How Low Can You Go?

Attempts to meet low level ozone audit levels

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Why Change?

- Since the promulgation of the October 17,2006 monitoring rule, EPA received feedback on the audit levels established for the gaseous pollutant annual performance evaluations in 40 CFR Pat 58 appendix A, Section 3.2.2.
- Monitoring organizations commented that the audit levels, as identified in CFR, did not reflect or represent their data very well

Why Change?

- In response the comments, OAQPS ran an evaluation on 3 years of valid data (2004-2006) for each reporting organization
- The analysis confirmed that the audit levels currently in the CFR did not relate very well to the ambient data being measured

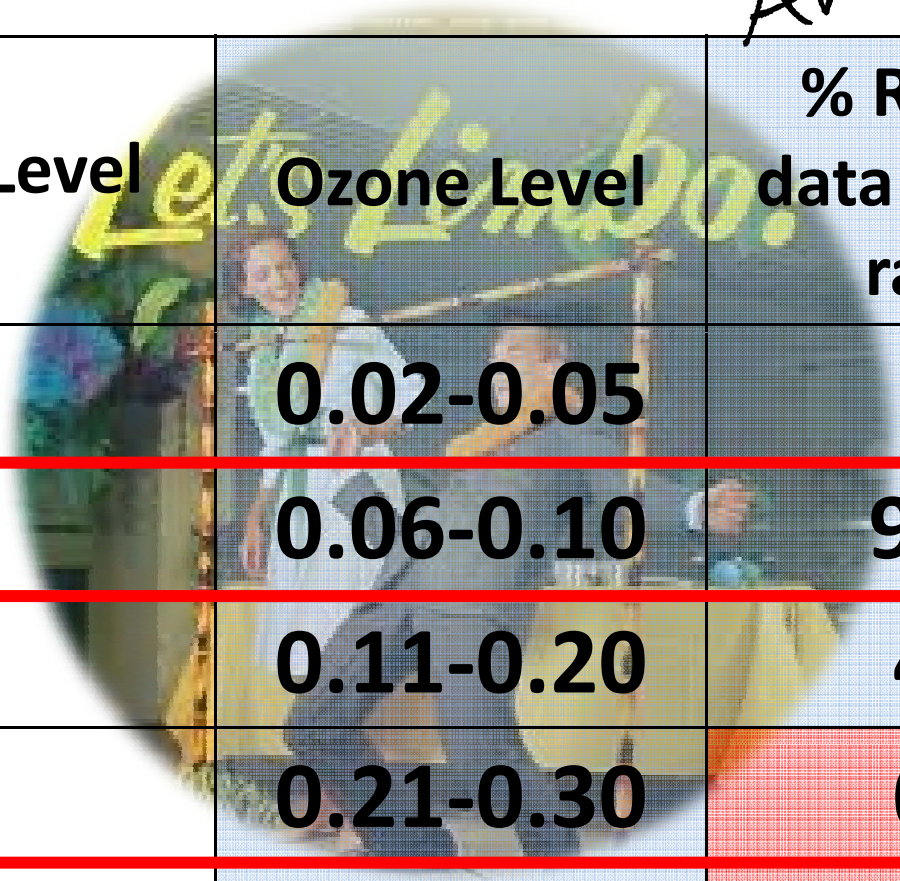
Previous CFR Audit Levels and Percent of Reporting Organizations That Had Routine Concentrations Extending in the Audit Level

Audit Level	O_3	% RO with data in audit range	SO_2	% RO with data in audit range	NO_2	% RO with data in audit range	CO	% RO with data in audit range
1	0.02-0.05	All	0.0003-0.005	All	0.0002-0.002	All	0.08-0.10	All
2	0.06-0.10	99%	0.006-.01	97%	0.003-0.005	All	0.50-1.00	All
3	0.11-0.20	4%	0.02-0.10	89%	0.006-0.10	All	1.50-4.00	98%
4	0.21-0.30	0%	0.11-0.040	11%	0.11-0.30	0%	5-15	12%
5	0.31-0.90	0%	0.41-0.90	0%	0.31-0.60	0%	20-50	0%

Before the New Monitoring Rule and NCore

This is easy!

And fun too!



