

**PM_{2.5} and Pb Performance
Evaluation Programs
Current Events**

MARAMA Annual Monitoring
Committee Training Workshop
February 23-24, 2010



At a glance

- Update on Pb-PEP
 - What it is and “ain’t”
 - Schedule
- PM_{2.5}-PEP Recent results
 - Completeness concerns with new metric
 - Bias trend is thought-provoking



Lead (Pb) FRM/FEM Performance Evaluation Program

- Same philosophy as PM_{2.5}—Bias is primary
- Analytical method will be ICP-MS FEM due to sensitivity for lower concentrations
- Samplers will be “state-of-the-art” Hi-vol FRMs

■ PEP Requirements Per PQAO:

- 15% of all sites audited per year; all sites in 6 years
- If 5 sites or less-----5 audits per year
- If >5 sites-----8 sites per year
- At least one of each “monitor type” audited each year, including “regulatory” FEMs and SPMS

Lead (Pb) FRM/FEM Performance Evaluation Program

■ PEP Requirements Per PQAO:

- 5 audits per year
 - 1 collocation with a PEP sampler
 - 4 filters collected from network precision samplers; **sent to PEP Lab**
- 8 sites per year
 - 2 collocations with a PEP Sampler
 - 6 filters collected from network precision samplers; **sent to PEP Lab**



Pb-PEP Implementation Schedule

- SLTs can begin collecting and storing collocated site filters and storing
 - EPA will provide shipping instructions and labels as soon as Lab gains FEM approval
- PEP Lab should get FEM approval for ICP-MS via hot block extraction soon
- Deployment of PEP samplers is expected in second half of 2010
- We & Regions need a good count of Hi Vol sites

Recent PM_{2.5} National FRM
Network BIAS Trends Based
on 2008 Performance
Evaluation Program Findings



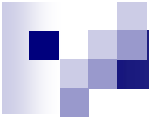
Completeness Goals

Prior to 2007

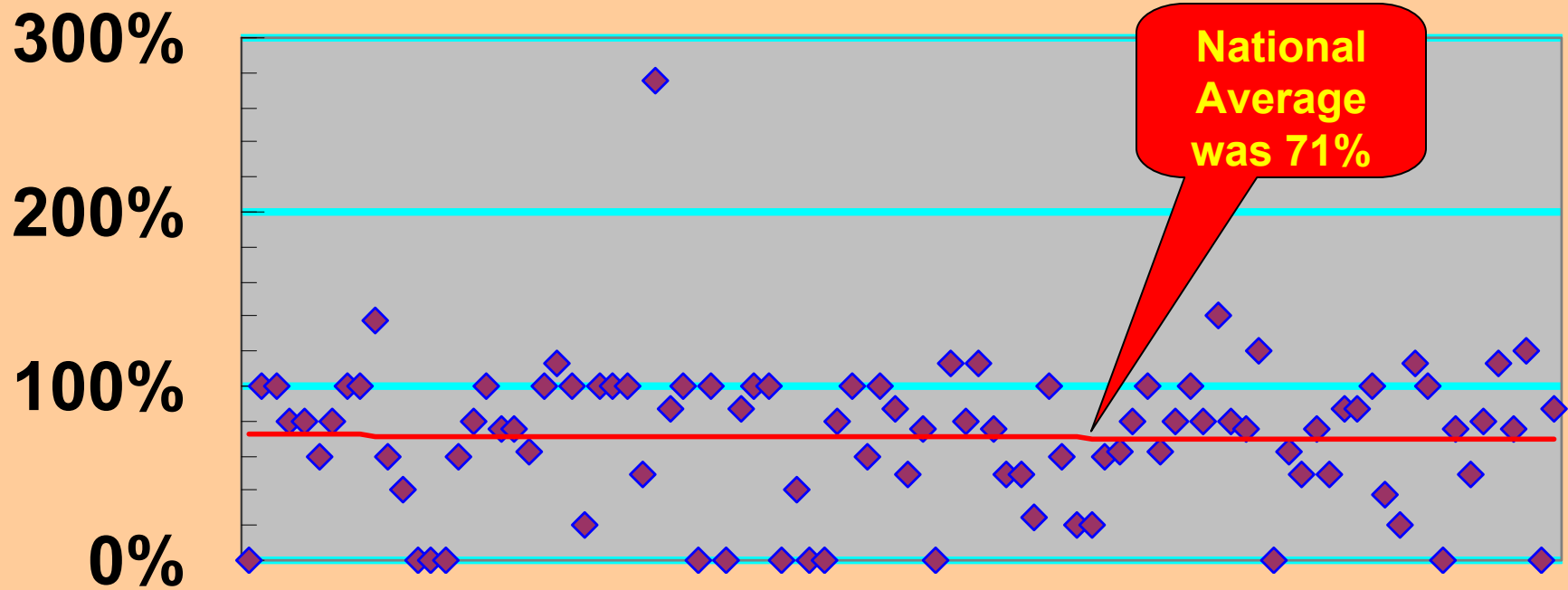
- Each sampler in the selected 25% was audited 4 times each year,
- Generated about 1200 PEP audits per year.
- Completeness criteria—at least 75% of the audits had to be valid.
- PEP Audit presumed valid if both the primary monitor and PEP audit concentration measurements were not invalidated for operational or other reasons, and
- The measured concentrations of both samplers > 6 $\mu\text{g}/\text{m}^3$ for bias statistic
- PEP audits at 25% of every State, local or tribal (SLT) “Reporting Organization’s” network of FRMS,

