The AMP255 and Statistical Data Assessments

August 19, 2008

Presented by Jonathan Miller
EPA - Office of Air Quality Planning and Standards
Presentation Created by Louise Camalier & Jonathan Miller

Agenda

- How We Got Here (10 Minutes)
  - Brief History of the AMP255
  - Intended Usage of the AMP255
- Review of 40 CFR 58 Appendix A (60 Minutes)
  - The Statistics
  - Data Quality Indicators (DQI's)
- How to Generate the AMP255 (10 Minutes)
- BREAK (15 Minutes)
- Morning Review (10 Minutes)
- What Am I Looking At?!?! (60 Minutes)
  - Walkthrough Each Report
  - Field & Value Definitions
- Known Bugs & Future Enhancements (10 Minutes)
- Questions and Answers (10 Minutes)

Part I: Review of 40 CFR Part 58 Appendix A

Quantifying "Good 'nuff"

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AMP255 History

- February 2004: EPA Releases "2002-2004 Criteria Pollutant Precision and Bias Data"
  - 1st Publication by EPA Showing Results of Proposed Changes in the P&B Statistics
  - Subsequent Report Released in December 2004

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AMP255 History (Cont)

- OAQPS QA Team Proposed Funding the Development of the Annual Report as a Standard Report in AQS
- Development Starts in May 2005
- Development Completes in October 2005
  - Used in Annual Assessment Report December 2005
- January 17, 2006: 40 CFR Part 58 Appendix A Revisions Go FINAL
  - Last Minute Revisions NOT Accounted for in AMP255

AMP255 Intended Usages

- Save $$$: Report was Based on the Annual Assessment Report Which Was Created by Contractors
- Needed a Mechanism to Produce Assessments in AQS to be Consistent with the New Appendix A Rules
  - Replacement of the AMP240 Report Beginning in 2008 for 2007 Data Annual Certification

Limitations with AMP255

- Only for Criteria Pollutants
  - Only Covers What is in Appendix A
  - Non-Criteria Report Under Development
- Known Issues
  - Some Calculations are Based on the Proposal and Not What Was Finalized
  - Formatting Issues

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Percent Difference & Relative Percent Difference

Basis for All Statistical Calculations

- For standard gas

$$d_i = \frac{meas - audit}{audit} \times 100$$

- For Collocated Samples,

$$d_i = \frac{X_i - Y_i}{(X_i + Y_i)/2} \bullet 100$$

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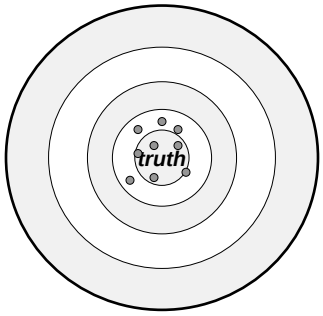
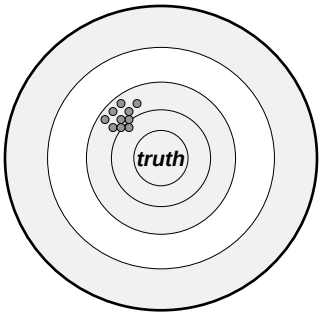
What Are We Trying to Determine?



Precision

"A measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions"



Bias

"A systematic or persistent distortion of a measurement process which causes errors in one direction"

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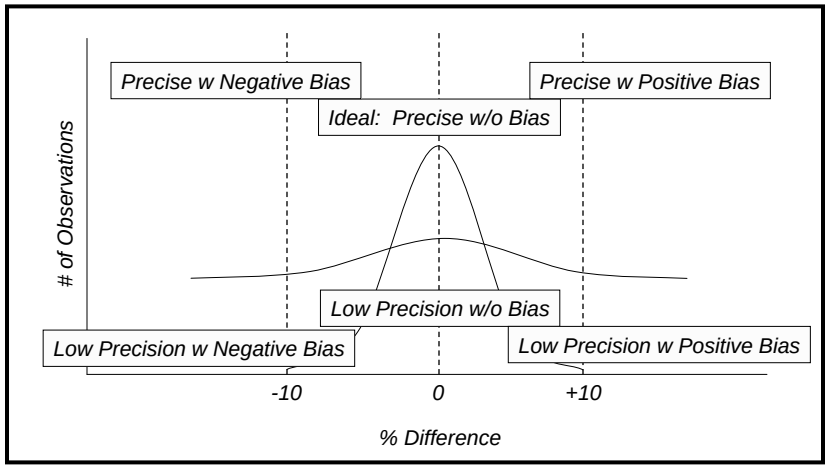
Another Way of Looking at It…



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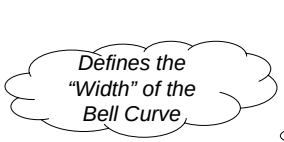
Precision



Defines the "Width" of the Bell Curve

*90th Percentile of a Chi-Squared Distribution → **More Conservative***

Gaseous Estimate

$$\Pr ecision\_Estimate = \sqrt{\frac{n \bullet \sum_{i=1}^{n} d_i^2 - (\sum_{i=1}^{n} d_i)^2}{n(n-1)}} \bullet \sqrt{\frac{n-1}{\chi^2_{0.1,n-1}}}$$

