



# **New Opacity QC Procedures**

**2015 WRBA Conference**

# General

## **40 CFR Part 60 Appendix F - Procedure 3:**

- Published in FR 2/14/2012
- Comment period ended 3/15/2012
- EPA withdrew direct final rule 3/28/2012
- Issued final rule on 5/16/2014
- Effective on 11/12/2014
- Establishes minimum QA/QC procedures for COMS
- Includes new reporting and recordkeeping requirements

## General (cont.)

### Applicability:

- Applies to COMS used to demonstrate continuous compliance with federally enforceable standards.
- State and local issued permits are also federally enforceable.

# Daily Checks

- Check zero and upscale drift
- Routine system checks for status indicators, DAS error messages, other self-diagnostic indicators
- COMS is OOC when:
  - Zero or upscale drift exceeds 2 x PS-1 spec:  
(2 x 2% = 4%)

Note: Fault status does not necessarily mean data is invalid. It should be considered a warning that readings are nearing the limit.

# Quarterly Audits

This will require the following assessments:

1. Optical Alignment
2. Calibration Error
3. Zero Compensation
  - This must be done once a operating quarter. (168 hrs)
  - If you pass 4 consecutive quarters. This can move to semi-annual testing.

## Quarterly Audits (cont.)

- Determine auto zero compensation  
*(as % Opacity corrected to stack exit conditions)*
- Three-point calibration error test (from PS-1):
  - Three filters meeting PS-1 specs (\*annual certification)
  - Must be independently recorded from the COMS permanent data recorder (DAHS)
- Calculate mean difference and 95% confidence coefficient as in PS-1
  - Without a filter in place, reading must be  $\leq 1\%$  Opacity

## Quarterly Audits (cont.)

- Check optical alignment when stack is at normal operating temp
- COMS is OOC when:
  - Optical alignment does not line up with reference
  - Zero compensation exceeds 4% Opacity
  - Calibration error exceeds 3% Opacity

Note: If you have 4 consecutive passing audits, testing frequency can be reduced to semi-annually



## Quarterly Performance Audit

Company:	Stack/Unit:
Location:	Date:
City:	Technician:
Analyzer Manufacture:	S/N:
Model:	

Monitoring Pathlength: ##	PLCF #VALUE!
Emission Outlet Pathlength: ##	
Is Monitoring System Output Pathlength Corrected? #VALUE!	

Calibrated Neutral Density Filter Value				
	Actual Opacity	Serial Number	Stability Check date	Pathlength Corrected Opacity
LOW	##			LOW #VALUE!
MID	##			MID #VALUE!
HIGH	##			HIGH #VALUE!

Run Number	Filter Level	Attenuator value (Path Corrected) % Opacity	Instrument Reading % Opacity	Arithmetic Difference		
				LOW	MID	HIGH
1	LOW	#VALUE!	##	#VALUE!	-	-
2	MID	#VALUE!	##	-	#VALUE!	-
3	HIGH	#VALUE!	##	-	-	#VALUE!
4	LOW	#VALUE!	##	#VALUE!	-	-
5	MID	#VALUE!	##	-	#VALUE!	-
6	HIGH	#VALUE!	##	-	-	#VALUE!
7	LOW	#VALUE!	##	#VALUE!	-	-
8	MID	#VALUE!	##	-	#VALUE!	-
9	HIGH	#VALUE!	##	-	-	#VALUE!

Arithmetic Mean	#VALUE!	#VALUE!	#VALUE!
Standard Deviation	#VALUE!	#VALUE!	#VALUE!
Confidence Coefficient	#VALUE!	#VALUE!	#VALUE!
Calibration Error	#VALUE!	#VALUE!	#VALUE!
Maximum Error 3%	#VALUE!	#VALUE!	#VALUE!

Primary Zero Alignment Method	Zero Jig
Verify Proper Optical Alignment	Yes
External Audit Device Zero Value	0.00
Must be less than 1%	PASS
Zero Compensation Value	0.00
Must be less than 4%	PASS



# Annual Audits

## Annual primary zero alignment

*(zero adjustment using off-stack clear path)*

- COMS must be removed and replaced under clear path conditions
- No adjustments may be made when determining proper path length and correct optical alignment
- Disable or disconnect any automatic zero compensation mechanism
- Record response difference % opacity to clear path

# Annual Audits

- Alternatively, you may use an external zero device
  - Proven accuracy by MCOC or installing/removing three times prior to final zero alignment check
  - Must be permanently set at initial zeroing
  - If setting has changed, remove COMS from stack and reset the zero device
  - Must do an off-stack zero alignment at least every three years

# Annual Audits

## **COMS is OOC when:**

- Zero alignment error exceeds 2% Opacity

Note: COMS data may not be used in any calculations during out of control periods

# COMS Quality Control Plan

- Must develop a written QC Plan
- Must include detailed, step-by-step procedures for:
  - Daily zero and upscale drift checks
  - Daily status indicator checks
  - Quarterly audits
  - Annual zero alignment checks
  - Corrective action procedures

# COMS Quality Control Plan

- QC plan may require revision and COMS OOC when COMS fails:
  - Two consecutive annual audits
  - Two consecutive quarterly audits
  - Five consecutive daily checks

# Corrective Action Plan

- Routine/Preventative
- Analyzer repairs
- Develop corrective action program and determine appropriate diagnostic testing

# Temporary Monitors

- Requirements:
  - Must be certified per ASTM D6216-12
  - Does not exceed 1080 hours in use (45 days)
- QC activities:
  - Optical alignment and status indicator check
  - Off-stack zero assessment and zero adjustment
  - Zero and upscale drift checks
  - 3 point calibration error test

## Temporary Monitors (cont.)

- Document all activities in maintenance log
- If the 45 day period expires, the temporary monitor must be recertified
- The permanent monitor must be returned to service



# Reporting Requirements

- Data Assessment Report (DAR):
  - Quarterly report to include:
    - Facility specific information
    - COMS location
    - All Calibration and audit results
    - Summary of all corrective actions taken after out of control periods

# Notable Differences

- Must perform off-stack zero alignment audit
- Use of a temporary monitor was increased to 45 days from 30
- They now allow up to 180 days to complete QA/QC compliance instead of 60 days
- Diagnostic test activities required after maintenance are no longer detailed in a table
- Fault status does not make data invalid

## Notable Differences (cont.)

- Daily defined as any portion of day in which a unit operates
- QA operating quarter defined  $> 168$  operating hours
- Annually is now defined as  $\geq 28$  operating days within a calendar year
- More general requirements to allow site specific QA/QC program

# Diagnostic Tests Required After Maintenance

Event	Optical Alignment	Optical Alignment Indicator (1)	Zero Cal Check	Off Stack Zero (3)	Upscale Cal Check	Calibration Error Check	Fault Status Indicator Check (2)	Avg. Period Calc & Recorder	7-Day Zero & Upscale Drift
Routine / Preventative	X		X		X		X		
Replace Light Source	X	X	X	X	X	X	X		
Meas. Non-Critical	X		X		X		X		
Meas. Critical	X	X	X	X	X	X	X		X
Meas. Critical (non-optical)			X		X	X	X	X	
Rebuild / Refurbish Analyzer	Recertify per PS-1								

**Questions ?**