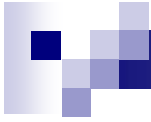
Beginning January 2007

- 15% of all sites in a PQAO are to be audited per year;
- All sites in 6 years
- Some seasonal representation should be scheduled
- All FRM/FEM Monitor types are to be audited
- If PQAO network is ≥ 5 sites-5 audits per year
- If PQAO network is > 5 sites-8 sites per year
- Retained valid operational and measurement requirements
- The lower concentration limit for use in precision and bias calculations was lowered to 3 $\mu\text{g}/\text{m}^3$.

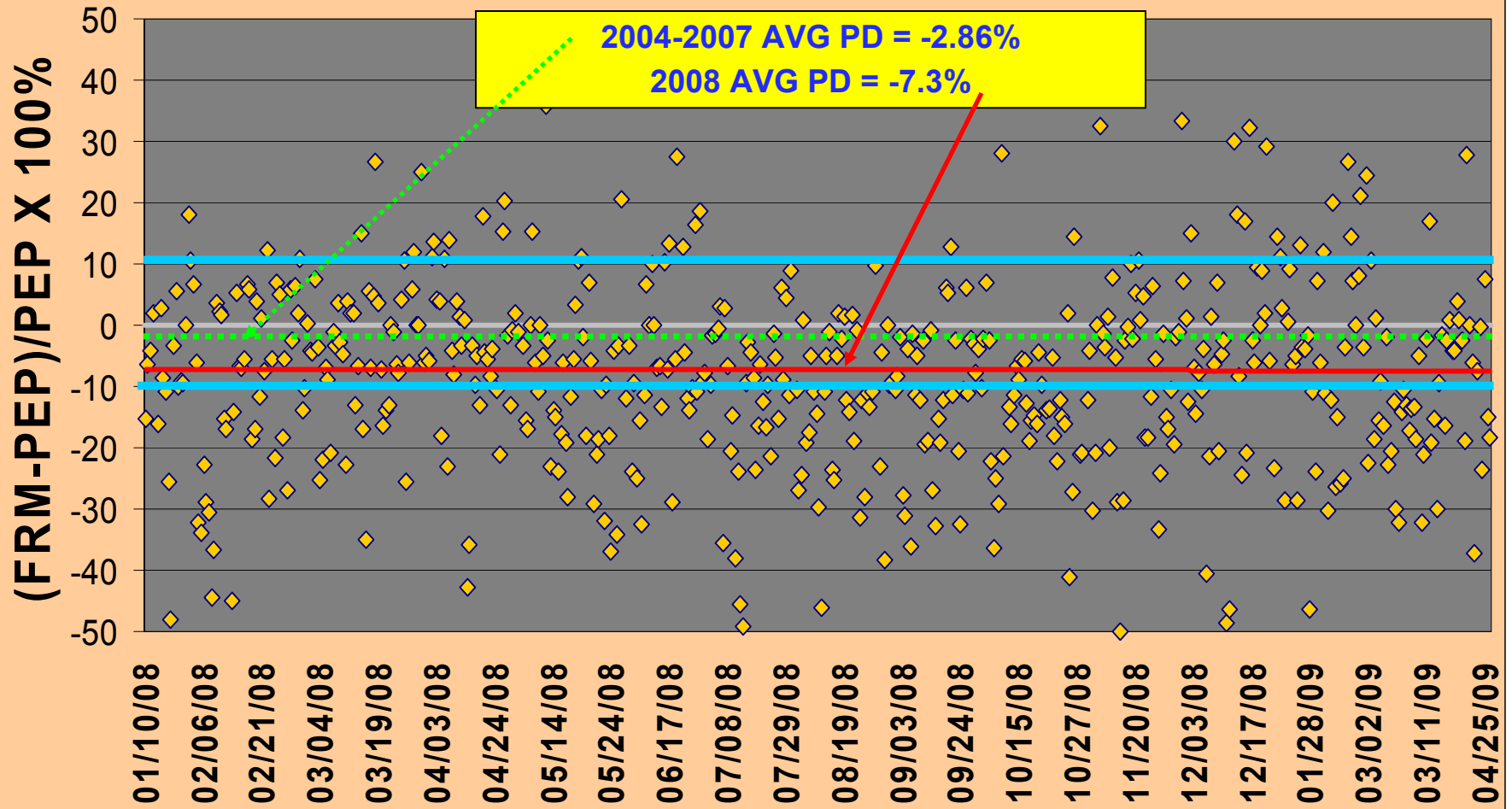


