

Areas of Concern in Relative Accuracy Test Audits (RATA)

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Introduction

- Stack Testing is a labor and time intensive process and requires thorough planning and communication to be conducted successfully.
- Typically, an hour or two of pre-project planning (especially with input from production and maintenance) can save thousands of dollars in delays, postponements and most importantly, lost production time.



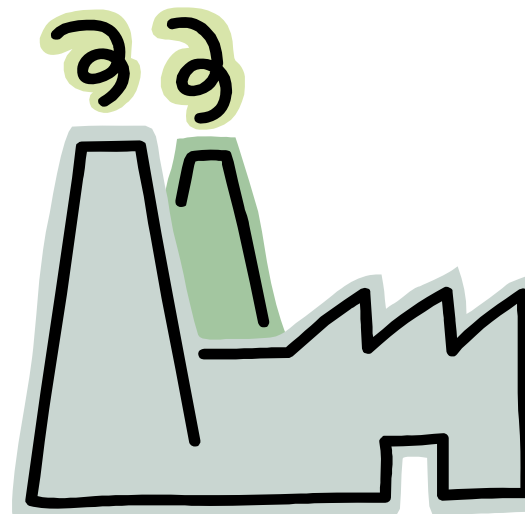
Objectives

- Common Pitfalls
- Performance Specifications
- Certification Events and Testing Requirements
- Causes of Failures
- Flare Sampling Considerations
- Test Protocol and Reporting Requirements



Common Pitfalls

- Technical Review
- Electrical Power Availability
- Stack Setup & Access
- Site Safety



Site Safety

- Is there a safe means available to access the test ports (i.e. ladder, stairs, man lift, elevator)?
- Is there a safe location to conduct testing (i.e. platform, scaffolding, man lift)?
- Can the area below test location be secured?
- How high are the handrails? Are handrails cut?
- Any site specific safety issues (heat stress, respiratory concerns)?
- Work area conditions due to plant operations?
- Weather?



Technical Review

PROCESS DESCRIPTION

- Temperature?
- Estimated flow rate?
- Type of flow? (i.e. induced or natural draft, fixed or variable drive fan)
- Static pressure?
- Moisture Content?

Technical Review

STACK GAS DATA

- O₂ & CO₂ concentrations (gas MW, pollutant corrections)
- Target parameters (specific parameters)
- Expected concentrations and permit limits of target parameters
(method selection, test duration, interferences)
- Are any hazardous pollutants present (personnel safety)?

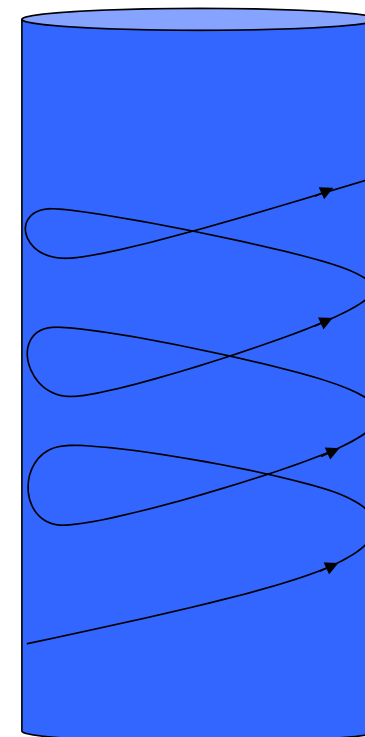
Special insight - Ammonia

- Commonly Installed systems
 - NOx Differential
 - Optical
 - FTIR, TDL, Other NDIR
 - Extractive or In-Situ
- Reference Method approaches
 - Fourier Transform Infra-Red
 - Wet Chemistry (impingers and ion-chromatography)
 - NOx Differential

Stack Specifics

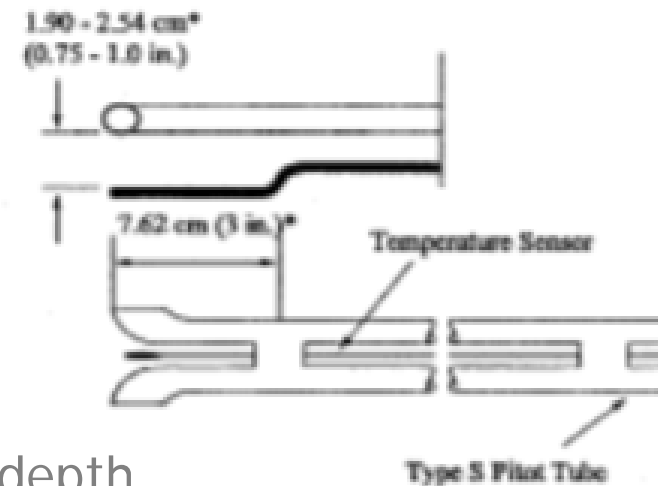
STACK SETUP & ACCESS

- Is the stack vertical or horizontal?
- Height to test ports from ground?
- Is the stack circular or rectangular?
- Stack diameter (circular) or width/depth (rectangular)?
- Are cyclonic flow conditions anticipated?



