NLA CEMS Task Force

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Environmental Committee Meeting

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Recap: Cement MACT Organic Hazardous Air Pollutants (HAPs)

- Based on data from 11 CEMS-equipped kilns
  - 30 days of data collected from each kiln (PCA: increased variability with smaller data sets)
- Floor based on best performing 12% (2 kilns)
  - Average emissions from 2 top kilns = 5.2 ppm
  - Adjusted to account for variability; 99th percentile
  - Standard = 24 ppm (30-day rolling avg., 7% O_2)
- Standard applies during start-up, shutdown, and malfunction periods

Why Form a CEMS Taskforce?

- Revised Lime MACT will likely include organic HAPs standards
- For lime, CO will be surrogate for organic HAPs rather than THC
  - No THC CEMS in lime industry
  - CO used in the Boiler MACT
- Six CO CEMS-equipped lime kilns, at 4 plants representing 3 companies
  - Absent NLA Advocacy, floor will be based on one kiln

CEMS Taskforce: Initial Charter

- Representatives from the 3 companies with CO CEMS-equipped kilns participated
- CO, NOx and opacity CEMS data analyzed
  - This presentation focuses solely on CO results
- Examined the trade-off of a longer averaging period (30-day) vs. lower numeric limit
  - Goal: determine which scenario resulted in fewest exceedances

Characteristics of Evaluated Kilns

- Two pre-heaters, one straight rotary
- All utilize low organic, hical stone
- Low NOx levels
  - below 3.95 lb/ton lime on 30-day rolling average
- All have bluff body burners
- One kiln relatively new & operating below capacity

