

**NATTS Quality Assurance
Multi-Year Assessment
NAAMC Conference
2009**

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Outline

- The NATTS Program QA Indicators
 - Evolution of the NATTS Program and Compounds
 - Data Quality Objectives
 - Measurement Quality Objectives

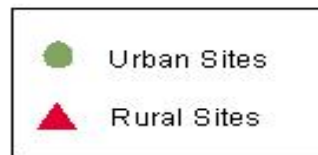
- Meeting our Stated Objectives
 - Precision
 - Completeness
 - Detectability
 - Bias

- What's New?
- Summary/Recommendations

NATTS Sites - 2008



•Urban Sites		•Rural
<ul style="list-style-type: none"> •E. Providence, RI •Boston (Roxbury), MA •New York, NY •Rochester, NY •Washington, DC •Decatur, GA •Tampa, FL •Detroit, MI •<u>Los Angeles, CA</u> •<u>Rubidoux, CA</u> 	<ul style="list-style-type: none"> •Chicago, IL •Houston (Deer Park), TX •St. Louis, MO •Bountiful, UT •San Jose, CA •Phoenix, AZ •Seattle, WA •<u>Richmond, VA</u> •<u>Portland, OR</u> 	<ul style="list-style-type: none"> •Underhill, VT •Hazard, KY •Chesterfield, SC •Grand Junction, CO •La Grande, OR •Harrison County, TX



NATTS QA Objective

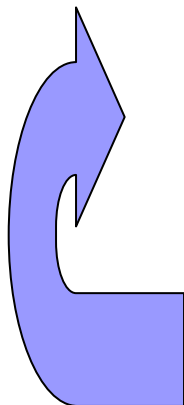
Data Quality Objectives (DQOs) are tied to the GPRA goal of reduction of Air Toxics by 75% (1993 levels) by 2010:

“To be able to detect a 15% difference (trend) between two successive 3-year annual mean concentrations within acceptable levels of decision error.”

To meet these DQOs we need:

- 1-in-6 day sampling frequency with at least an 85% quarterly completeness;
- precision controlled to a Coefficient of Variance (CV) of no more than 15%;
- detectability based on 2001 Pilot Study Minimum Detection Limits (MDLs);
- bias for the data set of less than 25%.

These are our Measurement Quality Objectives (MQOs)!



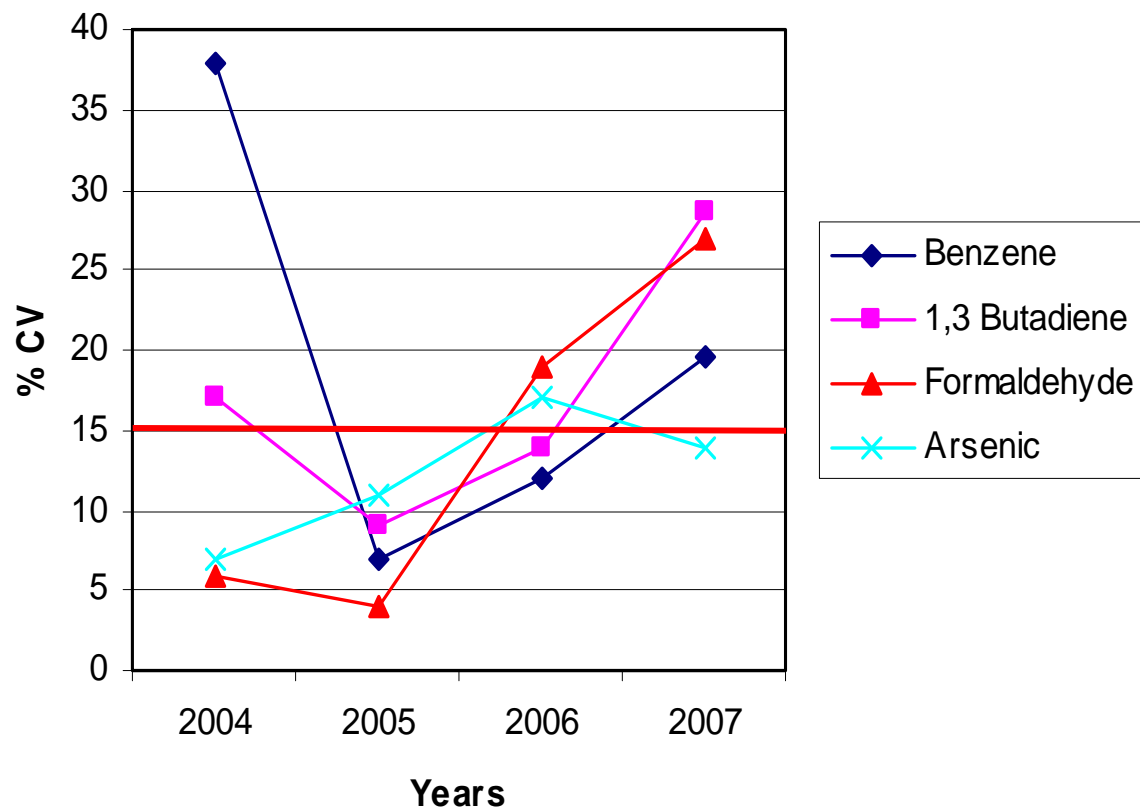
NATTS QA Program

Measurement Quality Objectives (MQOs)

Compound	Precision (CV)	Bias (Lab)	Detectability	Completeness
Arsenic	< 15%	< 25%	0.046 ng/m³	> 85%
Benzene	< 15%	< 25%	0.044 ug/m³	> 85%
1,3-Butadiene	< 15%	< 25%	0.020 ug/m³	> 85%
Formaldehyde	< 15%	< 25%	0.014 ug/m³	> 85%

