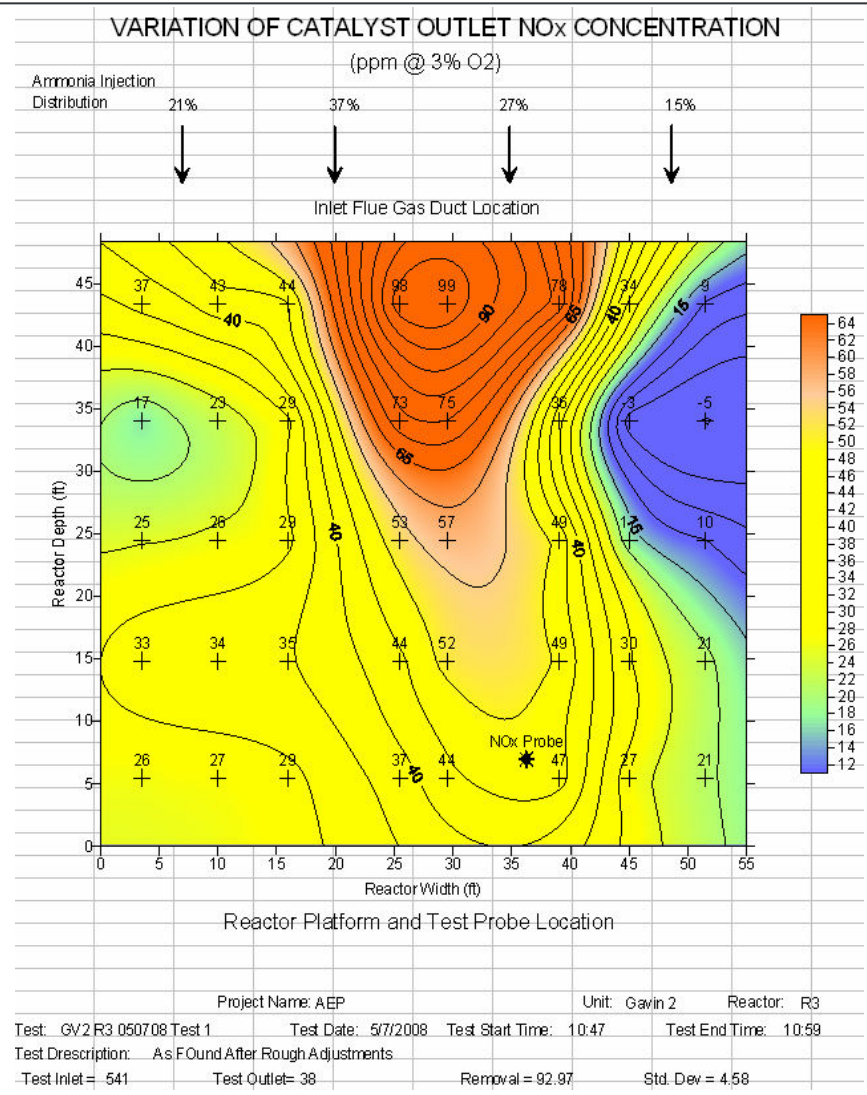
Air Heater dp

Opacity

NO_x Controls

NO_x Bias

NOx Bias Example

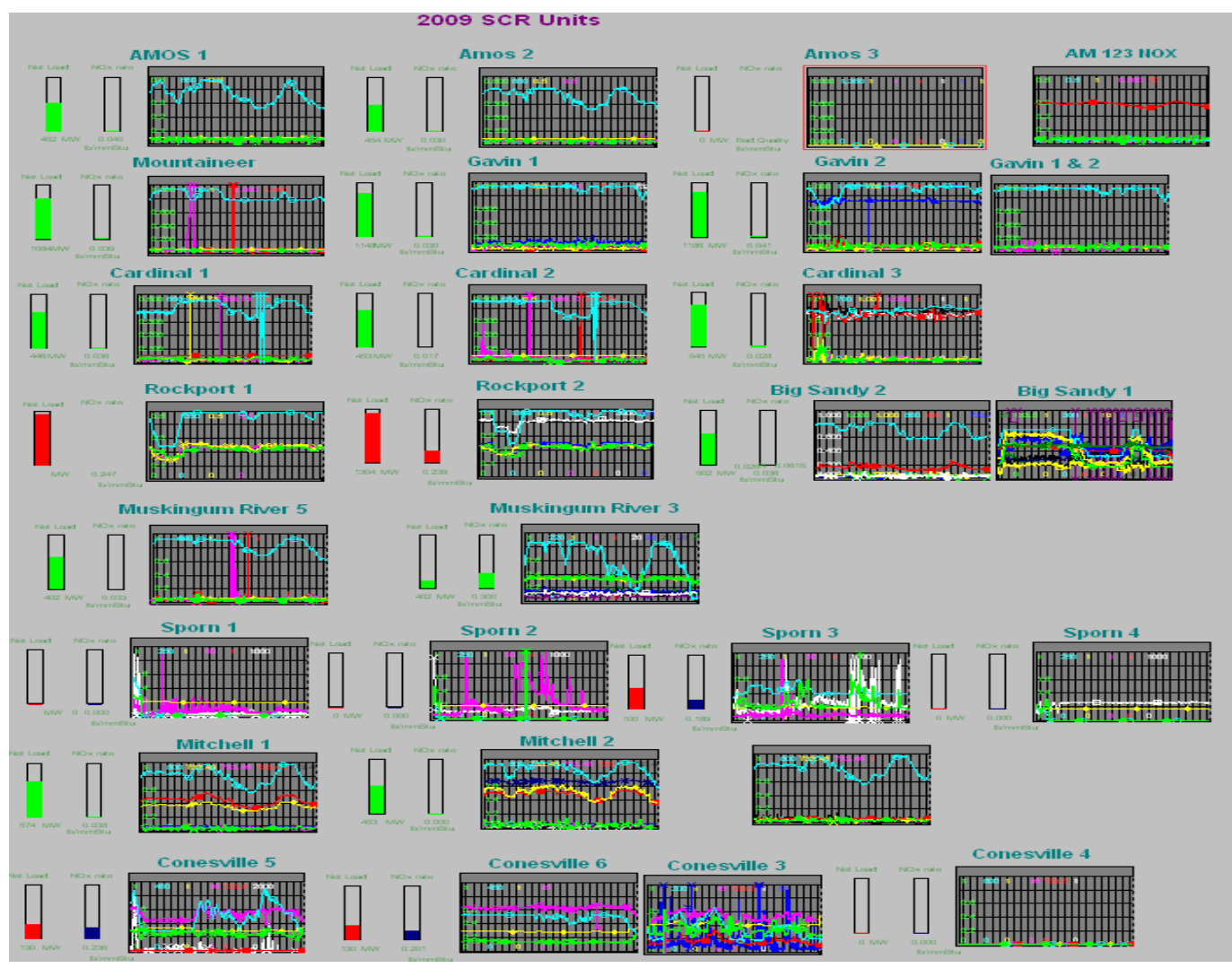




NH₃ Slip Future