Special Insight - Cyclonic Flow

- Method 2 dP measurements
- ppmvd comparisons
- Flow calculated from combustion
- Lb/hr or Ib/MMBTU
- Stack diameter (circular) or width/depth (rectangular)?
- Are cyclonic flow conditions anticipated?



Stack Specifics

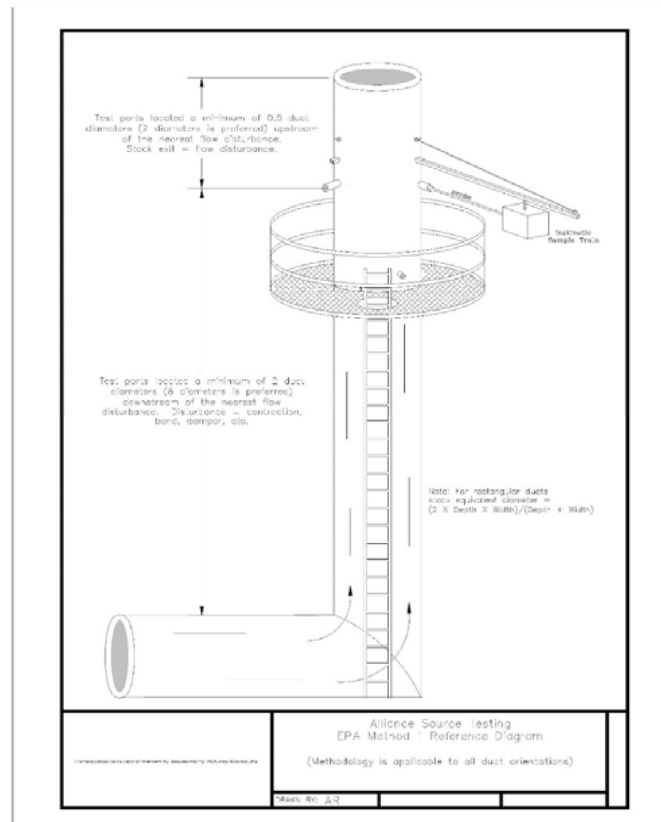
STACK SETUP & ACCESS

- Are test ports installed? How many?
- Are they located 90 degrees apart or in center of equal areas?
- What are the diameters of the test ports?
- What are the nipple lengths?
- What is the height of the test ports?
- What is the minimum EPA Method 1 criteria?