Audit Level	Ozone Level	% RO with data in audit range
1	0.02-0.05	All
2	0.06-0.10	99%
3	0.11-0.20	4%
4	0.21-0.30	0%
5	0.31-0.90	0%

Some went lower……

Audit Level	Ozone Level	% RO with data in audit range
1	0.02-0.05	All
2	0.06-0.10	99%
3	0.11-0.20	4%
4	0.21-0.30	0%
5	0.31-0.90	0%

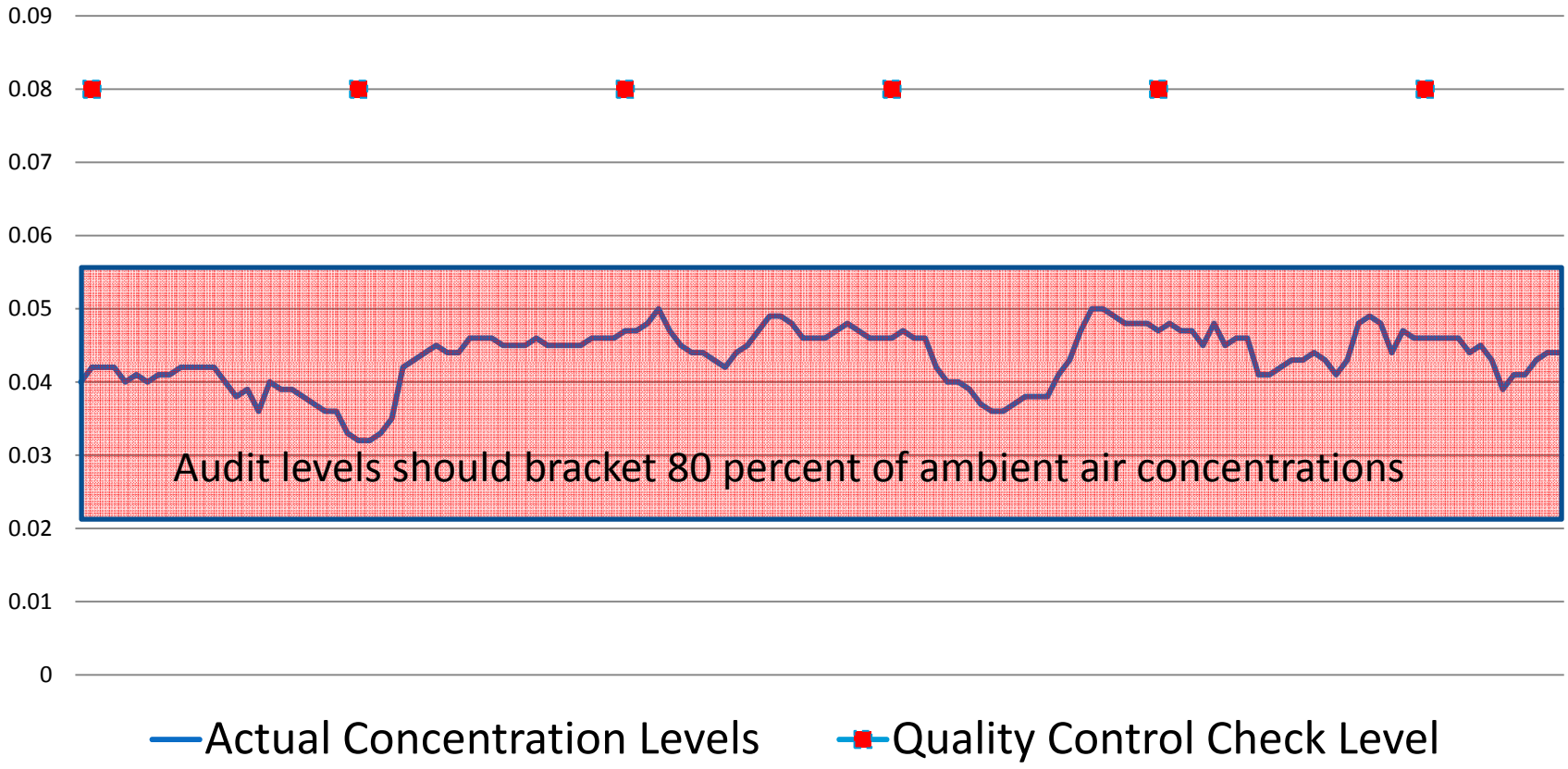
It's all in the hips

Hey, no problem!

Changes in the Rule

- The 2006 rule established one additional low level (audit level 1) but also changed the concentration of some of the other levels
- Changes made to provide audit ranges for routine SLAMS sites as well as the NCore precursor gas sites
- The rule stated that the selected audit levels should represent or bracket 80 percent of ambient concentrations measured by the analyzer being evaluated

Example of audits (and QC checks) conducted at concentrations much higher than measured at site



What kind of changes?