Meeting Objectives: Precision Results 2004 - 2007

NATTS DQO Compounds - Precision



**Four Year
Average:**

Benzene: 19%

1,3 Butadiene 17%

Formaldehyde: 14%

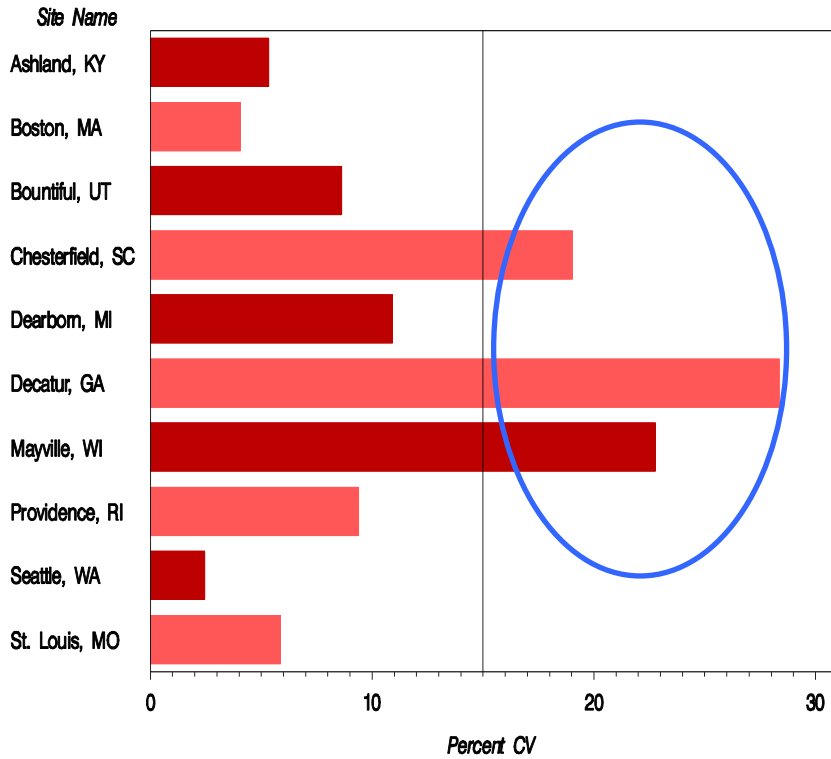
Arsenic: 12%

No. of collocated sites

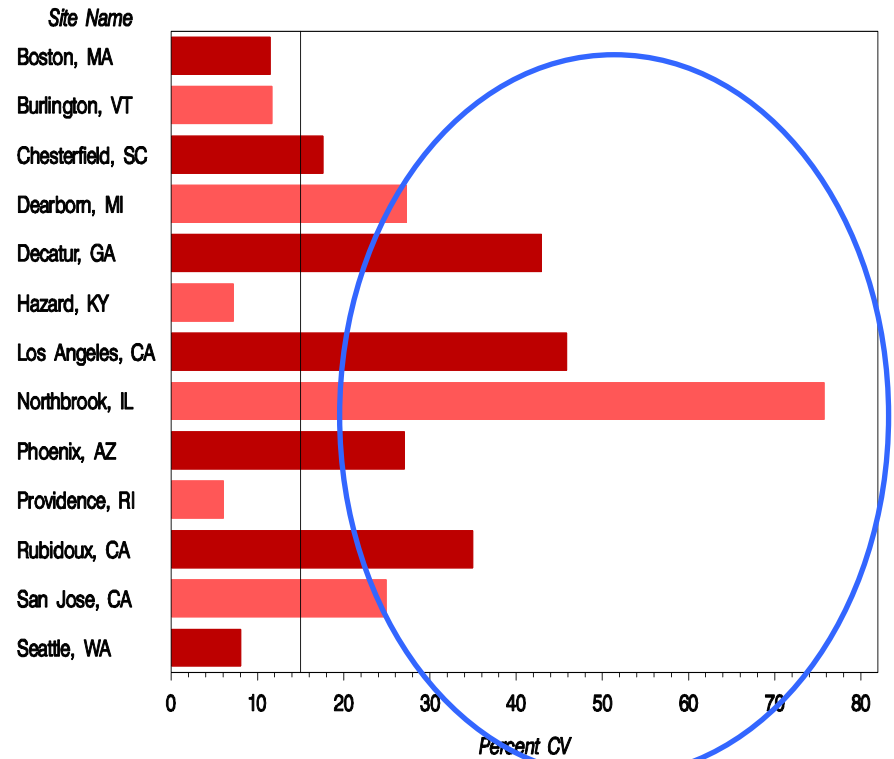
	'04	'05	'06	'07
vocs	7	4	14	14
aldehydes	5	5	13	13
metals	1	2	8	10