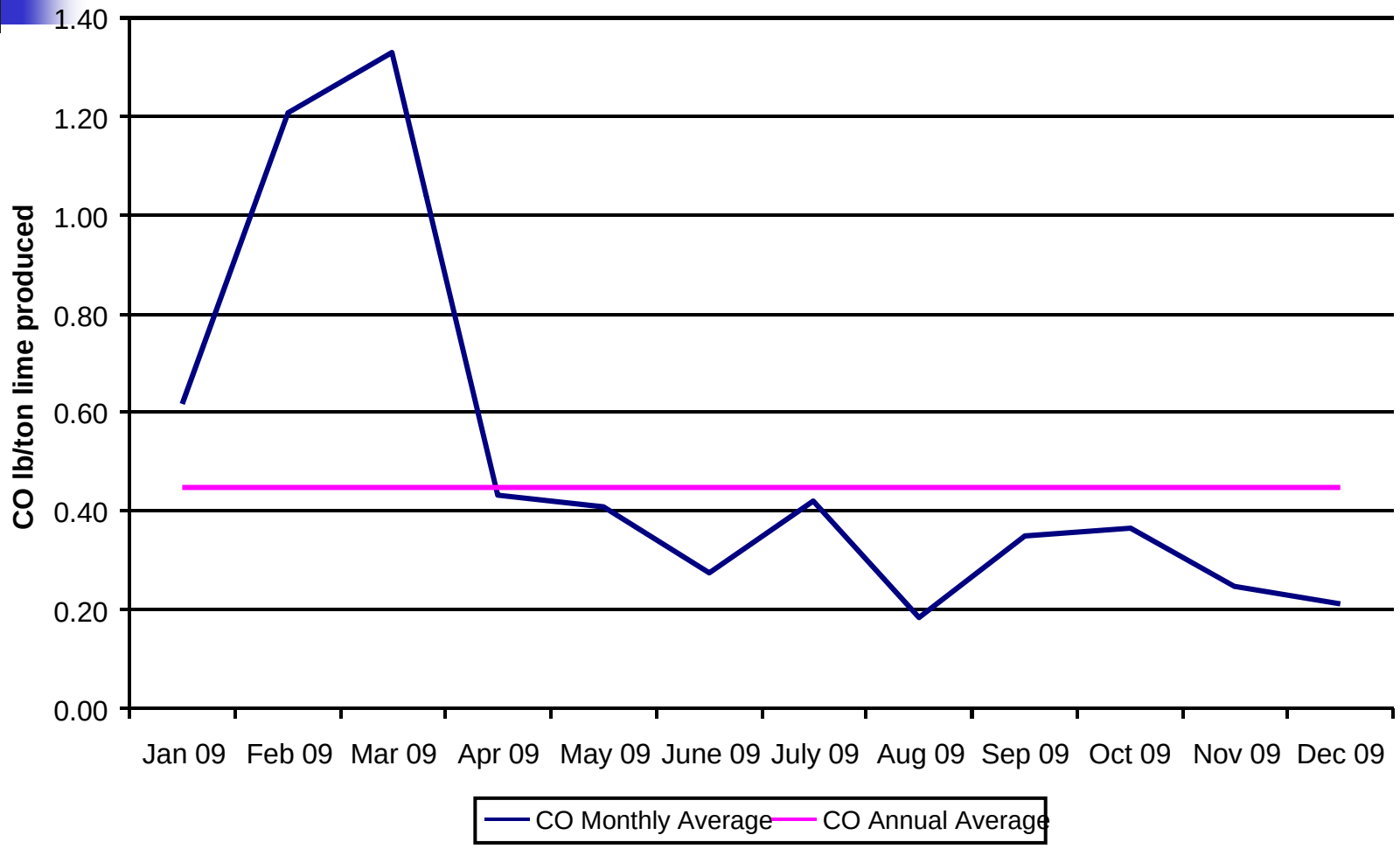
Round 1:
Based on Proposed Cement MACT

- To account for long term variability of best performers, EPA used a statistical method due to small dataset
  - *Predict* permit limit where 99% of future readings would fall below
- NLA Task Force used an Avg + 3 SD approach
  - Similar to EPA's approach (next slide)