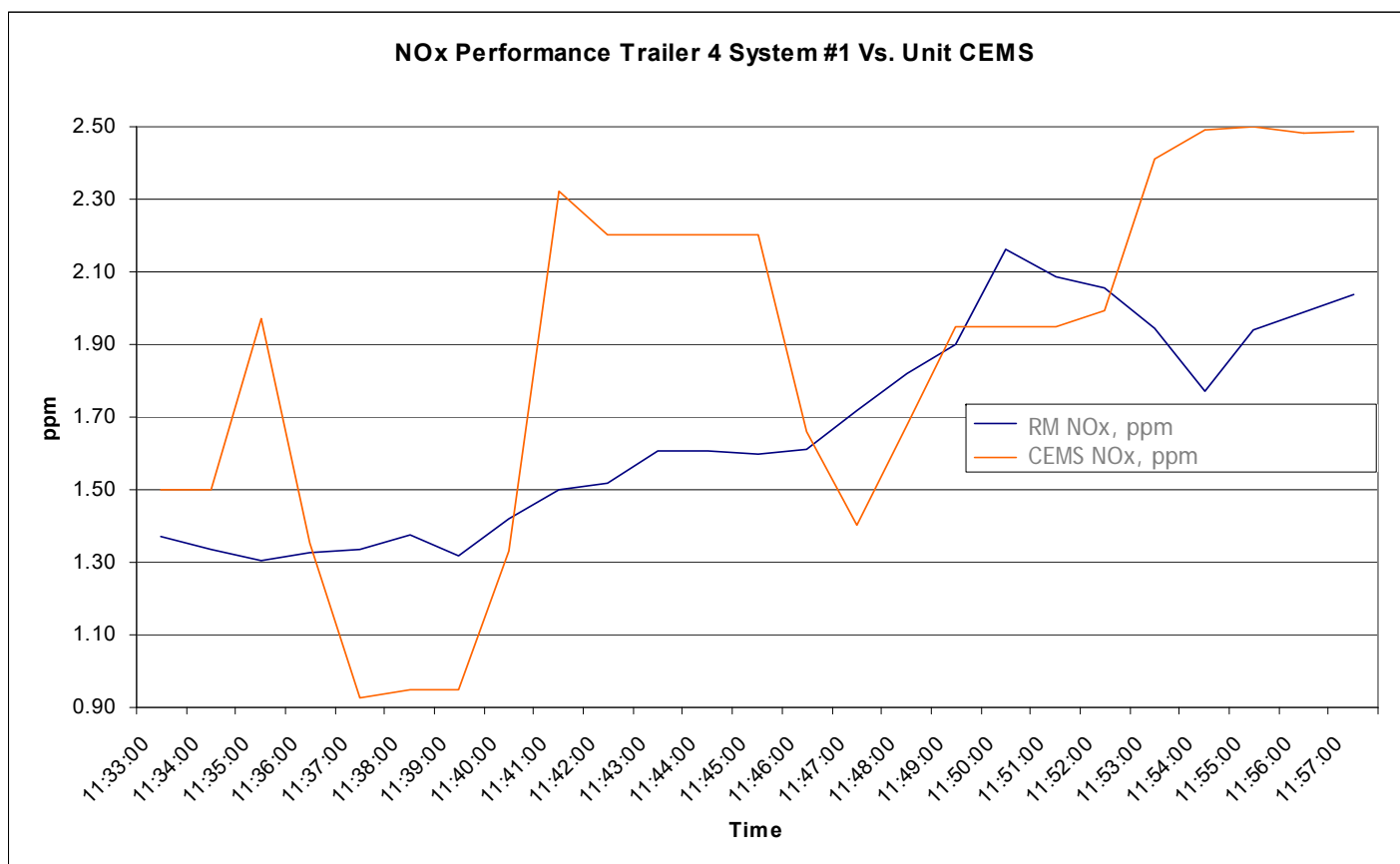
Special Insights - Stack and CEMs setup

- CEMs In-situ or extractive?
 - Transport properties of target parameter(s)
- CEMs probe location
 - Interference & location
- Manual Reference methods - platform, manlift
- Special exception for shared sampling system needed

Typical Stack Diagram



Special Insight - Cyclical Processes



Common Causes of CEMS Failures

- Pre-test failure to properly correlate CEMS and Reference Method Systems (DAS times, response times)
- Incorrect calculations, rounding procedures (ex. emission rate calculations using same molecular weight)
- Flue gas characteristics require dilution (higher than expected concentrations, moisture, particulate)
- Dilution CEMS vs extractive CEMS error (wet vs. dry)
- Cyclonic Flow

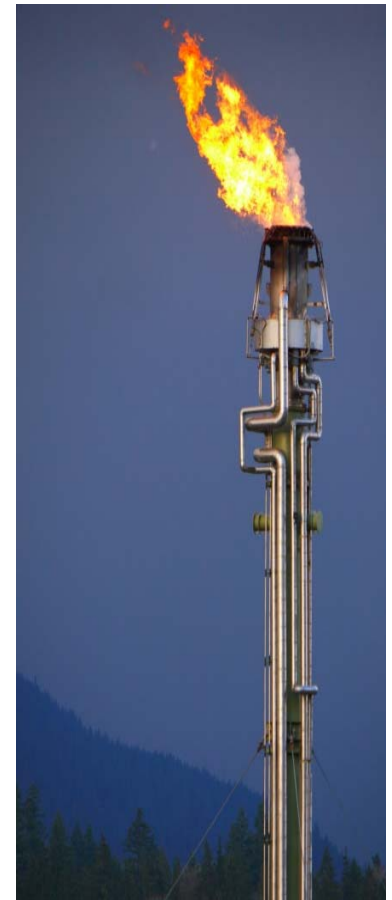


Common Causes of CEMS Failures

- Flue gas location/stratification problems
- Interferences by other flue gases
- Incorrect calibration gases (calibration dilution system; bad mixture)
- Improper calibration methods, failure to properly calibrate
- Uncorrected ambient or source effects (T, P, %H₂O, especially for flow RATAs)
- DAS problems (programmed equations, input parameters, etc.)
- System design/operation problems