Method Precision by Site 2007

Arsenic

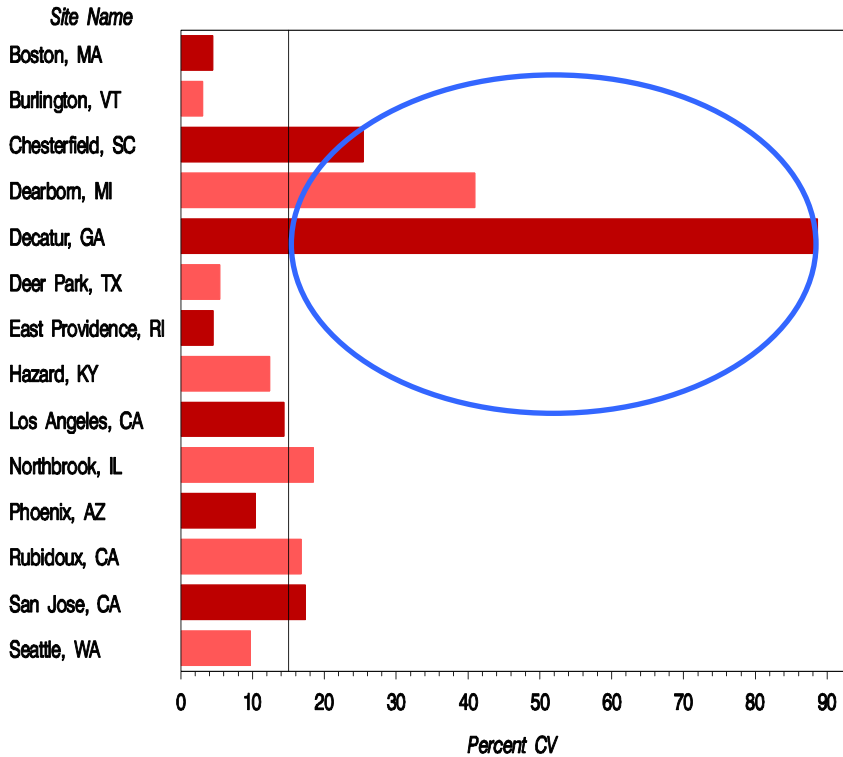


Formaldehyde

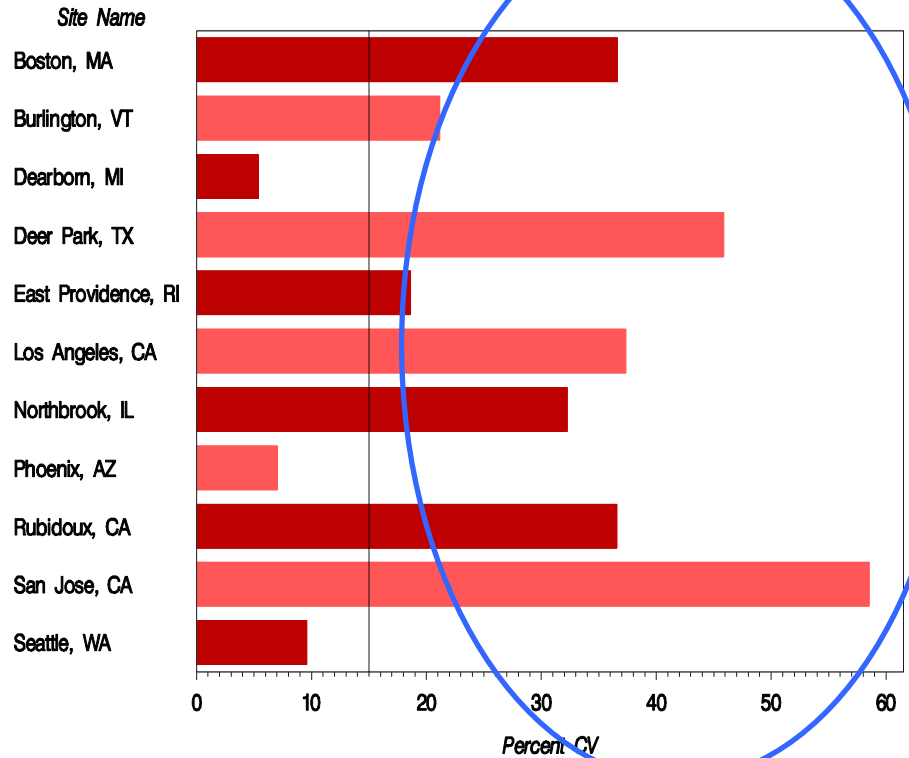


Method Precision by Site 2007

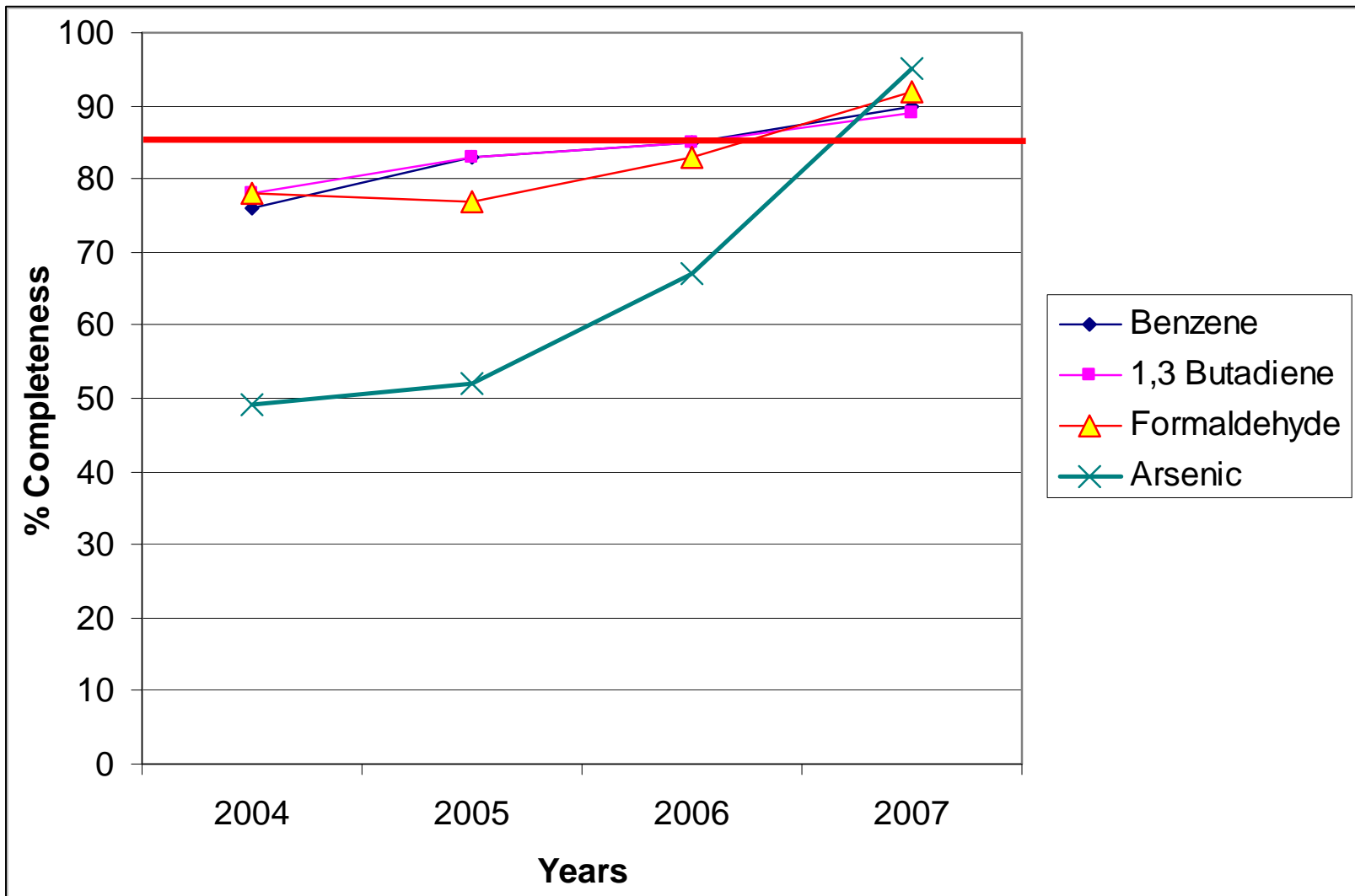
Benzene



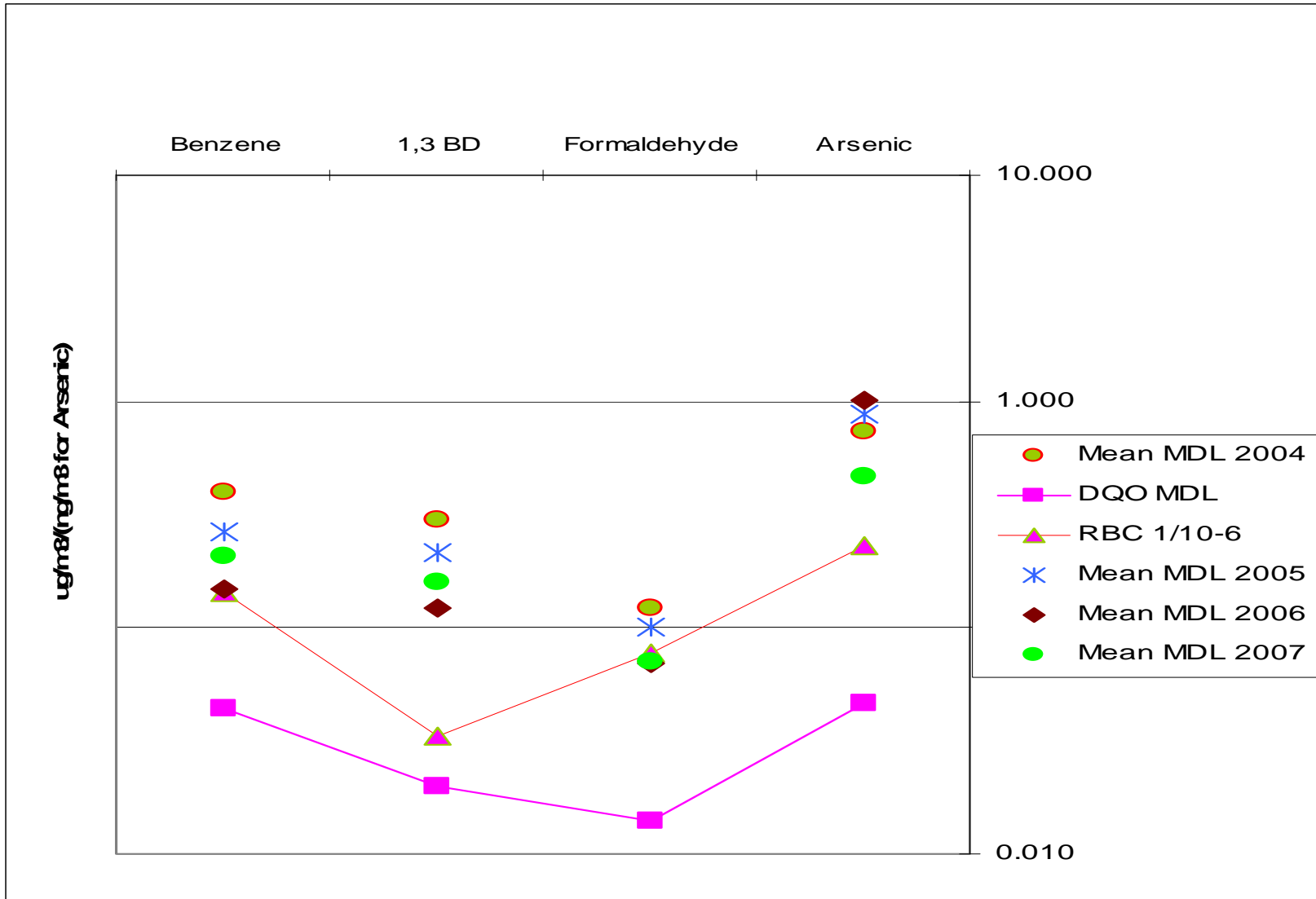
1,3 Butadiene



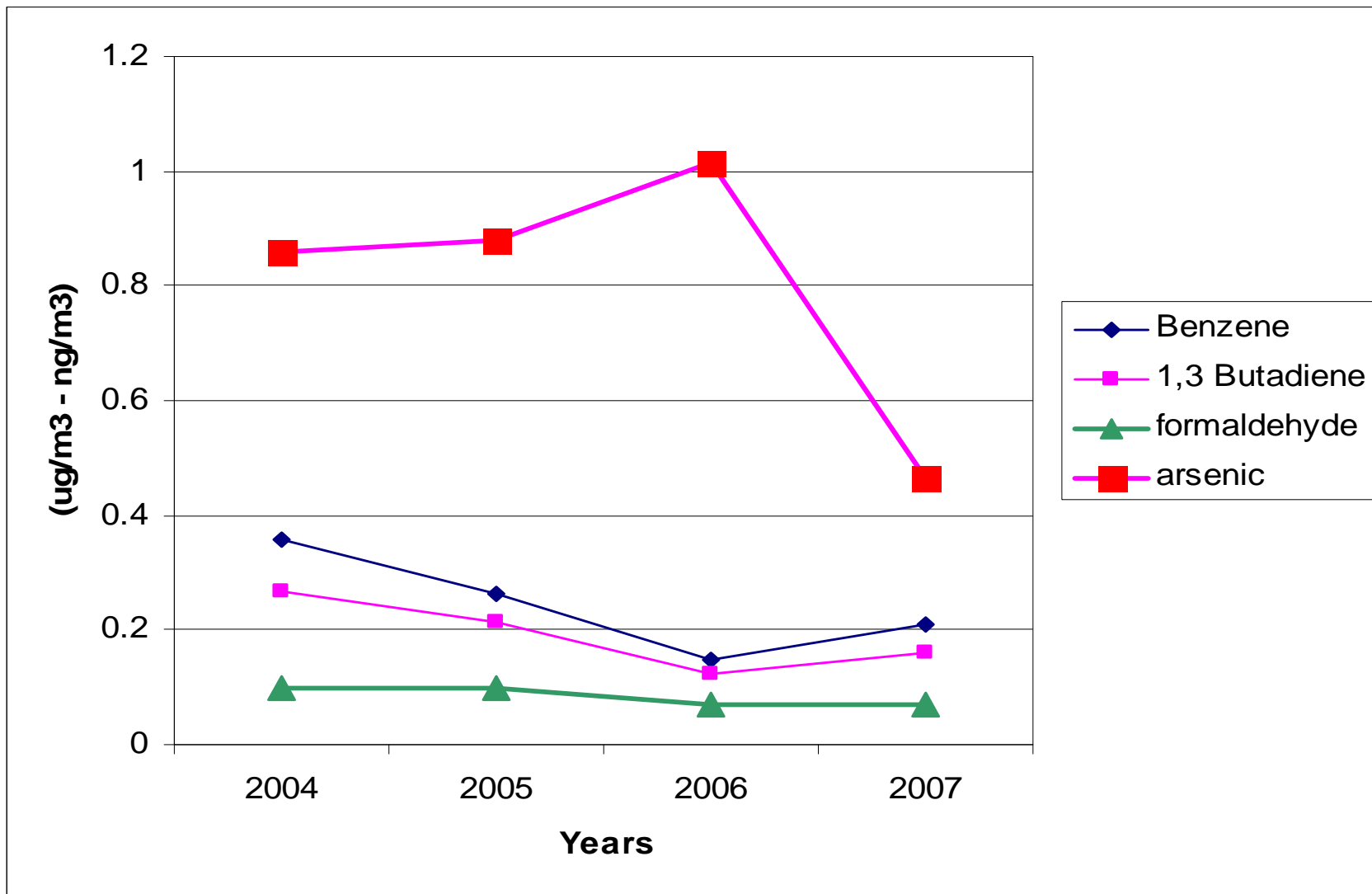
Meeting Objectives: Data Completeness 2004 – 2007