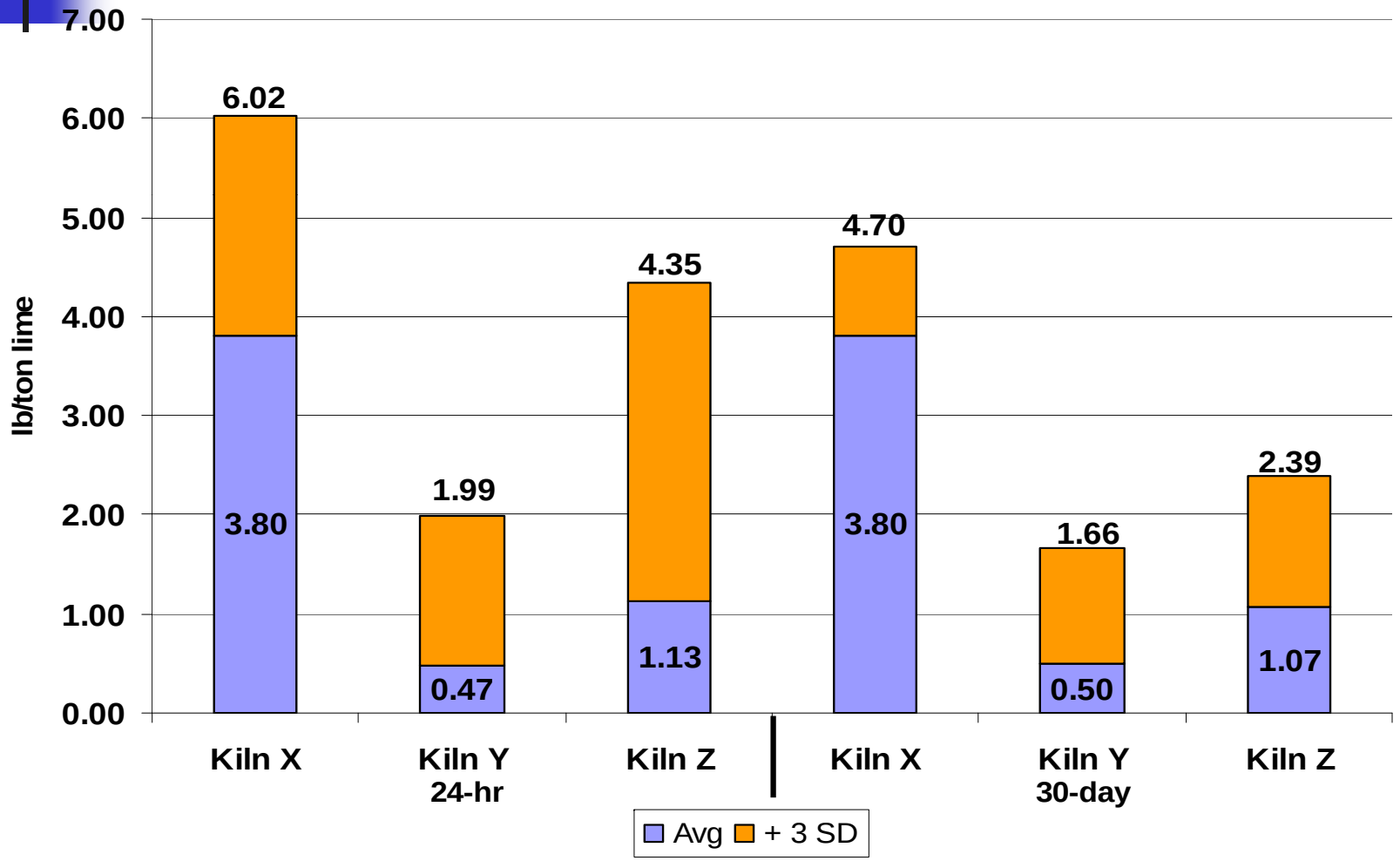
NLA Data Analysis

- 12 continuous months of data evaluated from each participating company
  - Excluded data points from SSM, monitor malfunction, and analyzer calibration periods
- CO data normalized to lb/ton lime
- Computed 30-day rolling averages on all kilns; block averages evaluated for one kiln
- Average plus three standard deviations (Avg. + 3 SD) used as rough proxy for 99th percentile