Collocated Estimate

$$\Pr ecision\_Estimate = \sqrt{\frac{n \bullet \sum_{i=1}^{n} d_i^2 - (\sum_{i=1}^{n} d_i)^2}{2n(n-1)}} \bullet \sqrt{\frac{n-1}{\chi^2_{0.1,n-1}}}$$

Denominator changes because we do not have "truth"

Precision is more conservative when evaluated at the 90% one-sided upper confidence level

Bias

$$Bias\_Estimate = |AB| = AB + t_{0.95,n-1} \bullet \frac{AS}{\sqrt{n}}$$

Central Tendency

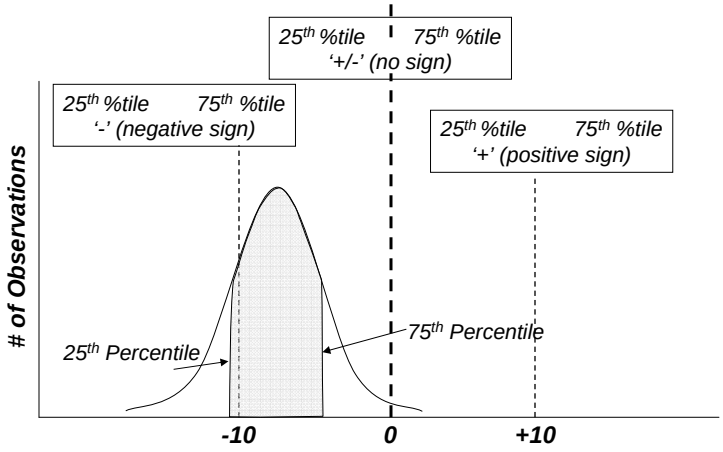
Standard Error

95th Quartile of a Student-t Distribution w/ n-1 df

$$AB = \frac{1}{n} \bullet \sum_{i=1}^{n} |d_i|$$

$$AS = \sqrt{\frac{n \bullet \sum_{i=1}^{n} |d_i|^2 - (\sum_{i=1}^{n} |d_i|)^2}{n(n-1)}}$$

Assigning a Sign to Bias



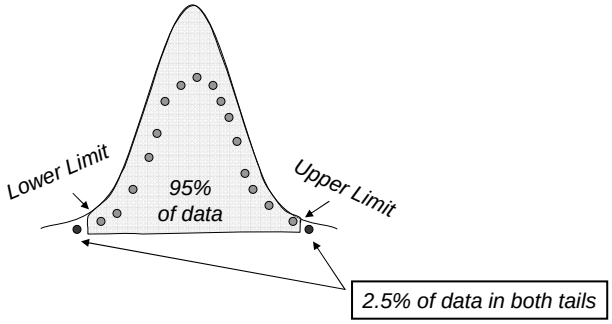
$25^{th} < 0 < 75^{th}$ → "+/-"
25^{th} Percentile is >0 → "+"
75^{th} Percentile is <0 → "-"

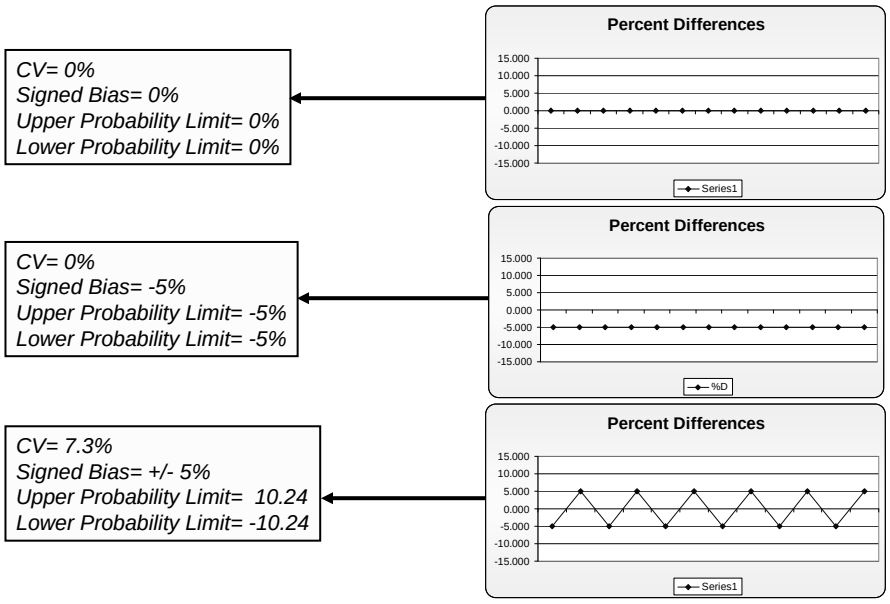
Validation of Bias

*Upper Probability Limit = m + 1.96*S*

*Lower Probability Limit = m + 1.96*S*

- *"d"s for the Results of the Annual Performance Evaluation*





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The DQI's

- The Statistics
  - Gaseous Precision & Bias Assessments
  - Precision Estimate from Collocated Samples
  - $PM_{2.5}$ Bias Assessment
  - $PM_{2.5}$ & PM_c Absolute Bias Assessment
  - One-Point Flow Rate Bias Estimate
  - Semi-Annual Flow Rate Audits
  - Lead Bias Assessments