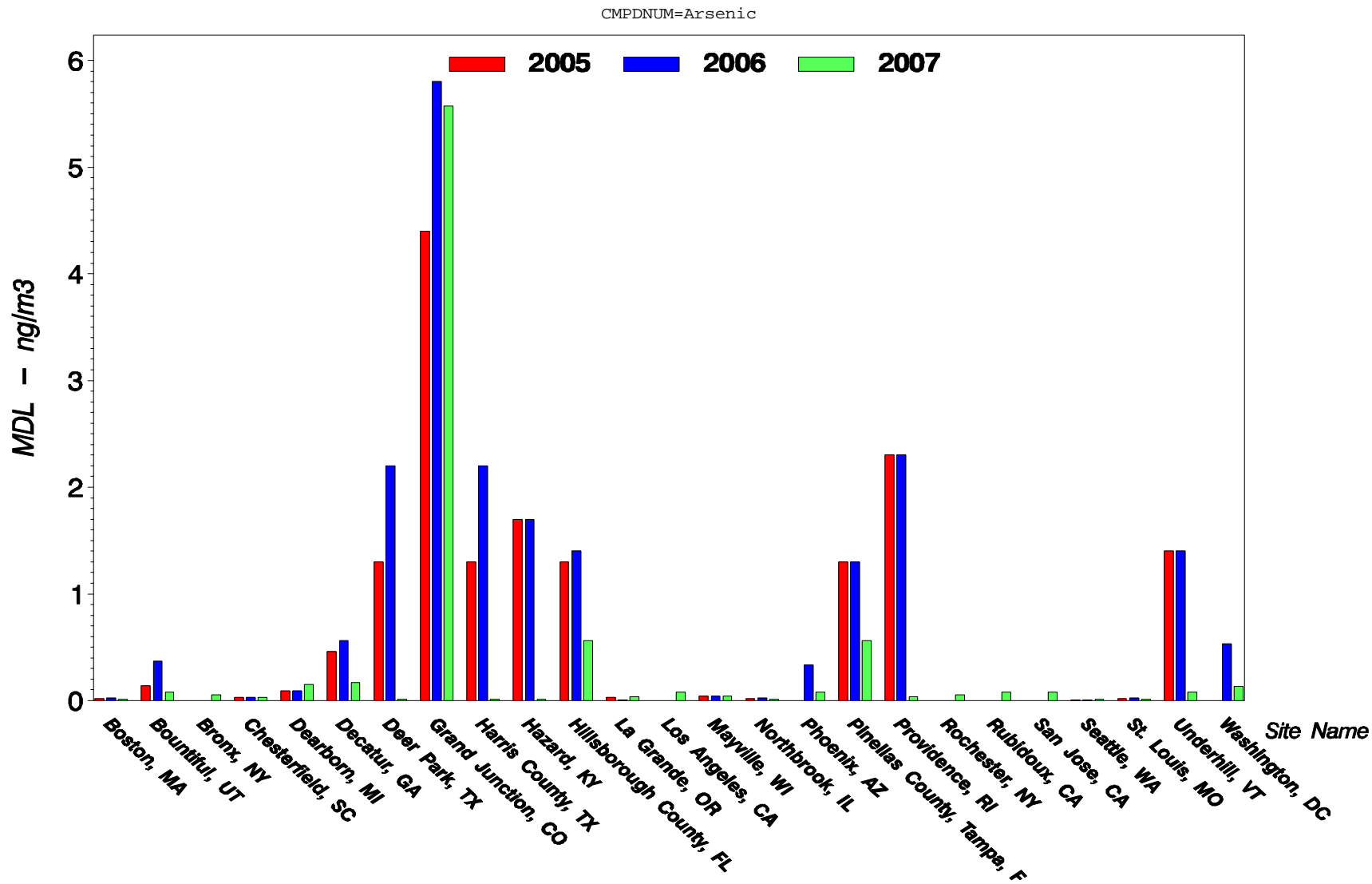
Meeting Objectives: Mean MDLs 2004 - 2007



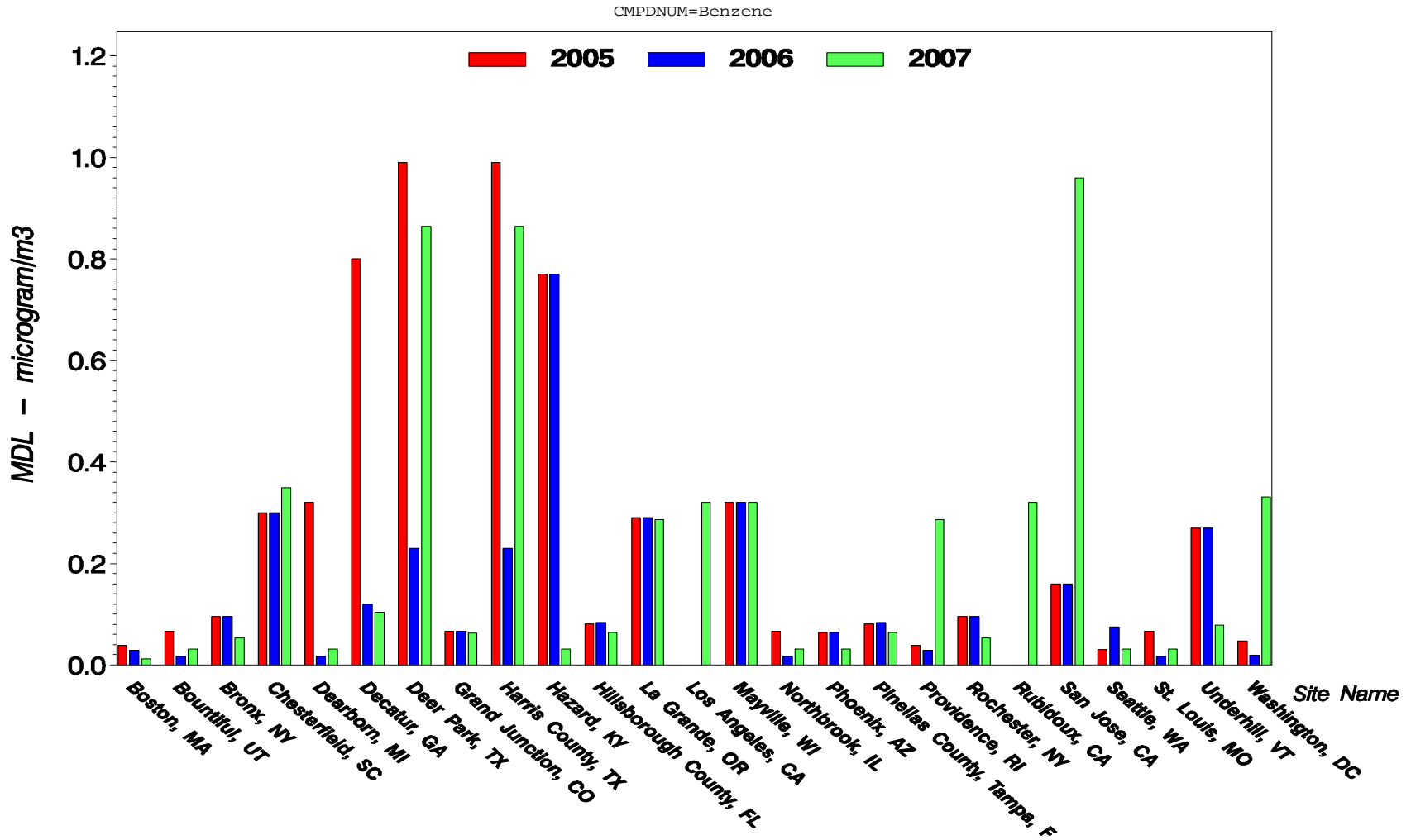
Identifying Problems: DQO compounds 2004 – 2007