2008 Completeness for All PQAOs

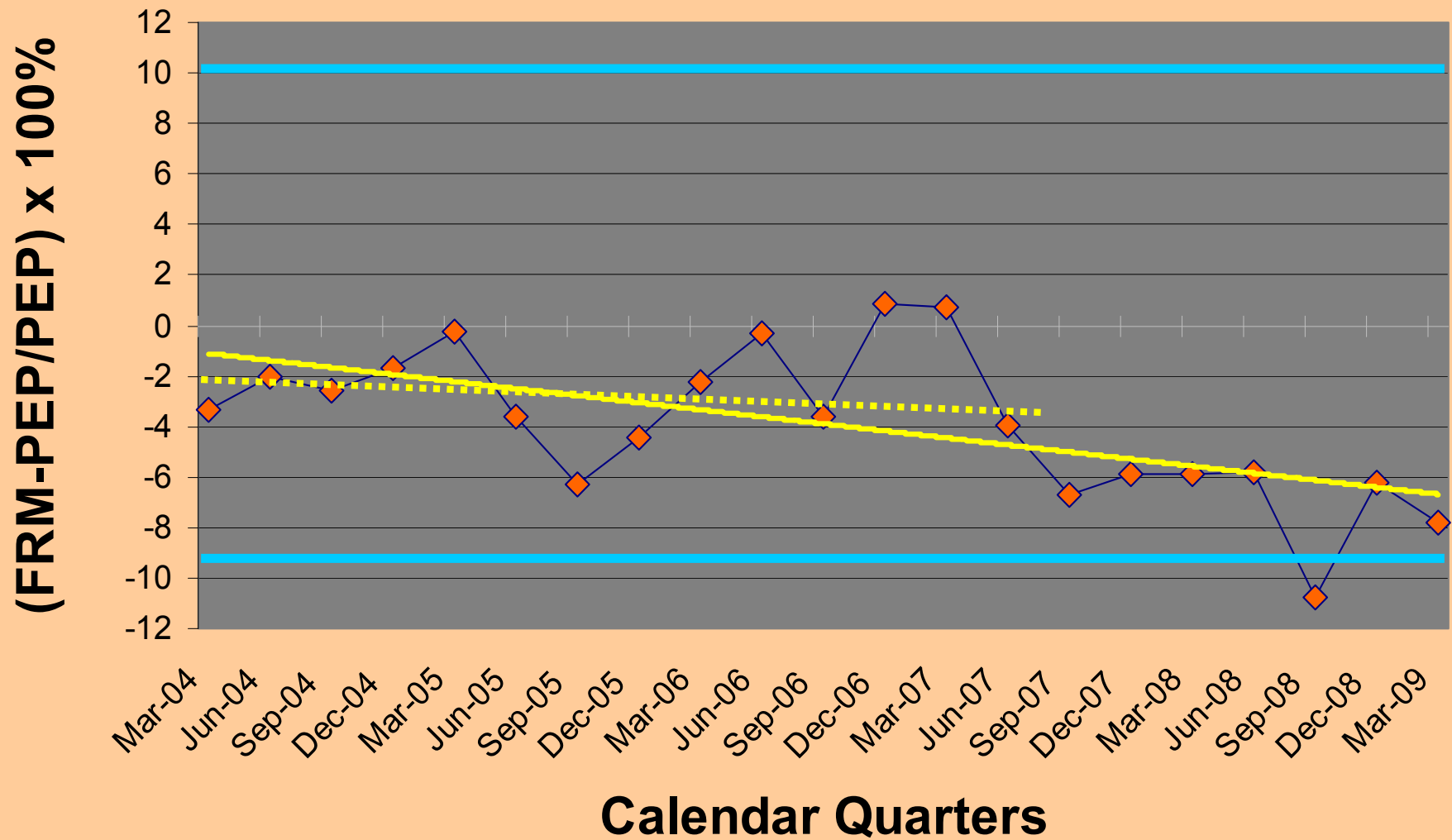




PM_{2.5} Network Bias Jan 08-Mar 09



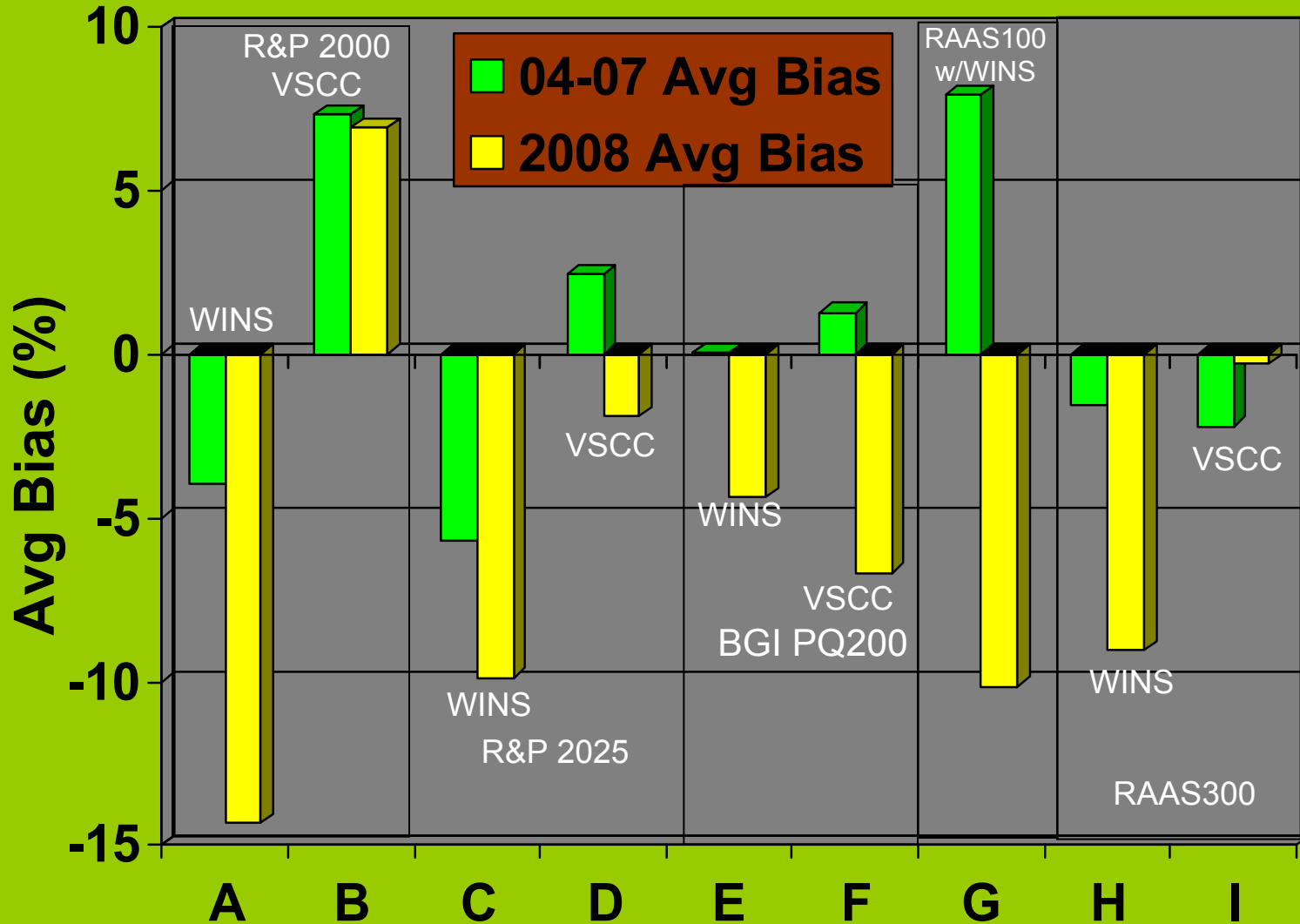
2004--Mar 2009 PM_{2.5} Network BIAS Quarterly Average



Comparison Statistical data 2004-2007 vs 2008-Mar 2009

Time Period	Average Bias (%)	Standard Deviation	Upper Confidence Limit %	Lower Confidence Limit %	Fraction < -30%	Fraction > 30%	Fraction < -50%	Fraction < 50%
'04 – '07	-2.86	16.35	-2.36	-3.35	3.67 %	3.64 %	0.58 %	1.23 %
'08 – 03/09	-7.28	19.82	-5.87	-8.70	8.08 %	2.07 %	0.75 %	0.94 %

Comparison of Historical Sampler Bias to 2008





Conclusions:

1. Bias of the PM_{2.5} Network is exhibiting a downward trend that is approaching the DQO of -10%.
2. Numerous Primary Quality Assurance Organizations experienced a significant excursion beyond the DQO in 2008, and most were in the negative direction indicating the PEP samplers were more often measuring higher concentrations than the Network FRMs.
3. The variability of the individual bias values is significantly higher in 2008 and most were in the negative direction indicating the PEP samplers were more often measuring higher concentrations than the Network FRMs.



Conclusions:

4. The PM2.5 PEP experienced a 20% loss of data in 2008, which is consistent with historical performance; however, it may have a more profound impact on the variability of bias, since the number of PEP audits has dropped by over 50%.



Conclusions:

5. Much work needs to be done to understand the trend in bias and to determine if the loss of PEP data is crucial to bias assessment