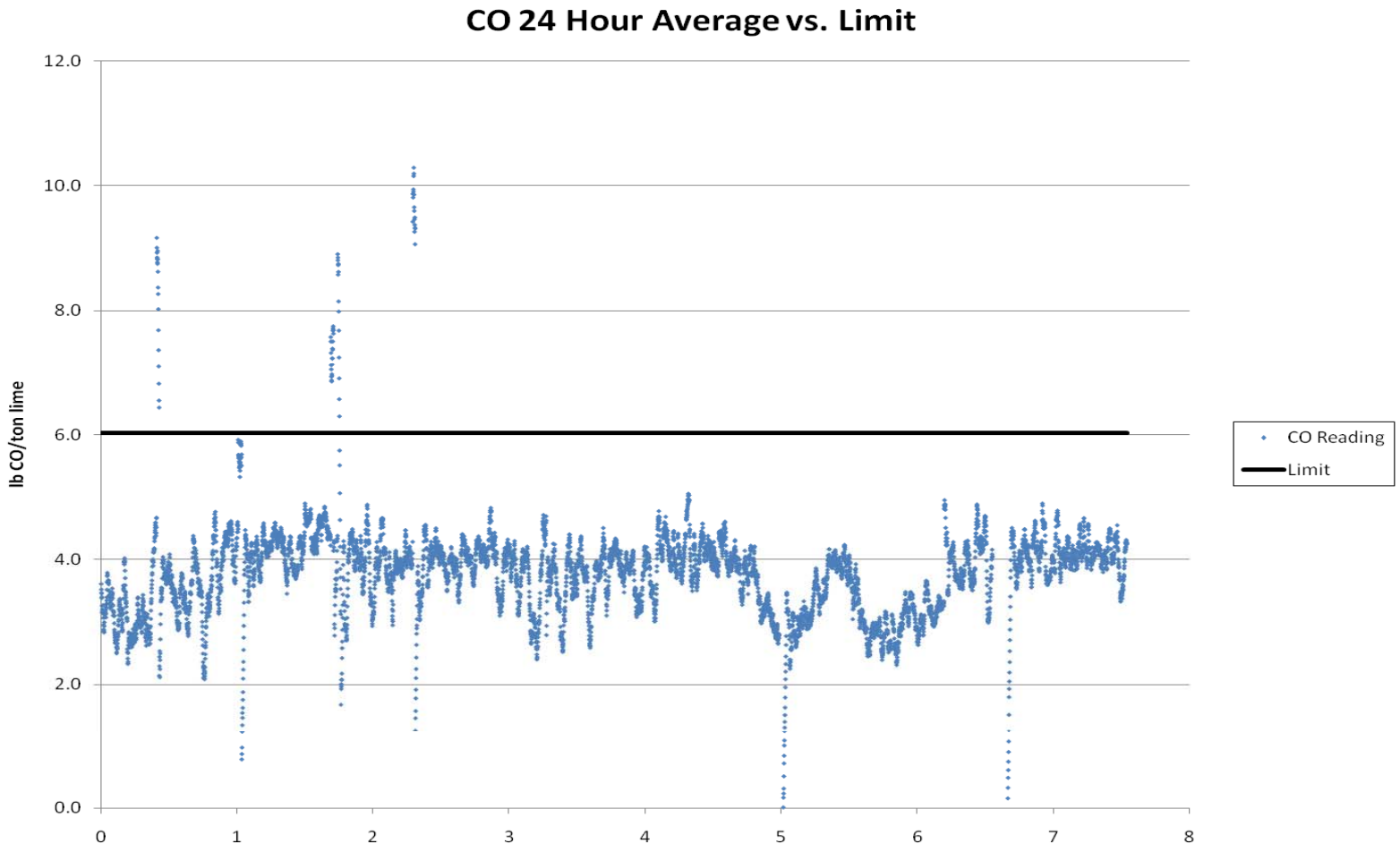
Hourly, Monthly, Annual CO lb/ton lime