Flare Sampling Considerations

- Flares often can not be accessed completely independent of the CEMS sample system.
 - This is a deviation and must be approved at the protocol stage
- Isolation or cut-off valve
 - If sample point can be positioned on the flare, pass-through ball valve
 - The more detail provided, the better prepared your testers will be
- Excess sampled gas
 - Special routing of potentially harmful gases
 - Proper test trailer ventilation (if applicable)
- Mobile Laboratory Location
 - Non-explosive atmosphere



Special insight - Total Sulfur

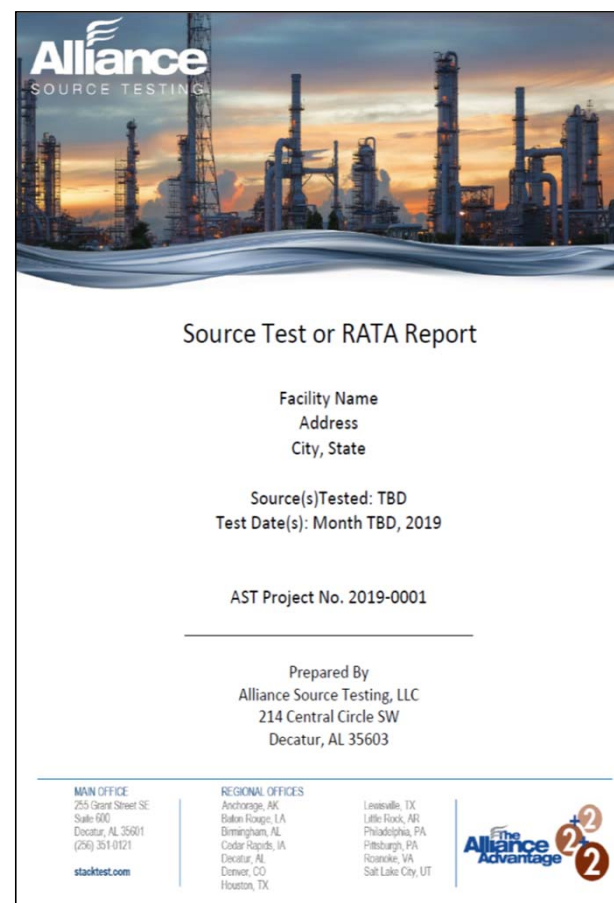
- Installed systems
 - Integrated oxidizer and SO₂ measurement
 - GC for speciated measurement and summation
 - GCMS for speciated measurement and summation
- Reference Method approaches
 - Tube furnace and SO₂ measurement
 - Manual method or analyzer method
 - GC for speciated measurement and summation

General Protocol Notes

- Due Dates
 - Part 60 Testing - 30 Days Prior
 - Part 63 Testing - 60 Days Prior
 - Permit Testing - Varies by State
- Test Plan Requirements - SSTP, State Specific Protocol Requirements, Etc.
- Facility Information / Site Contact
- Current Permit & Limits
- CEMS Analyzer Information
- Process Operating / Control System Data

General Reporting Notes

- Basic Requirements
 - Summary of Results
 - Facility & Source Information
 - CEMS Analyzer Information
 - Methodology
 - Field Data & QA/QC Data
 - Process/Control System Data
 - Feed Rate, Fuel, Production Rate, etc.



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- Continuous monitoring systems are approved only after they have been installed, a 7-day drift test has been performed, and a relative accuracy test audit has been conducted.
 - Reference methods are located in 40 CFR 60, Appendix A, performance specifications are located in 40 CFR 60, Appendix B and the quality assurance procedures are located in 40 CFR 60, Appendix F
 - More certifying methods are found in 40 CFR Part 75 Appendix A
 - Most initial RATAs are due within the first 180 days of operation
 - Modifications to the CEMS require recertification.



Questions & Discussion



The logo for Alliance SOURCE TESTING. The word "Alliance" is in a large, white, sans-serif font with a stylized flame icon above the 'i'. Below it, "SOURCE TESTING" is written in a smaller, white, all-caps, sans-serif font. The background of the top half of the slide is a photograph of an industrial refinery or chemical plant at sunset, with tall distillation columns and complex piping silhouetted against a sky with orange and blue tones. A white wavy graphic element separates the top image from the white text area below.

Alliance

SOURCE TESTING

THANK YOU

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