- Has been enhanced to show data for 10 levels
- Provide audit ranges for routine SLAMS and Ncore
- Allows for audit levels to bracket 80 percent of ambient concentrations
- Allows audit levels (10 new) to be skipped
- Can still audit three consecutive levels (from original 5)
- Level is determined by actual audit concentration

Skipping new levels and still meeting the CFR's

Audit Level		Ozone Concentration
1	1	0.004-0.0059
	2	0.006-0.019
2	3	0.020-0.039
	4	0.040-0.069
3	5	0.070-0.089
	6	0.090-0.119
4	7	0.120-0.139
	8	0.140-0.169

Audit Levels Expanded

- Are not required to do all ten levels
- Should bracket 80 percent of ambient concentrations
- Must audit a minimum of three "consecutive" levels
- Level is determined by actual audit concentration

Location	Level 1 4-5.9 ppb	Level 2 6-19.9 ppb	Level 3 20-39.9 ppb	Level 4 40-69.9 ppb	Level 5 70-89.9 ppb	Level 6 90-120 ppb
Palooka	5.0	16.0	29.0	49.0	79.0	115.0

Concerns About Achieving Lowest Levels

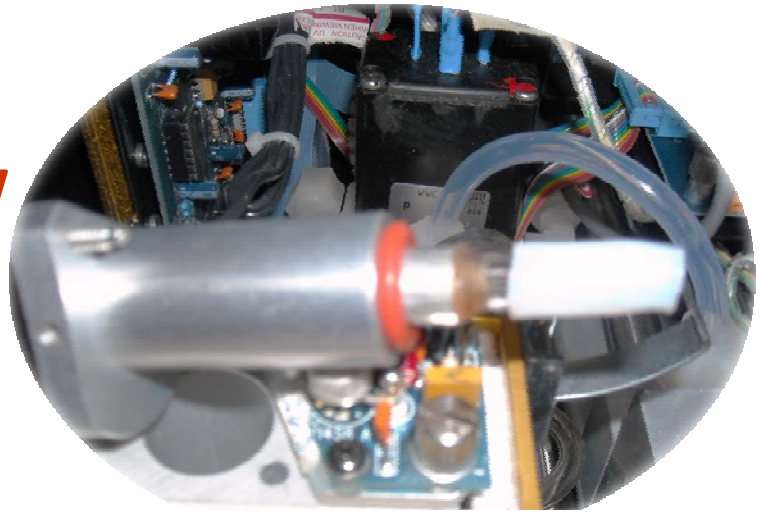
OAQPS Quality Assurance Group

"Isn't this fun?"

New Low Levels 4 ppb –19 ppb

Observations

- In the beginning, some difficulties achieving levels below 30 ppb. Contacted manufacturers
- "Covering" the ozone generator lamp will achieved lower concentrations (Houston)
- API Teledyne instruments can be adjusted by accessing menu to lower ozone generator lamp voltage
- Environics adjusted by flow



Ozone Audit Results			
Actual (ppb)	Indicated (ppb)	% Difference	ppb Difference
3.0	3.1	3	.10
4.5	5.7	27	1.2
11.0	12.0	9	1.0
10.0	10.6	6	.60
11.0	11.0	0	0

Acceptance Criteria:
1.5 ppb or ± 15%
Whichever is greater

Ozone Audit Results			
Actual (ppb)	Indicated (ppb)	% Difference	ppb Difference
4.0	4.6	15	.60
3.0	3.0	0	0
4.0	5.0	25	1.0
16.0	16.0	0	0
11.0	11.0	0	0
15.0	16.0	0	0
10.0	11.0	7	1.0

2011 AMP255 Report Results for Ozone

Site	Level 1 4-5.9 ppb	Level 2 6-19.9 ppb	Level 3 20-39.9 ppb
A	26.57	5.03	5.61
B	*	- 3.13	0.0
C	*	0.0	0.0
D	25.00	10.63	3.98
E	-12.25	10.21	1.85
F	25.00	5.56	1.67
G	*	7.52	5.34
H	*	4.95	2.67
I	*	14.29	4.35
Summary	16.11	6.12	2.83

Various types of calibration instruments
Various degrees of success at lowest levels

Concerns in the "field" about new low Levels 4 ppb –19 ppb

- Some believe the requirements are overly restrictive
- Manufactures have limitations on their ozone generators
- Some claim generators unreliable below 50 ppb
- Some are uncomfortable with using % difference at the lowest levels

- **More comfortable with absolute difference of 1.5 ppb but think 3 ppb is more reasonable**
- **What are the repercussions if only the lowest fails by as little as 2-3 ppb?**
- **Some feel OAQPS has been Draconian**

“Bring to me low audit results”

“The Great and Powerful Has Spoken”

Never be afraid to ask questions

- Staff at OAQPS have been very helpful (Shanis is no Draco, Oz….maybe)
- People enjoy sharing their secrets, seek them out, they love to share their experiences
- Instrument manufacturers can be very helpful, work with them
- Going low can be “fun”
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