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What is Performed

Method	Pollutants	Frequency	MQO	
One-Point QC	SO_2, NO_2, O_3, CO	Every 2 Weeks	O_3 : Precision = 7% Bias = 7%	SO_2, NO_2, CO : Precision = 10% Bias = 10%
Annual Performance Evaluation	SO_2, NO_2, O_3, CO	Once per Year @ 3 Levels	<= 15% for each audit concentration	
Flow Rate Verification	PM_{10}, $PM_{2.5}$, PM_c	Once per Month (Quarterly for TSP & PM_{10} High Vols)	<= 4% of Standard & 5% of Design Value	
Semi-Annual Flow Rate Audit	PM_{10}, $PM_{2.5}$, PM_c	Every 6 Months	<= 4% of Standard & 5% of Design Value	
Collocated Sampling	$PM_{10\ (Manual)}$, TSP, $PM_{2.5}$, PM_c	15% of Network Every 12 Days	$PM_{2.5}$, TSP, PM_{10} : Precision = 10%	PM_c: Precision = 15%
PM PEP Program	$PM_{2.5}$, PM_c	If <= 5 Sites: 5/yr If > 5 Sites: 8/yr All monitors covered in 6 years	$PM_{2.5}$: Precision = 10%	PM_c: Precision = 15%

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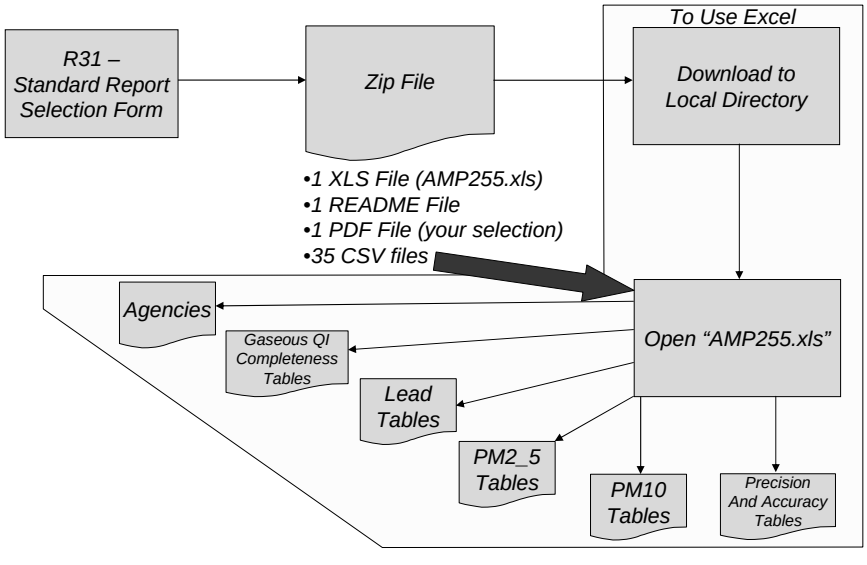
How it is Entered

Method	Pollutants	Frequency	MQO
One-Point QC	SO_2, NO_2, O_3, CO	*"Precision"*	
Annual Performance Evaluation	SO_2, NO_2, O_3, CO	*"Accuracy"*	
Flow Rate Verification	PM_{10}, $PM_{2.5}$, PM_c	*"Precision"*	
Semi-Annual Flow Rate Audit	PM_{10}, $PM_{2.5}$, PM_c	*"Accuracy"*	
Collocated Sampling	PM_{10}, TSP, $PM_{2.5}$, PM_c	*"Precision"*	
PM PEP Program	$PM_{2.5}$, PM_c	= *"Precision" – Only Entered by RTI… Not by all Users*	

The AMP255

Making Sense of the Madness…
Or adding to it…

Generating an AMP255

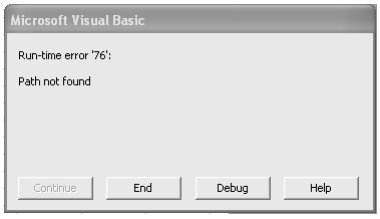


Things to Do Beforehand

- Check Your Excel Security Settings
- Enable the Macros When Prompted
- Indicate you want to Load the Summary Data When Prompted (why else are we here?!?!)

Common Errors on Opening

- You Tried to Open the AMP255.xls From the Zip File
- At Least 1 of the 35 csv files are missing from the Directory.



Live Demonstration

The Point in the Program Where it Can all go Horribly Wrong…

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Part II – Going Through the AMP255

Common Terminology

- PQAO
  - Primary Quality Assurance Organization
  - Organization Responsible for the QA Activities for a Monitor
- NSP vs Other
  - NSP = “NAMS / SLAMS / PAMS” Monitor Type
  - Anything other than “NAMS / SLAMS / PAMS” Monitor Type
  - Applies only to the “Highest Ranking” Monitor Type Defined for the Monitor
- The “M” After a PQAO Organization
  - The Agency Operates in Multiple States (National Park Service for Example)

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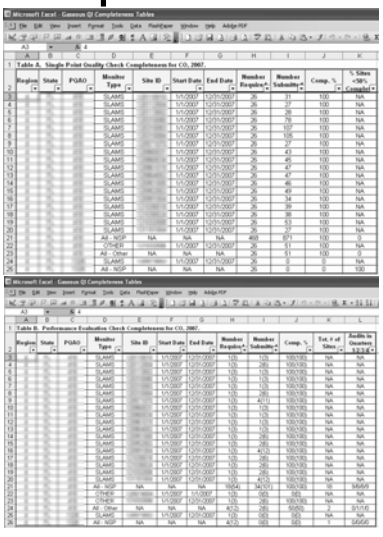
Gaseous QI Completeness