MDLs Reported - Arsenic

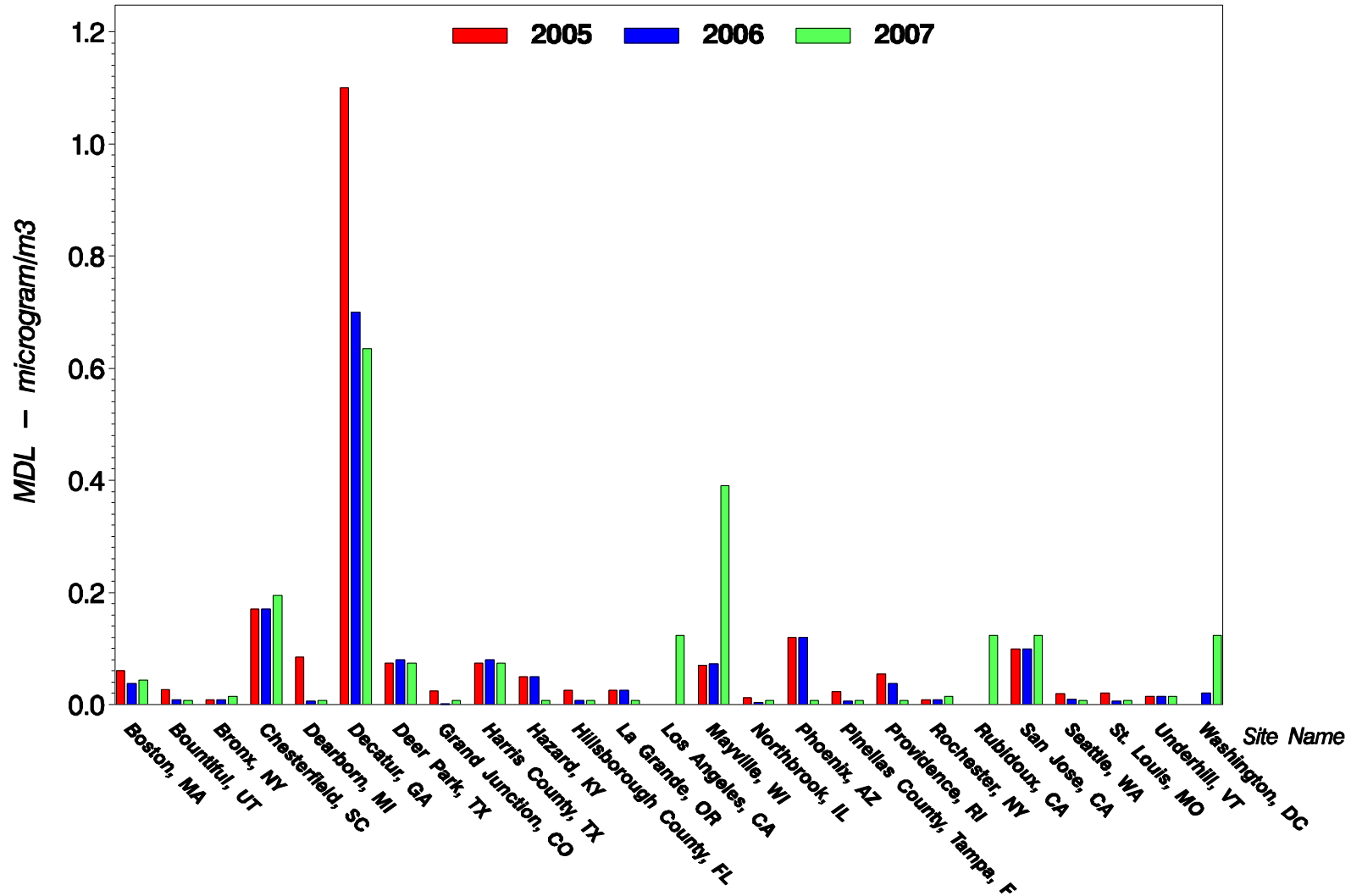


MDLs Reported - Benzene

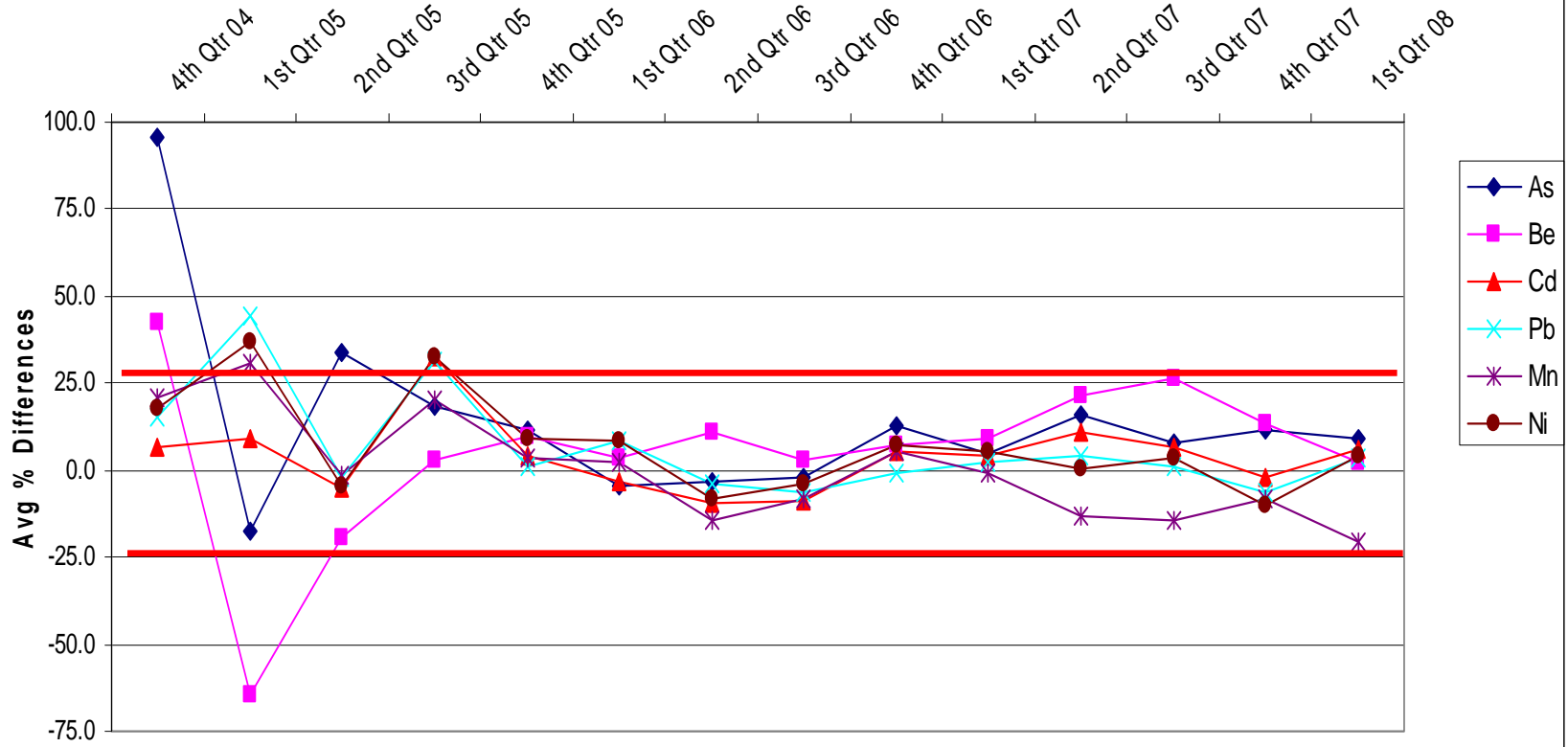


MDLs Reported - Formaldehyde

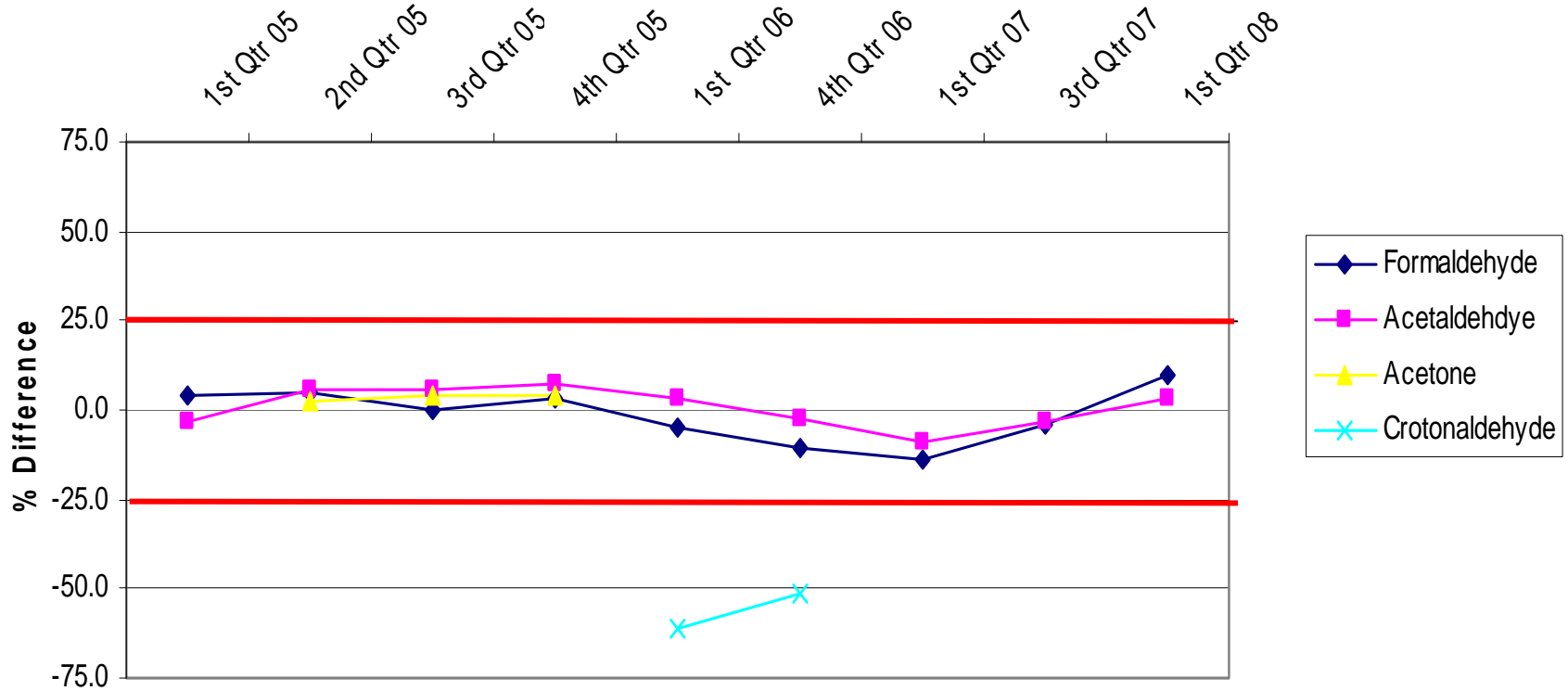
CMPDNUM=Formaldehyde



NATTS PT - Metals Performance

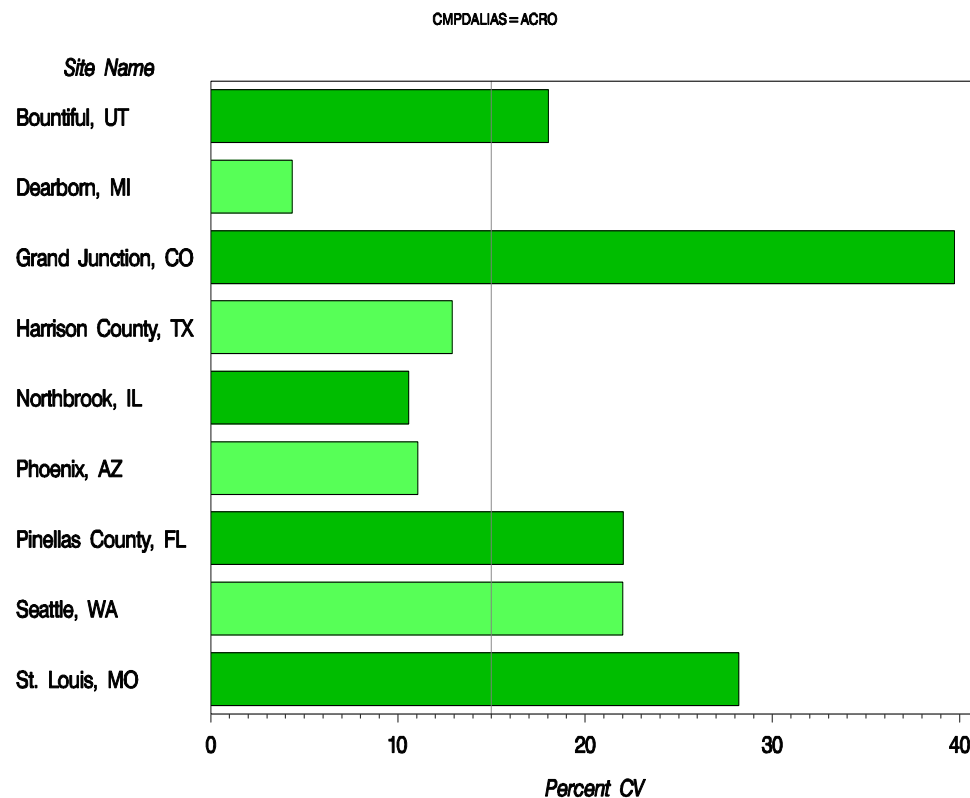


NATTS PT - Carbonyls Performance



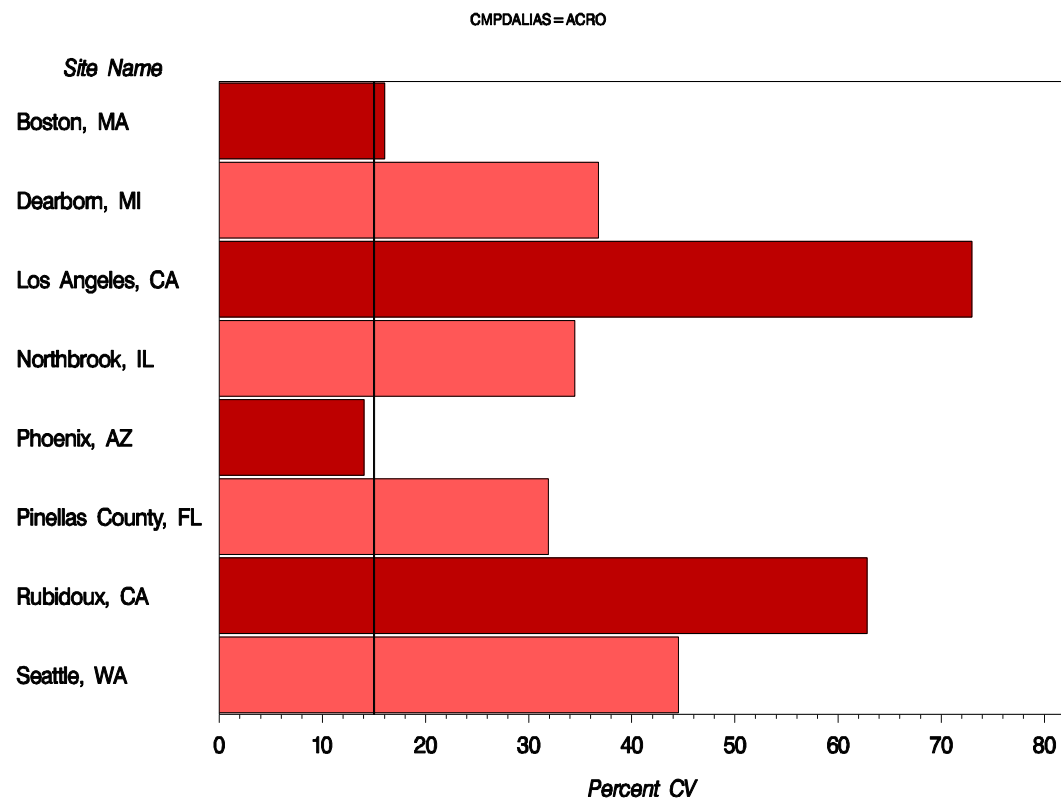
Acrolein QA – Analytical Precision 2007

AQS Site Id.	Site Description	Acrolein
04-013-9997	Phoenix, AZ	11.1 (6)
08-077-0018	Grand Junction, CO	39.7 (12)
12-103-0026	Pinellas County, FL	22 (83)
17-031-4201	Northbrook, IL	10.6 (9)
26-163-0033	Dearborn, MI	4.4 (12)
29-510-0085	St. Louis, MO	28.2 (10)
48-203-0002	Harrison County, TX	12.9 (2)
49-011-0004	Bountiful, UT	18 (12)
53-033-0080	Seattle, WA	22 (14)
Overall Mean^c		20.0 (160)