Portable NH₃ Slip Monitor

NH₃ Mitigation

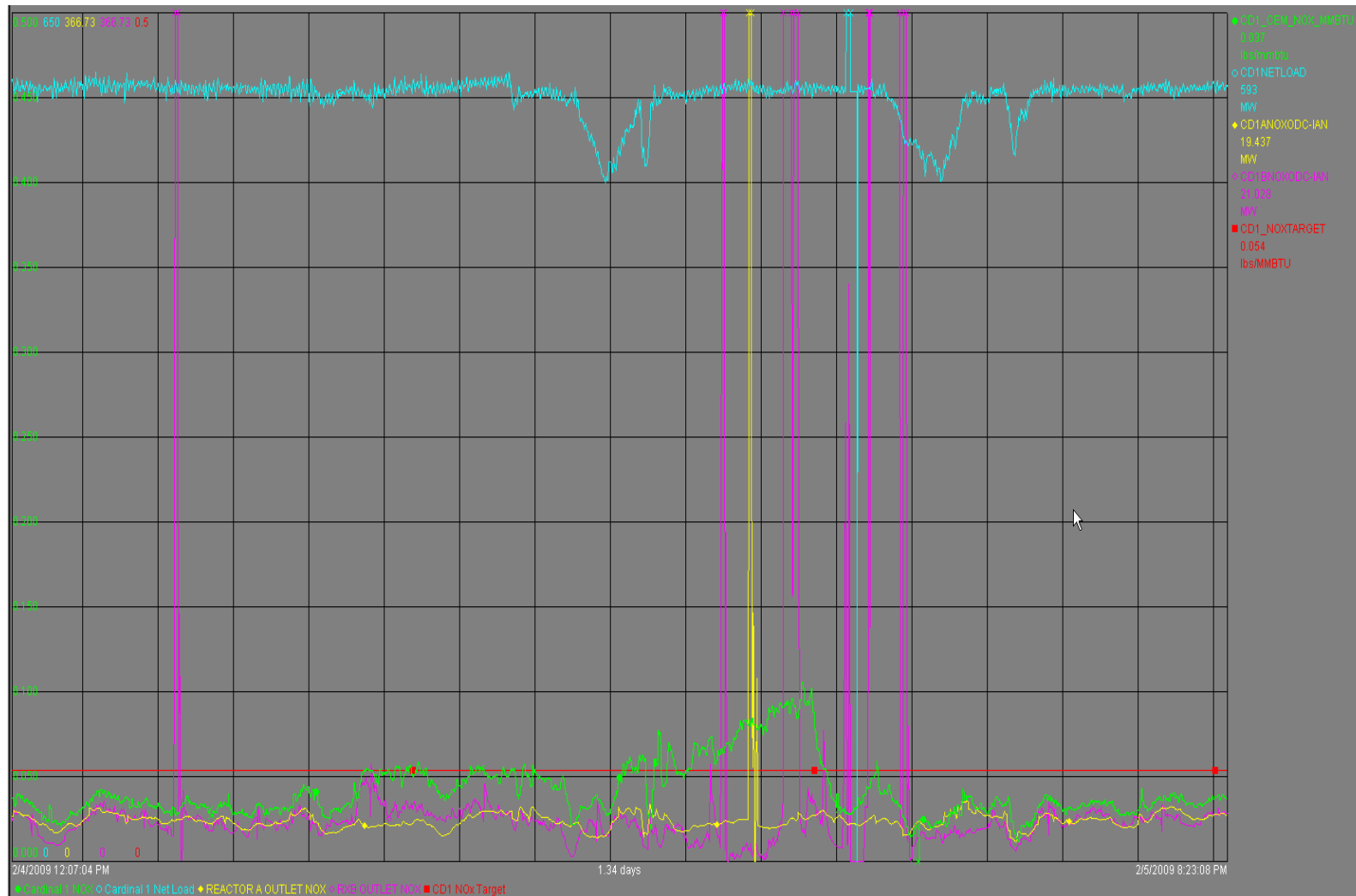




SCR Monitoring

SCR NOx outlet / CEMS Comparison

SCR Monitoring



SCR Monitoring