- Single Point Quality Check Completeness
  - Based on One-Point QC Checks
  - AQS: PRECISION
- Performance Evaluation Check Completeness
  - Based on Annual Performance Evaluations
  - 3 Consecutive Levels
  - AQS: ACCURACY
- Reports Repeated for O_3, CO, SO_2, NO_2



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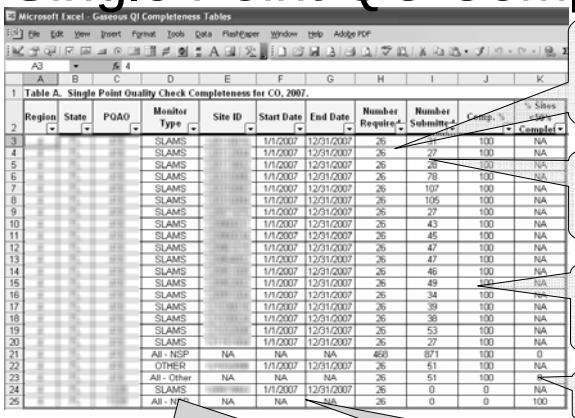
Single Point QC Completeness



Number Required =
Number of Days Between ("Start Date" & "End Date")/ 14

Number Submitted =
Number Precision Checks Between "Start Date" & "End Date"

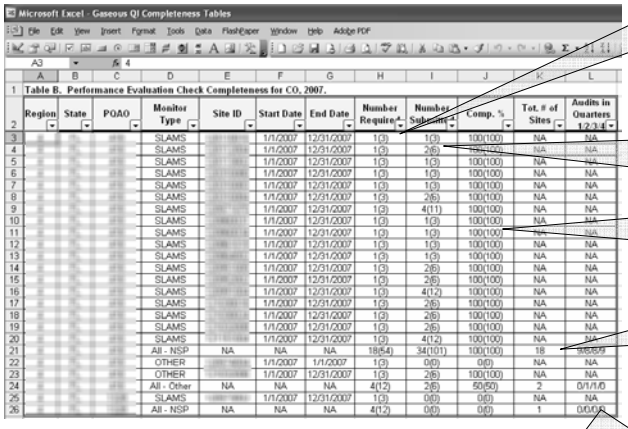
$$\frac{Number Submitted}{Number\ Required} \times 100$$

Count of "Comp %" < 50

Primary Monitor Type:
- *NAMS / SLAMS / PAMS = "SLAMS"*
- *Anything Else without one of those 3 = "OTHER*

Date Range Based on:
- *Sample Periods*
- *Monitor Type*
- *PQAO Dates*

PE Check Completeness



$$Ceiling(\frac{\#Quarters}{4})$$

The (x) value indicates the number of Levels required

Count of the number of Audits Performed.
(Count of the number of Levels Performed)

$$\frac{Number Submitted}{Number\ Required} \times 100$$

Number of Sites Within the Group

Number Audits Performed per Quarter Within the Group

Precision and Accuracy Tables

- Single Point P&B Estimates
  - One Sheet per Pollutant / MT Group
  - Summarized by PQAO
- PQAO Accuracy Summary
  - One Sheet per Pollutant / MT Group
  - One Line per PQAO
- Reports Repeated for
  - O_3, CO, SO_2, NO_2
  - NSP / Non-NSP Monitor Types


Microsoft Excel - Precision and Accuracy Tables

Table I. Single Point Precision and Bias Estimates for CO NSP Sites, 2007.

Region	State	PQAO	Site	CFR Lower Limit	CFR Upper Limit	Bias UB	CV UB
				NA	NA	-2.55	1.55
				NA	NA	1.54	1.54
				NA	NA	1.11	1.54
				NA	NA	-1.94	2.24
				NA	NA	-2.82	3.07
				NA	NA	-2.96	3.41
				NA	NA	4.37	5.01
				NA	NA	3.77	4.27
				NA	NA	5.7	3.83
				NA	NA	5.73	7.44
				NA	NA	3.84	4.69
				NA	NA	1.99	1.84
				NA	NA	-1.57	1.67
				NA	NA	3.15	3.43
				NA	NA	1.07	1.18
				NA	NA	-1.07	1.31
				NA	NA	-2.01	1.65
				NA	NA	6.46	5.98
			All - NSP	-7.04	6.92	2.6	3.67
				NA	NA		
			All - NSP				

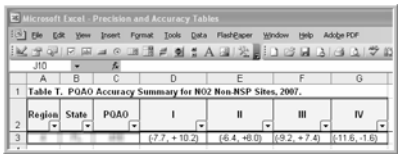

Microsoft Excel - Precision and Accuracy Tables

Table T. PQAO Accuracy Summary for NO2 Non-NSP Sites, 2007.

Region	State	PQAO	I	II	III	IV
			(-7.7, +10.2)	(-6.4, +8.0)	(-9.2, +7.4)	(-11.6, -1.6)

Single-Point P&B Estimates

Microsoft Excel - Precision and Accuracy Tables

Table I. Single Point Precision and Bias Estimates for CO NSP Sites, 2007.