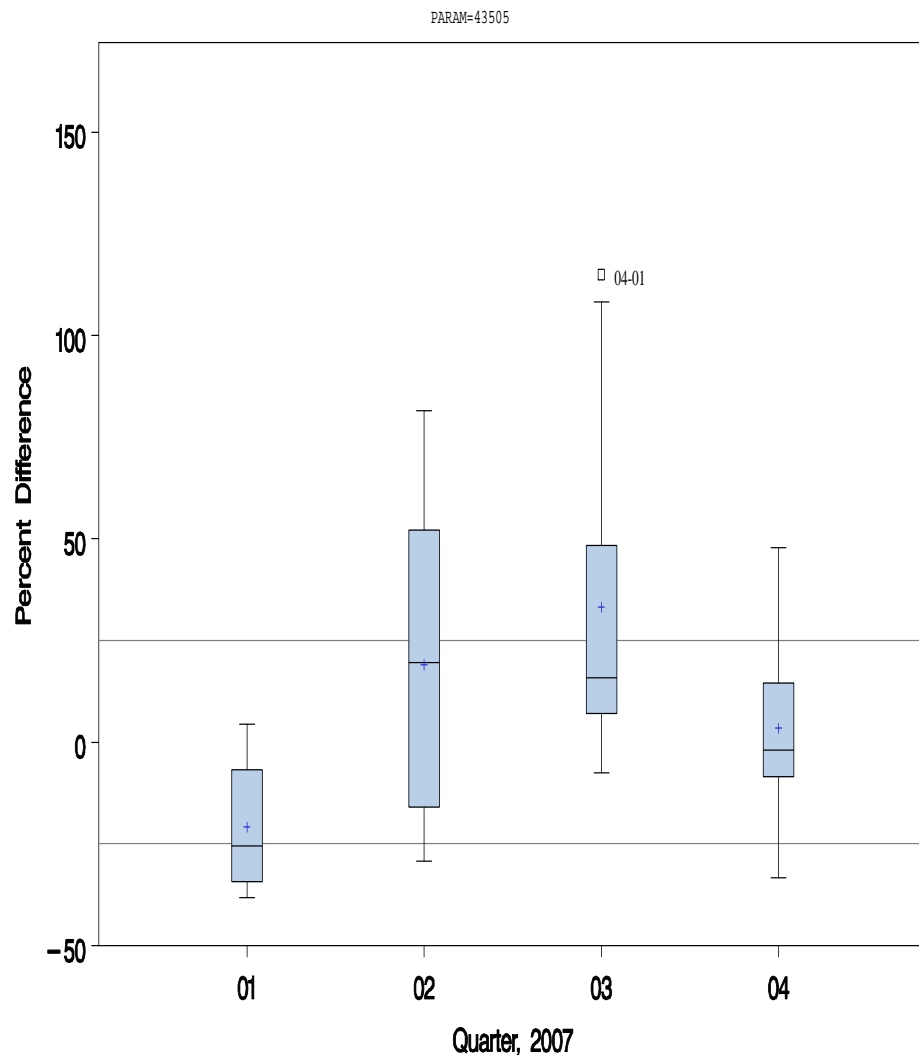
Acrolein QA – Method Precision 2007

AQS Site Id.	Site Description	Acrolein
04-013-9997	Phoenix, AZ	14 (3)
06-037-1103	Los Angeles, CA	73 (21)
06-065-8001	Rubidoux, CA	65.2 (27)
12-103-0026	Pinellas County, FL	31.9 (37)
17-031-4201	Northbrook, IL	34.5 (6)
25-025-0042	Boston, MA	16 (8)
26-163-0033	Dearborn, MI	36.8 (5)
53-033-0080	Seattle, WA	44.5 (7)
Overall Mean		50.4 (114)



Acrolein QA – Bias 2007

Monitoring Station	Acrolein
Providence, RI	-7.04
Underhill, VT	4.80
Queens, NY	2.72
Washington, DC	1.58
Tampa, FL	44.14
Chesterfield, SC	-11.2
Hazard, KY	19.28
Decatur, GA	-4.03
Mayville, WI	50.16
Deer Park, TX	-13.2
San Jose, CA	59.15
Phoenix, CA	5.05
St. Louis, MO	-7.46
Overall Mean^b	10.14