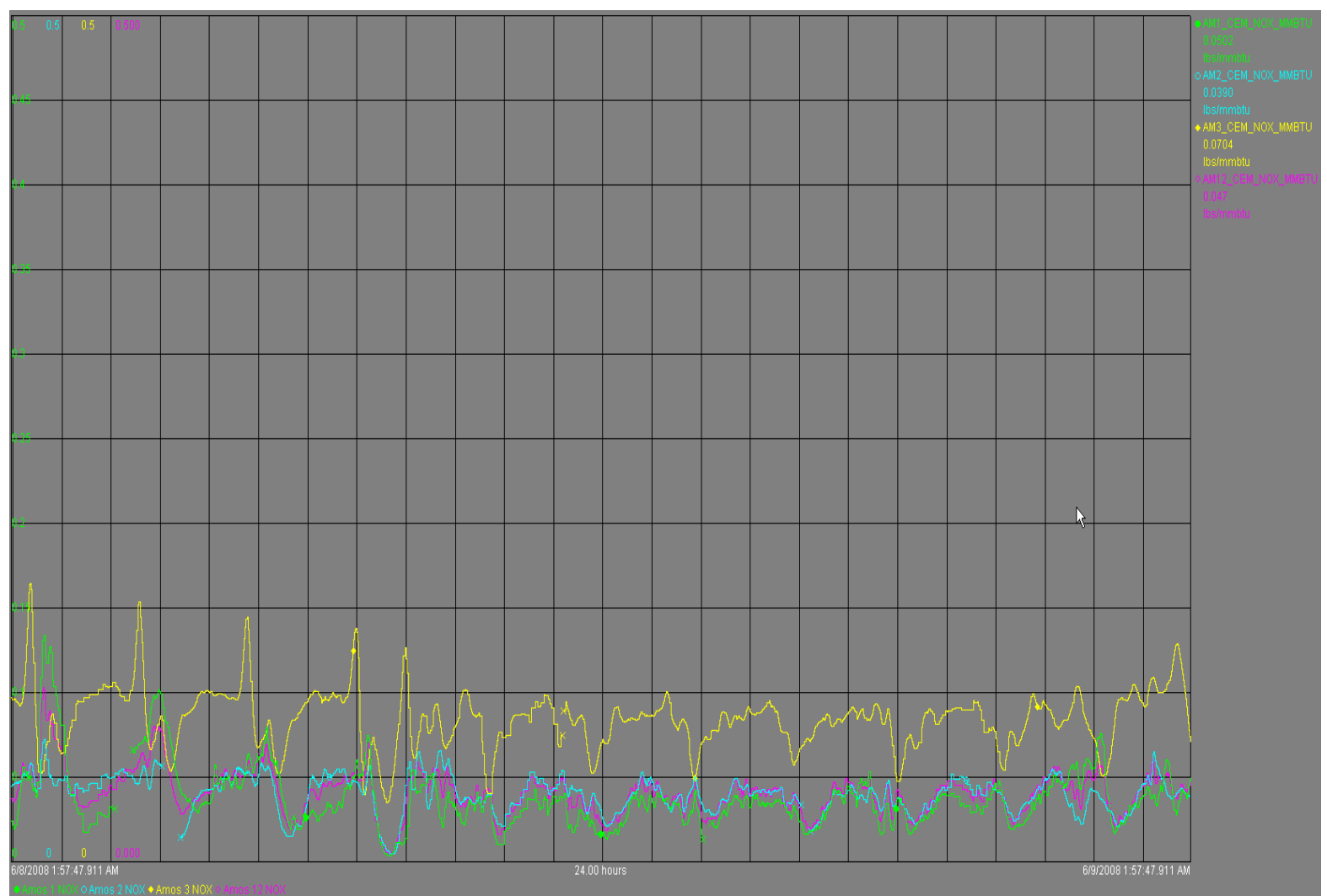
SCR NO_x outlet / CEMS Comparison

CO₂ Monitors

Injection Nozzle Flows

Multiple Units

Multiple Units



Year Round Operation - Reliability

Boiler NOx

Bypass Dampers

LPA

Target Awareness

Develop good Relationship with plant contacts

Favor the field

Relate don't berate

Don't go looking for feathers



Summary