Region	State	PQAO	Site	CFR Lower Limit	CFR Upper Limit	Bias UB	CV UB
				NA	NA	-2.55	1.55
				NA	NA	1.54	1.54
				NA	NA	1.11	1.54
				NA	NA	-1.94	2.24
				NA	NA	-2.82	3.07
				NA	NA	-2.96	3.41
				NA	NA	4.37	5.01
				NA	NA	3.77	4.27
				NA	NA	5.7	3.83
				NA	NA	5.73	7.44
				NA	NA	3.84	4.69
				NA	NA	1.99	1.84
				NA	NA	-1.57	1.67
				NA	NA	3.15	3.43
				NA	NA	1.07	1.18
				NA	NA	-1.07	1.31
				NA	NA	-2.01	1.65
				NA	NA	6.46	5.98
			All - NSP	-7.04	6.92	2.6	3.67
				NA	NA		
			All - NSP				

$$Bias\_Estimate = |AB| = AB + t_{0.95,n-1} \bullet \frac{AS}{\sqrt{n}}$$

$$\Pr ecision\_Estimate = \sqrt{\frac{n \bullet \sum_{i=1}^{n} d_i^2 - (\sum_{i=1}^{n} d_i)^2}{n(n-1)}} \bullet \sqrt{\frac{n-1}{\chi^2_{0.1,n-1}}}$$

Upper Probability Limit = m + 1.96*S

Lower Probability Limit = m - 1.96*S

PQAO Accuracy Summary

Microsoft Excel - Precision and Accuracy Tables

File Edit View Insert Format Tools Data FlashPaper Window Help Adobe PDF

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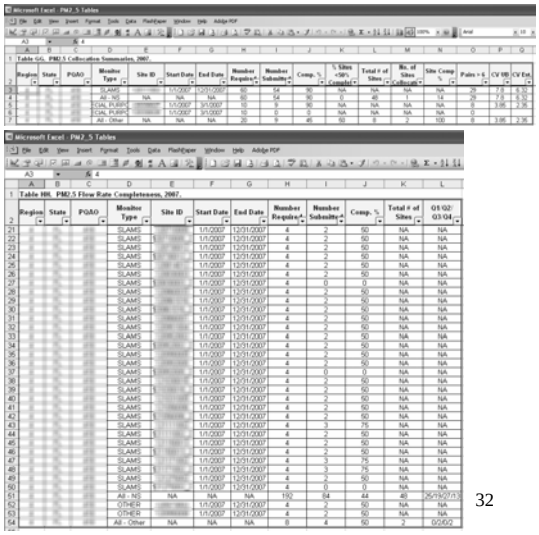
	A	B	C	D	E	F	G
1	Table T. PQAO Accuracy Summary for NO2 Non-NSP Sites, 2007.						
2	Region	State	PQAO	I	II	III	IV
3	[redacted]			(-7.7, + 10.2)	(-6.4, +8.0)	(-9.2, + 7.4)	(-11.6, -1.6)

*Upper Probability Limit = m + 1.96*S*

*Lower Probability Limit = m + 1.96*S*

$PM_{2.5}$ Tables

- $PM_{2.5}$ Collocation Summaries
  - Only Shows for "Primary Monitors"
- $PM_{2.5}$ Flow Rate Completeness



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PM2.5 Collocation Summaries

$$\sqrt{\frac{n\bullet\sum_{i=1}^{n}d_i^2-(\sum_{i=1}^{n}d_i)^2}{2n(n-1)}}$$

$$\sqrt{\frac{n\bullet\sum_{i=1}^{n}d_i^2-(\sum_{i=1}^{n}d_i)^2}{2n(n-1)}}\bullet\sqrt{\frac{n-1}{\chi^2_{0.1,n-1}}}$$

Microsoft Excel - PM2_5 Tables

Table GG. PM2.5 Collocation Summaries, 2007.

	Region	State	POAO	Monitor Type	Site ID	Start Date	End Date	Number Required	Number Submitted	Comp. %	% Sites <50% Complete	Total # of Sites	No. of Sites Collocated	Site Comp %	Pairs > 6	CV UB	CV Est.
3	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	60	54	90	NA	NA	NA	NA	29	7.8	6.32
4	[illegible]	[illegible]	[illegible]	All - NS	NA	NA	NA	60	54	90	0	48	1	14	29	7.8	6.32
5	[illegible]	[illegible]	[illegible]	ECIAL PURPC	[illegible]	1/1/2007	3/1/2007	10	9	90	NA	NA	NA	NA	8	3.85	2.35
6	[illegible]	[illegible]	[illegible]	ECIAL PURPC	[illegible]	1/1/2007	3/1/2007	10	0	0	NA	NA	NA	NA	0		
7	[illegible]	[illegible]	[illegible]	All - Other	NA	NA	NA	20	9	45	50	8	2	100	8	3.85	2.35

Number of Sites Within the Group

Number of Pairs wher both value > 6 ug/m3

Number Required =
Number of Days Between ("Start Date" & "End Date")/ 12

$$\frac{NumberSubmitted}{Number\,Required}\times 100$$

Number of Sites with "Primary" Designation

Number Submitted =
Number Collocation Precision Checks Between "Start Date" & "End Date"

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PM$_{2.5}$ Flow Rate Completeness

Microsoft Excel - PM2_5 Tables

Table HH. PM2.5 Flow Rate Completeness, 2007.