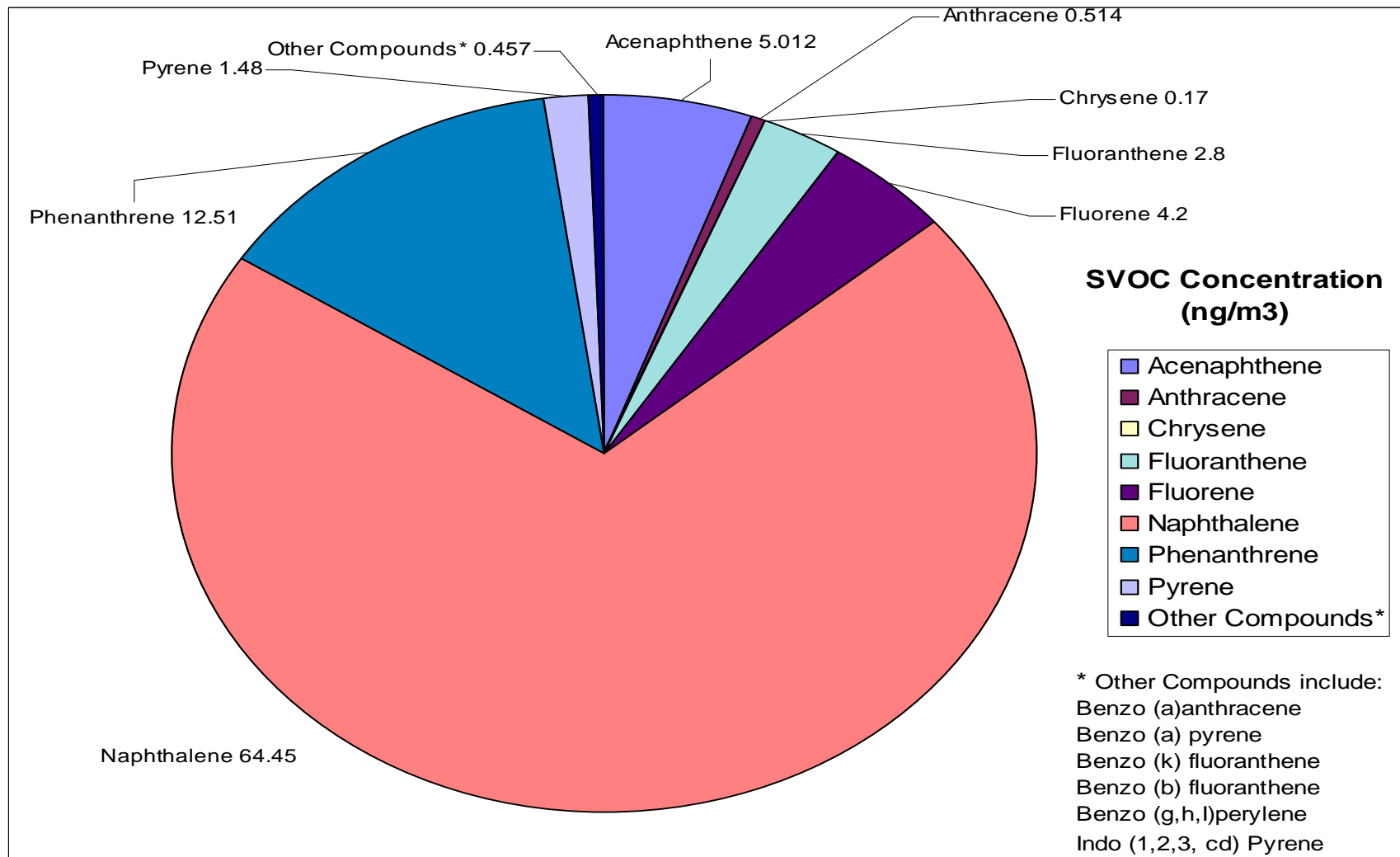




What's New

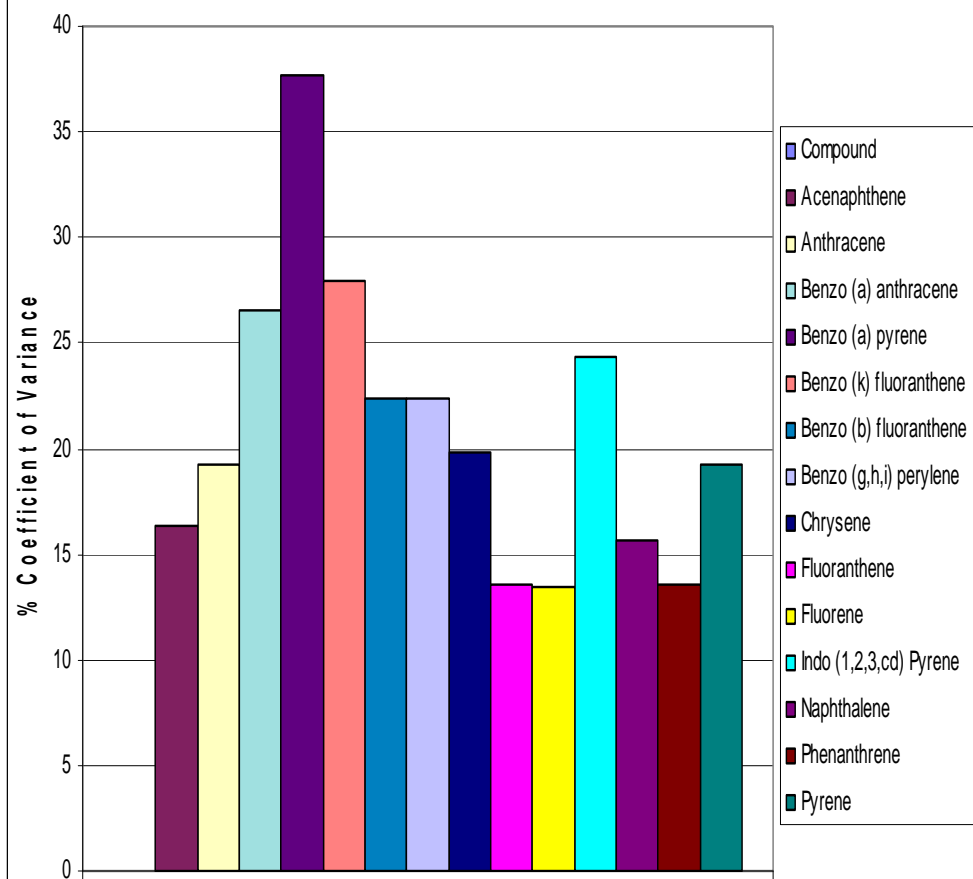
- Hexavalent Chromium (Cr+6)
 - Started in earnest in 2007
 - At this time, haven't pulled the collocated data
 - We have no PT samples yet; scheduled for 2010
- Polycyclic Aromatic Hydrocarbons
 - Started collecting data in earnest in 2008
 - Created two PT samples so far
 - Most recent PT 1st Qtr 2009
 - Results look excellent

PAH compounds by Concentration



PAH Precision Data 2007

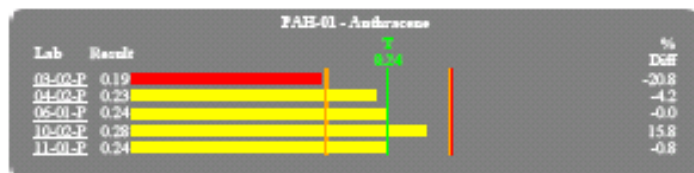
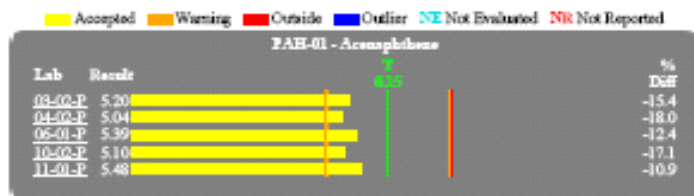
Precision Results of SVOC
TCEQ and ERG Combined
2007



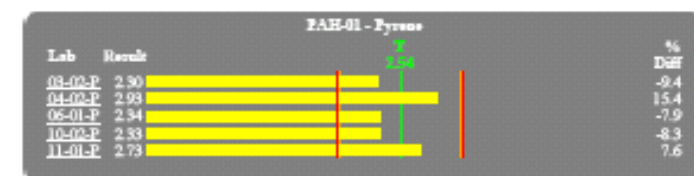
Compound	# of Pairs	Average Concentration (ng/m3)	Coefficient of Variance (%)
Acenaphthene	54	5.012	16.3%
Anthracene	45	0.514	19.2%
Chrysene	57	0.17	19.8%
Fluoranthene	57	2.8	13.6%
Fluorene	57	4.2	13.4%
Naphthalene	57	64.45	15.7%
Phenanthrene	57	12.51	13.6%
Pyrene	57	1.48	19.3%
Benzo (a) anthracene	50	0.069	26.5%
Benzo (a) pyrene	43	0.069	37.7%
Benzo (k) fluoranthene	47	0.094	28.0%
Benzo (b) fluoranthene	47	0.069	22.4%
Benzo (g,h,i) perylene	47	0.086	22.4%
Indo (1,2,3,cd) Pyrene	43	0.07	24.3%

PAH PT Study: 2009

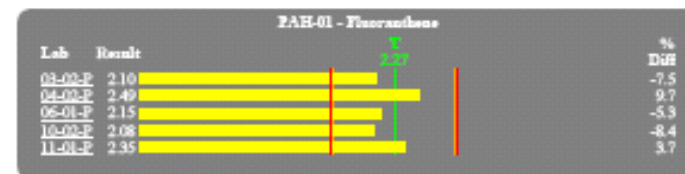
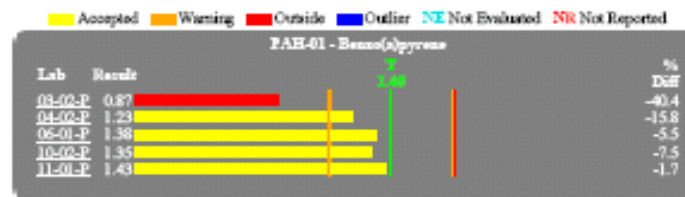
Study Number: 200901-P



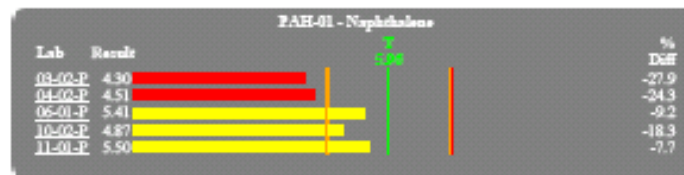
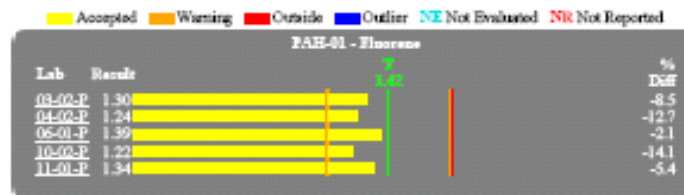
Study Number: 200901-P



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Study Number: 200901-P



Summary: Is the Program Able to Meet the DQOs?

✓ Yes and No

- ✓ The data completeness (2007) is above the required 85%.
Good Job everyone!
- ✓ The detectability for the 4 DQO compounds does not meet the MDLs stated in the DQOs, it appears that this has leveled out.
However, one to two labs drive up the MDLs.
- ✓ The CV data from the collocated/duplicate data illustrates that Overall, we are not meeting CV of less than 15% with the exception of Arsenic. Perhaps, 15% CV is too high, the program can meet 20%
- ✓ The laboratories are meeting the 25% Bias requirement.

Summary: What's Next?

- ✓ **We have added Hexavalent Chromium to the NATTS program - need to create PT samples and begin looking at the Precision**
- ✓ **We have added PAH compounds to the program and we know the P/B and things look good**
- ✓ **We are beginning to understand the realistic quality of HAPS data!**