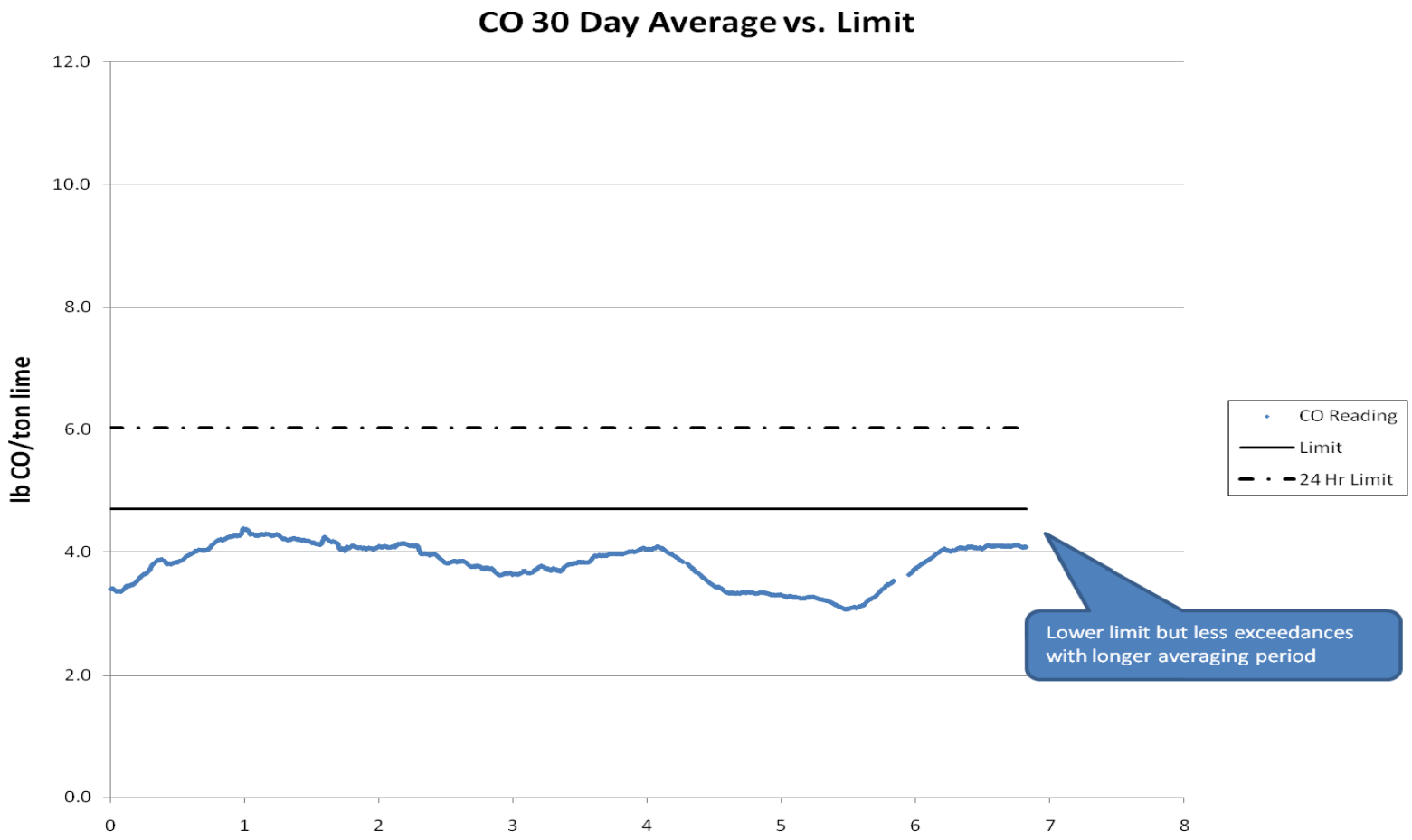
CO lb/ton lime Avg. + 3 SD Emission Comparisons