	Region	State	POAO	Monitor Type	Site ID	Start Date	End Date	Number Required	Number Submitted	Comp. %	Total # of Sites	Q1/Q2/Q3/Q4
21	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
22	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
23	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
24	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
25	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
26	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
27	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	0	0	NA	NA
28	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
29	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
30	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
31	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
32	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
33	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
34	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
35	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
36	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
37	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	0	0	NA	NA
38	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
39	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
40	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
41	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
42	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
43	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	3	75	NA	NA
44	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
45	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
46	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
47	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	3	75	NA	NA
48	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	3	75	NA	NA
49	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
50	[illegible]	[illegible]	[illegible]	SLAMS	[illegible]	1/1/2007	12/31/2007	4	0	0	NA	NA
51	[illegible]	[illegible]	[illegible]	All - NS	NA	NA	NA	192	84	44	48	25/19/27/13
52	[illegible]	[illegible]	[illegible]	OTHER	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
53	[illegible]	[illegible]	[illegible]	OTHER	[illegible]	1/1/2007	12/31/2007	4	2	50	NA	NA
54	[illegible]	[illegible]	[illegible]	All - Other	NA	NA	NA	8	4	50	2	0/2/0/2

Number Required =
Number of Months Between ("Start Date" & "End Date")/ 6

Number Submitted =
Number of Accuracy Flow Audits in the Period

$$\frac{NumberSubmitted}{Number\,Required}\times 100$$

Number Sites Within the Group

Number Audits Performed per Quarter Within the Group

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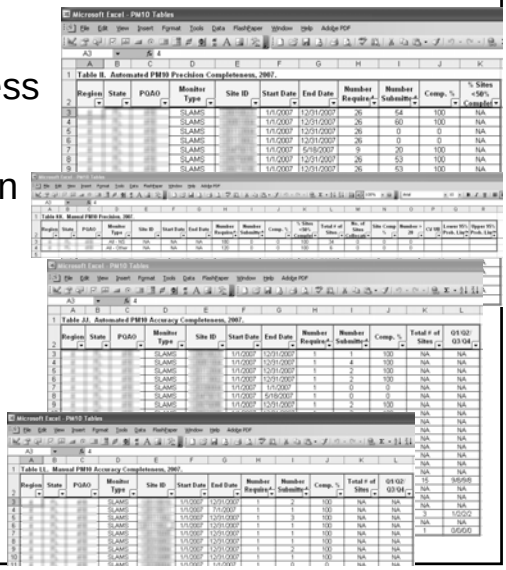
PM_{10} Tables

- Automated PM_{10} Precision Completeness
  - Based on Flow Audits
- Manual PM_{10} Precision Completeness
  - Based on Collocation
- Automated / Manual PM_{10} Accuracy



Automated Precision

Microsoft Excel - PM10 Tables

Table II. Automated PM10 Precision Completeness, 2007.

Region	State	PQAO	Monitor Type	Site ID	Start Date	End Date	Number Required	Number Submitted	Comp. %	% Sites <50% Complete
[redacted]			SLAMS	[redacted]	1/1/2007	12/31/2007	26	54	100	NA
			SLAMS		1/1/2007	12/31/2007	26	60	100	NA
			SLAMS		1/1/2007	12/31/2007	26	0	0	NA
			SLAMS		1/1/2007	12/31/2007	26	0	0	NA
			SLAMS		1/1/2007	5/18/2007	9	20	100	NA
			SLAMS		1/1/2007	12/31/2007	26	53	100	NA
			SLAMS		1/1/2007	12/31/2007	26	53	100	NA
			SLAMS		1/1/2007	12/31/2007	26	60	100	NA
			SLAMS		1/1/2007	12/31/2007	26	45	100	NA
			SLAMS		1/1/2007	5/17/2007	9	20	100	NA
			SLAMS		1/1/2007	12/31/2007	26	58	100	NA
			SLAMS		1/1/2007	12/31/2007	26	12	46	NA
			SLAMS		1/1/2007	12/31/2007	26	60	100	NA
			SLAMS		1/1/2007	12/31/2007	26	57	100	NA
			All - NS	NA	NA	NA	330	552	82	21
			ECIAL PURPO		1/1/2007	12/31/2007	26	60	100	NA
			OTHER		1/1/2007	12/31/2007	26	53	100	NA
			OTHER		1/1/2007	12/31/2007	26	50	100	NA
			All - Other	NA	NA	NA	78	163	100	0
			SLAMS		10/24/2007	12/31/2007	4	6	100	NA
			All - NS	NA	NA	NA	4	6	100	0

Number Required = *Number of Months Between "Start Date" & "End Date"*

Number Submitted = *Number of Precision Flow Check Days in the Period*

$$\frac{NumberSubmitted}{Number\ Required} \times 100$$

Count of "Comp %" < 50/# Sites

Manual Precision

Number Submitted =
Number of Precision Flow Checks in the Period

Count of "Comp %" < 50/# Sites

Upper Probability Limit = m + 1.96*S
Lower Probability Limit = m - 1.96*S

Number Sites Within the Group

Number Required = Number of Days Between ("Start Date" & "End Date")/ 12"

$$\frac{NumberSubmitted}{Number\ \mathrm{Re}quired} \times 100$$

 # Sites That Submitted Data (Should be 15%)

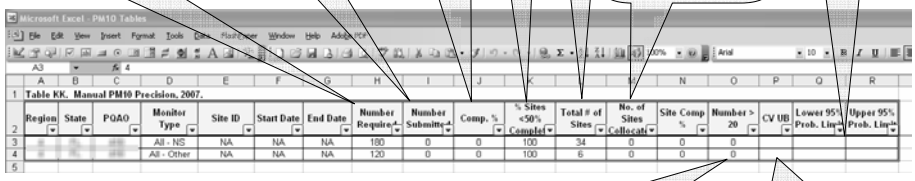


Table KK. Manual PM10 Precision, 2007.

Region	State	PQAO	Monitor Type	Site ID	Start Date	End Date	Number Required	Number Submitted	Comp. %	% Sites <50% Complet	Total # of Sites	No. of Sites Collocati	Site Comp %	Number > 20	CV UB	Lower 95% Prob. Lim	Upper 95% Prob. Lim
			All - NS	NA	NA	NA	180	0	0	100	34	0	0	0			
			All - Other	NA	NA	NA	120	0	0	100	6	0	0	0			

Number of Pairs wher both value > 20 ug/m3

$$\sqrt{\frac{n\bullet\sum_{i=1}^{n}d_i^2-(\sum_{i=1}^{n}d_i)^2}{2n(n-1)}}\bullet\sqrt{\frac{n-1}{\chi^2_{0.1,n-1}}}$$

Accuracy Completeness Tables

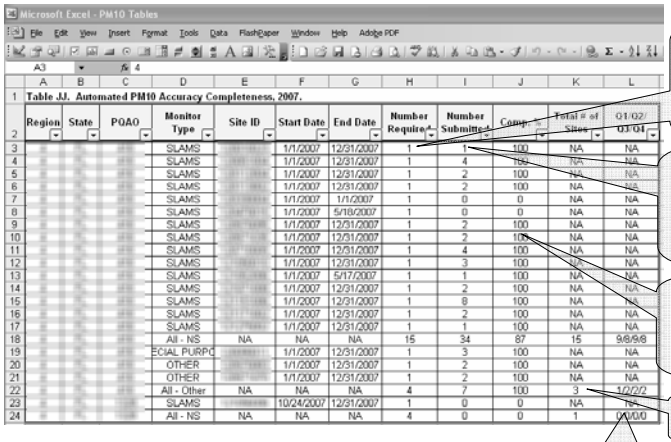


Table JJ. Automated PM10 Accuracy Completeness, 2007.

Region	State	PQAO	Monitor Type	Site ID	Start Date	End Date	Number Required	Number Submitted	Comp. %	Total # of Sites	Q1/Q2/ Q3/ Q4
			SLAMS		1/1/2007	12/31/2007	1	1	100	NA	NA
			SLAMS		1/1/2007	12/31/2007	1	4	100	NA	NA
			SLAMS		1/1/2007	12/31/2007	1	2	100	NA	NA
			SLAMS		1/1/2007	12/31/2007	1	2	100	NA	NA
			SLAMS		1/1/2007	1/1/2007	1	0	0	NA	NA
			SLAMS		1/1/2007	5/18/2007	1	0	0	NA	NA
			SLAMS		1/1/2007	12/31/2007	1	2	100	NA	NA
			SLAMS		1/1/2007	12/31/2007	1	2	100	NA	NA
			SLAMS		1/1/2007	12/31/2007	1	4	100	NA	NA
			SLAMS		1/1/2007	12/31/2007	1	3	100	NA	NA
			SLAMS		1/1/2007	5/17/2007	1	1	100	NA	NA
			SLAMS		1/1/2007	12/31/2007	1	2	100	NA	NA
			SLAMS		1/1/2007	12/31/2007	1	8	100	NA	NA
			SLAMS		1/1/2007	12/31/2007	1	2	100	NA	NA
			SLAMS		1/1/2007	12/31/2007	1	1	100	NA	NA
			All - NS	NA	NA	NA	15	34	87	15	9/8/9/8
			ECIAL PURPO		1/1/2007	12/31/2007	1	3	100	NA	NA
			OTHER		1/1/2007	12/31/2007	1	2	100	NA	NA
			OTHER		1/1/2007	12/31/2007	1	2	100	NA	NA
			All - Other	NA	NA	NA	4	7	100	3	1/2/2/2
			SLAMS		10/24/2007	12/31/2007	1	0	0	NA	NA
			All - NS	NA	NA	NA	4	0	0	1	0/0/0/0

Number Required =
Number of Months Between ("Start Date" & "End Date")/ 6

Number Submitted =
Number of Accuracy Flow Audit Days in the Period

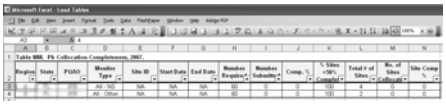
$$\frac{NumberSubmitted}{Number\ \mathrm{Re}quired} \times 100$$

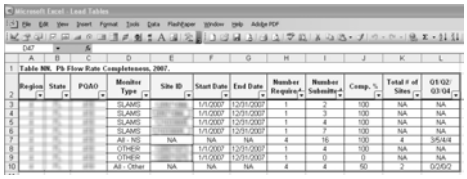
Number Sites Within the Group

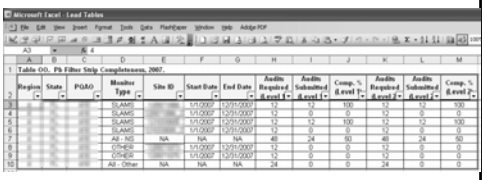
Number Audits Performed per Quarter Within the Group

Lead Tables

- Lead Collocation Completeness
  - Based on Collocated Precision Data
- Lead Flow Rate Completeness
  - Based on Accuracy Flow Data
- Lead Filter Strip Completeness







Lead Collocation Completeness

Number Submitted = Number of Precision Flow Checks in the Period

Count of "Comp %" < 50/# Sites

Number Sites Within the Group

Microsoft Excel - Lead Tables

Table MM. Pb Collocation Completeness, 2007.