24-hr Averages vs. Avg+3 SD Limit



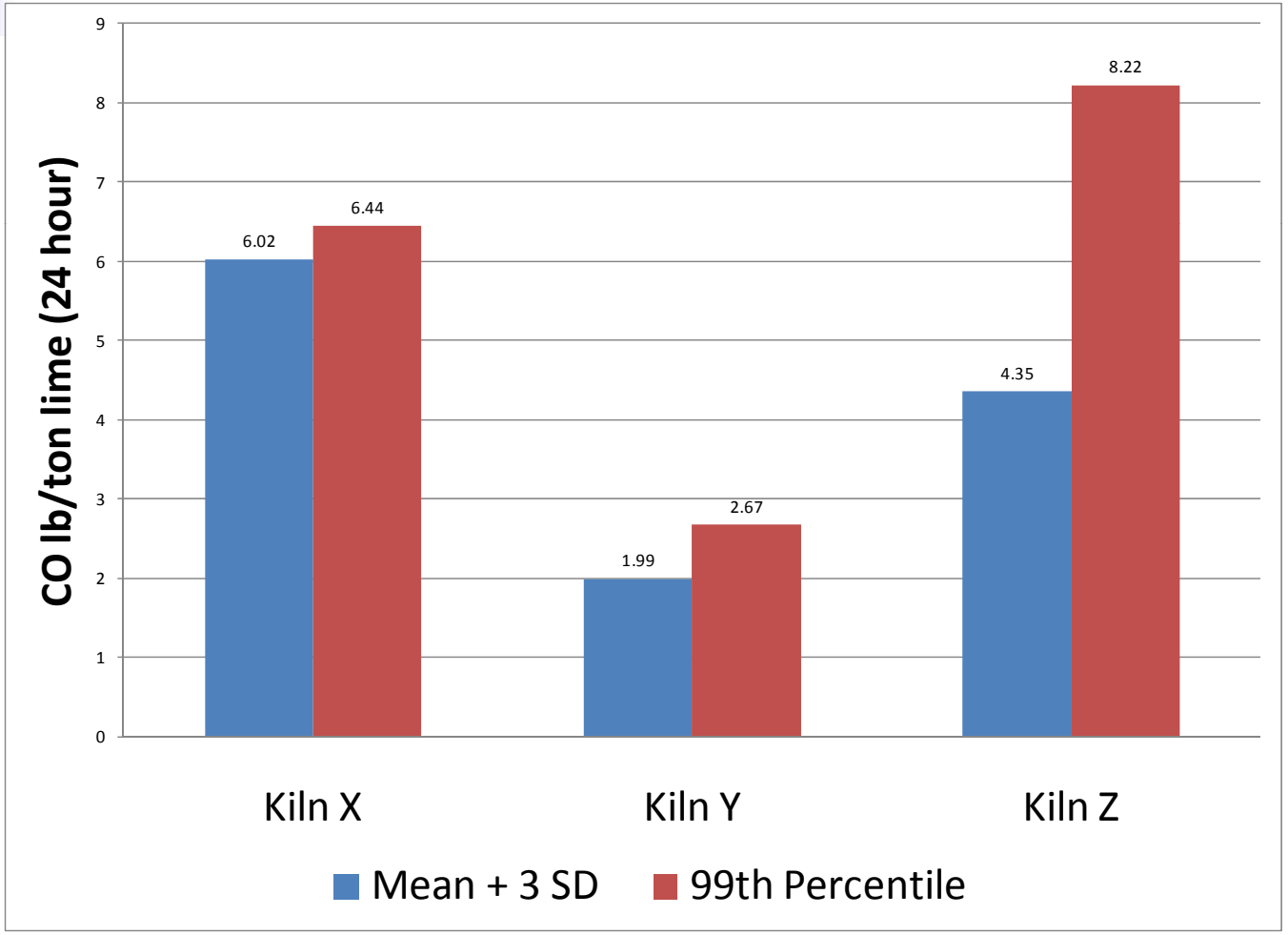
30-day Averages vs. Avg+3 SD Limit



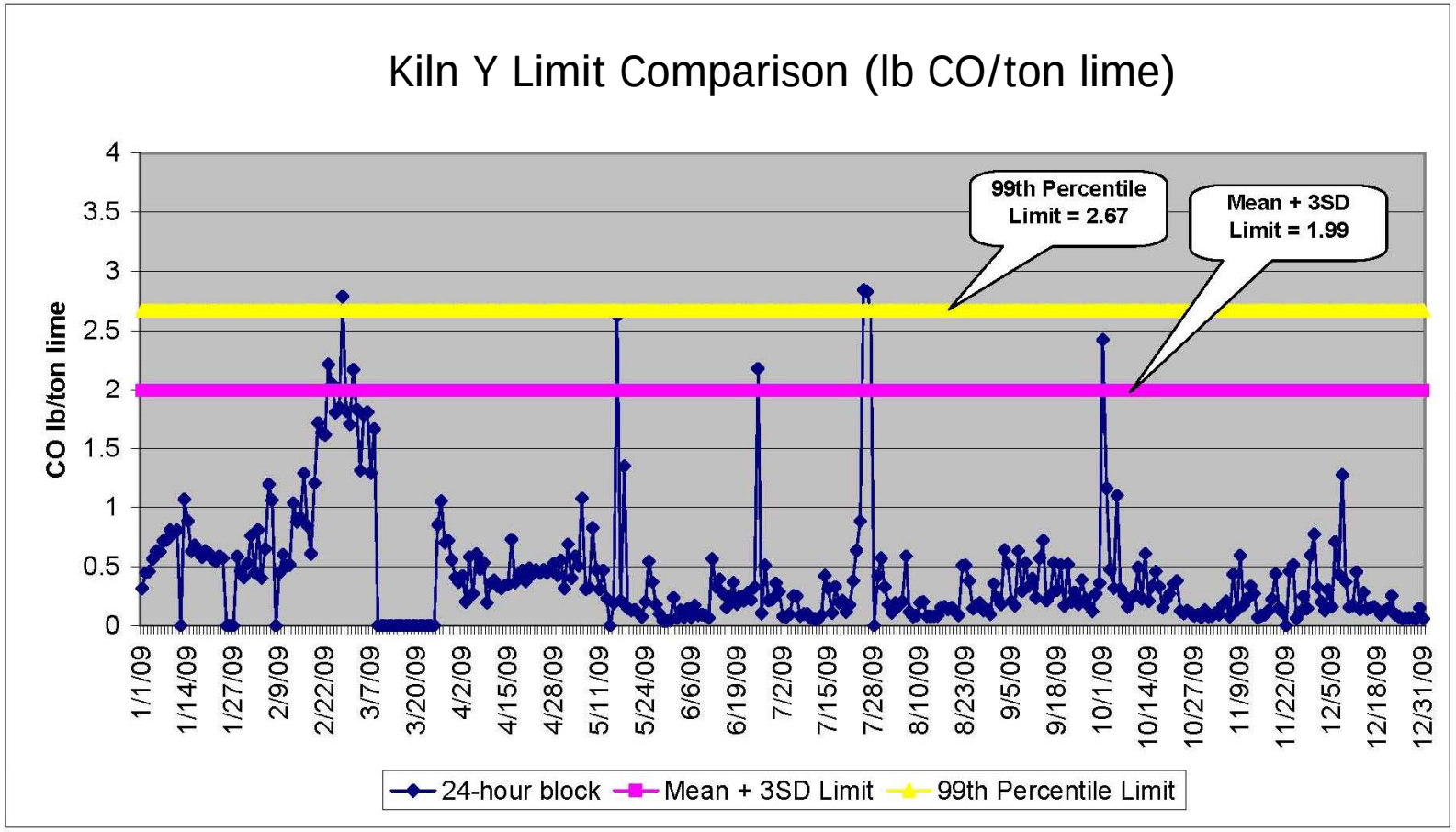
Round 2: Based on Final Cement MACT

- PCA submitted larger dataset
- EPA changed method to reflect real data
  - *Directly calculate* 99th percentile
- Task Force likewise used EPA's new approach
  - Exactly like EPA's approach

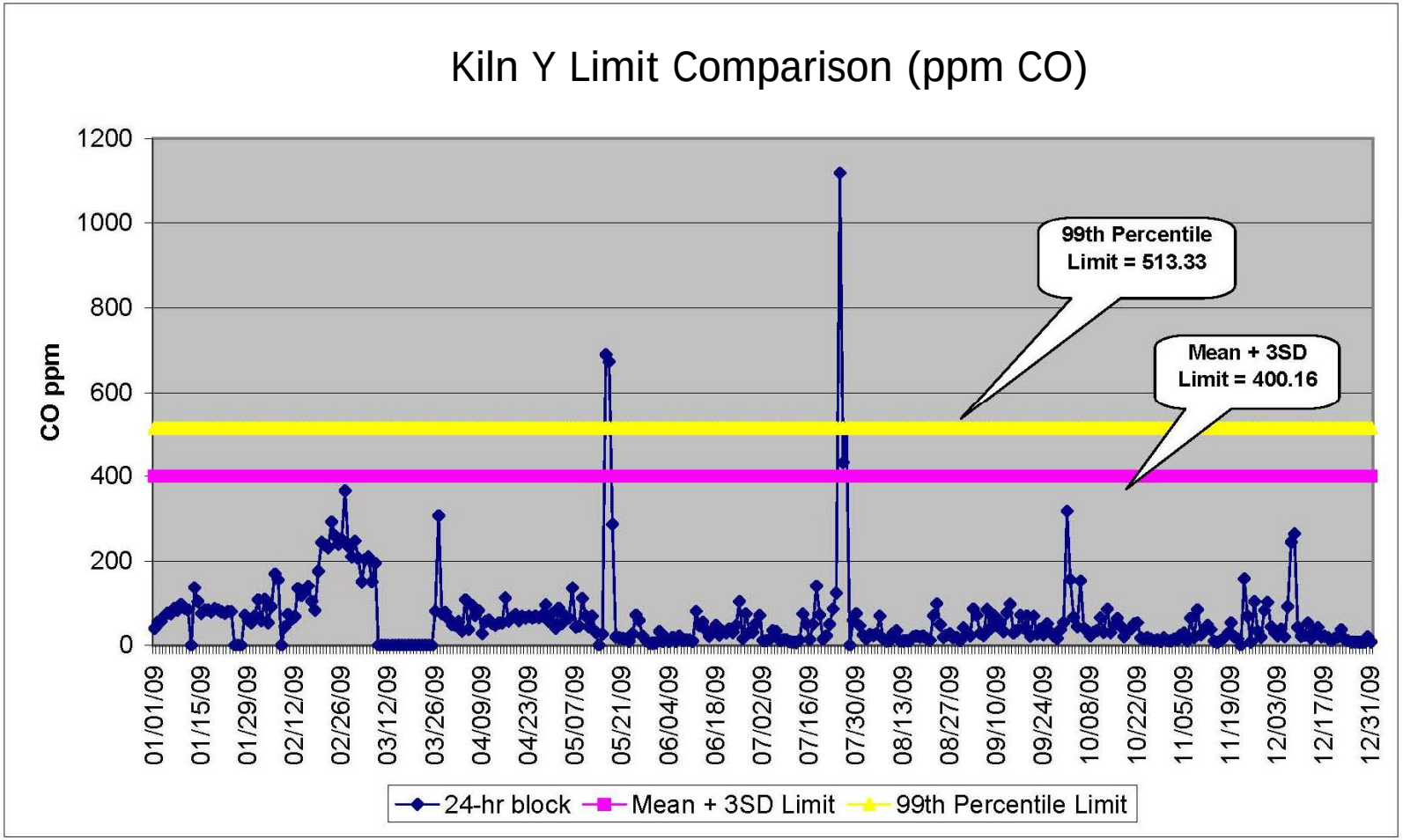
Method Matters



CO lb/ton lime



CO ppm


Kiln Y Limit Comparison (ppm CO)
CO ppm
1200
1000
800
600
400
200
0
99th Percentile Limit = 513.33
Mean + 3SD Limit = 400.16
01/01/09
01/15/09
01/29/09
02/12/09
02/26/09
03/12/09
03/26/09
04/09/09
04/23/09
05/07/09
05/21/09
06/04/09
06/18/09
07/02/09
07/16/09
07/30/09
08/13/09
08/27/09
09/10/09
09/24/09
10/08/09
10/22/09
11/05/09
11/19/09
12/03/09
12/17/09
12/31/09
24-hr block
Mean + 3SD Limit
99th Percentile Limit

Analysis Conclusions

- Similar kilns can have significantly different average CO emissions and data variability
- Evidence suggests longer averaging period even with lower numeric limit could result in fewer exceedances
- Based on evaluation of “best” performing kiln, MACT floor (30-day rolling avg) would be
  - 1.66 CO lb/ton lime – “predicted” 99th percentile
  - 2.67 CO lb/ton lime – calculated 99th percentile

Something to Ponder

- Limit set at 99th Percentile
- Conversely 1% of emissions will be in violation

Ongoing Discussions

- New entrants to the Task Force, primarily operations personnel
  - Provide expertise on kiln design, fuel availability, and product specs for future interactions with EPA
- Kiln Y's low emissions and small data spread
  - PID loops?
- Kiln X's relatively high emissions
  - Organic content of stone?
    - to be measured w/ modified ASTM test method
  - Operations below capacity?
  - Absence of stack O_2 analyzer?

Next Steps

- Examine emissions during startup
- Scrutinize data exclusion approaches for monitor malfunction/calibration periods
- Analyze emissions from kilns higher organic content stone
- Further investigate averaging periods
  - Evidence suggests move to longer roll period or block averages may further decrease number of exceedances
- Eventually may need to retain statistician

NLA CEMS Task Force Contributions

- Each participant committed valuable resources to this phase of the project, including data gathering & standardization, computations, and results presentation
- Collaboration of participants allowed a means for the group to evaluate existing data in a manner similar to EPA method for setting MACT limits
- Each company equally shared throughout the process, which created a mutual learning environment

Thank You Task Force Members!