Region	State	PQAO	Monitor Type	Site ID	Start Date	End Date	Number Required	Number Submitted	Comp. %	% Sites <50% Complet	Total # of Sites	No. of Sites Collocat	Site Comp %
			All - NS	NA	NA	NA	60	0	0	100	4	0	0
			All - Other	NA	NA	NA	60	0	0	100	2	0	0

Number Required = Number of Days Between ("Start Date" & "End Date")/ 12

$$\frac{NumberSubmitted}{Number\,Required} \times 100$$

 # Sites That Submitted Data (Should be 15%)

$$\frac{NumberSitesSubmitted}{(TotalSites * 0.15)} \times 100$$

Flow Rate Completeness

Number Required =
Number of Months Between ("Start Date" & "End Date")/ 6

Number Submitted =
Number of Accuracy Flow Audits in the Period

Microsoft Excel - Lead Tables

Table NN. Pb Flow Rate Completeness, 2007.

Region	State	PQAO	Monitor Type	Site ID	Start Date	End Date	Number Required	Number Submitted	Comp. %	Total # of Sites	Q1/Q2/ Q3/Q4
			SLAMS		1/1/2007	12/31/2007	1	2	100	NA	NA
			SLAMS		1/1/2007	12/31/2007	1	3	100	NA	NA
			SLAMS		1/1/2007	12/31/2007	1	4	100	NA	NA
			SLAMS		1/1/2007	12/31/2007	1	7	100	NA	NA
			All - NS	NA	NA	NA	4	16	100	4	3/5/4/4
			OTHER		1/1/2007	12/31/2007	1	4	100	NA	NA
			OTHER		1/1/2007	12/31/2007	1	0	0	NA	NA
			All - Other	NA	NA	NA	4	4	50	2	0/2/0/2

$$\frac{NumberSubmitted}{Number\ \mathrm{Re}quired} \times 100$$

Number Sites Within the Group

Number Audits Performed per Quarter Within the Group

Filter Strip Completeness

Number Required =
3 x Number of Months Between ("Start Date" & "End Date")/ 4 @ Level 1

Number Submitted =
Number of Accuracy Audits in the Period @ Level 1

Number Required =
3 x Number of Months Between ("Start Date" & "End Date")/ 4 @ Level 2

Number Submitted =
Number of Accuracy Audits in the Period @ Level 2

Microsoft Excel - Lead Tables

Table OO. Pb Filter Strip Completeness, 2007.

Region	State	PQAO	Monitor Type	Site ID	Start Date	End Date	Audits Required (Level 1	Audits Submitted (Level 1	Comp. % (Level 1	Audits Required (Level 2	Audits Submitted (Level 2	Comp. % (Level 2
			SLAMS		1/1/2007	12/31/2007	12	12	100	12	12	100
			SLAMS		1/1/2007	12/31/2007	12	0	0	12	0	0
			SLAMS		1/1/2007	12/31/2007	12	12	100	12	12	100
			SLAMS		1/1/2007	12/31/2007	12	0	0	12	0	0
			All - NS	NA	NA	NA	48	24	50	48	24	50
			OTHER		1/1/2007	12/31/2007	12	0	0	12	0	0
			OTHER		1/1/2007	12/31/2007	12	0	0	12	0	0
			All - Other	NA	NA	NA	24	0	0	24	0	0

$$\frac{NumberSubmitted}{Number\ \mathrm{Re}quired} \times 100$$

$$\frac{NumberSubmitted}{Number\ \mathrm{Re}quired} \times 100$$

Known Issues

Item	Indicator	Issue	What AMP255 Does	What App A Does
Automated PM_{10}	Completeness	Required # Flow Rate Verifications	Every 2 Weeks	One / Month
Manual PM_{10} & $PM_{2.5}$	Precision Value	Minimum value to be used in Calculations	PM_{10} = 20 $PM_{2.5}$ = 6	PM_{10} = 15 $PM_{2.5}$ = 3
Manual PM_{10} & $PM_{2.5}$	Completeness	Flow Rate Audits	Once / Quarter	Every 6 Months
Manual PM_{10} , $PM_{2.5,}$ Lead	Collocation Completeness	Frequency and Number of Sites	1 in 6 days; based on # sites in PQAO	1 in 12 Days; 15% of the PQAO Network. For PM, this is based on method designation

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Known Issues

Item	Indicator	Issue	What AMP255 Does	What App A Does
Lead	Completeness	# Required Flow Rates	1 per Year	1 every 6 months
O_3, SO_2, NO_2, CO		New Tables Need to be Used	Pre-2007 tables with only 4 levels	5 Levels using new level ranges
All	Display	Formatting Issues with Upper/Lower Probability Limits	Program assumes the "," between the values means it is two values.	

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