Reinhold Environmental Ltd.

2007 APC Round Table & Expo Presentation

July 8-10, 2007
Chattanooga, TN
Hosted by TVA

Experience With PM Monitors in Wet Stacks

APC/PCUG Conference

July 10, 2007

Dominion Generation

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Dominion

Dominion

- Dominion is one of the nation's largest producers of energy.
- About 26,500 megawatts of power generation, in 10 States
- 6,000 miles of electric transmission

Dominion

The nation's largest natural gas storage system, with more than 965 billion cubic feet of storage capacity.

- Nations Largest LNG Import Facility

Why

- Dominion's "Regulated" Plants in Virginia and West Virginia, VEPCo Entered Consent Decree to Settle Alleged PSD Issues with EPA and Some Northeastern States
- Consent Required Installation of PM CEMS on 9 Units

When

- Three Units Monitored By End of 2004
- Two Years to Demonstrate Successful / Unsuccessful Operation
- Two Additional Units Monitored in Each Year 2007, 2008 and 2009

Where

- Mt Storm Units 1 and 2 Common Stack (Two Units)
  - Consent Specified Mt Storm Units
- Chesterfield 5
  - Clean Dry Stack with Good Access

Mt Storm 1 & 2

- Each Unit 551 MW, CE 8 Corner Tangential Coal
- Each Unit SCR, ESP, Wet FGD
- Stack Inside Diameter = 38 Ft
- Closed 6 Ft Annulus
- Port Pipes 8 Ft Long

What - Mt Storm - MSI BetaGuard

- Wet Stack Has Few Options
- MSI Has Good Reputation in CEMS
- MSI Had Several System Operating on Wet Stacks in US
- System Appeared Complex But Well Designed

How - Mt Storm - MSI BetaGuard

- Dominion Managed All Engineering, Design, Installation Startup and Testing
- 5X8 Shelter Installed on CEMS Platform
- 13 Ft Heated Probe In 8” Port, 30 Ft Heated Umbilical
- Fiber Optic Communication to Remote Display and CEMS ESC 8832 Datalogger

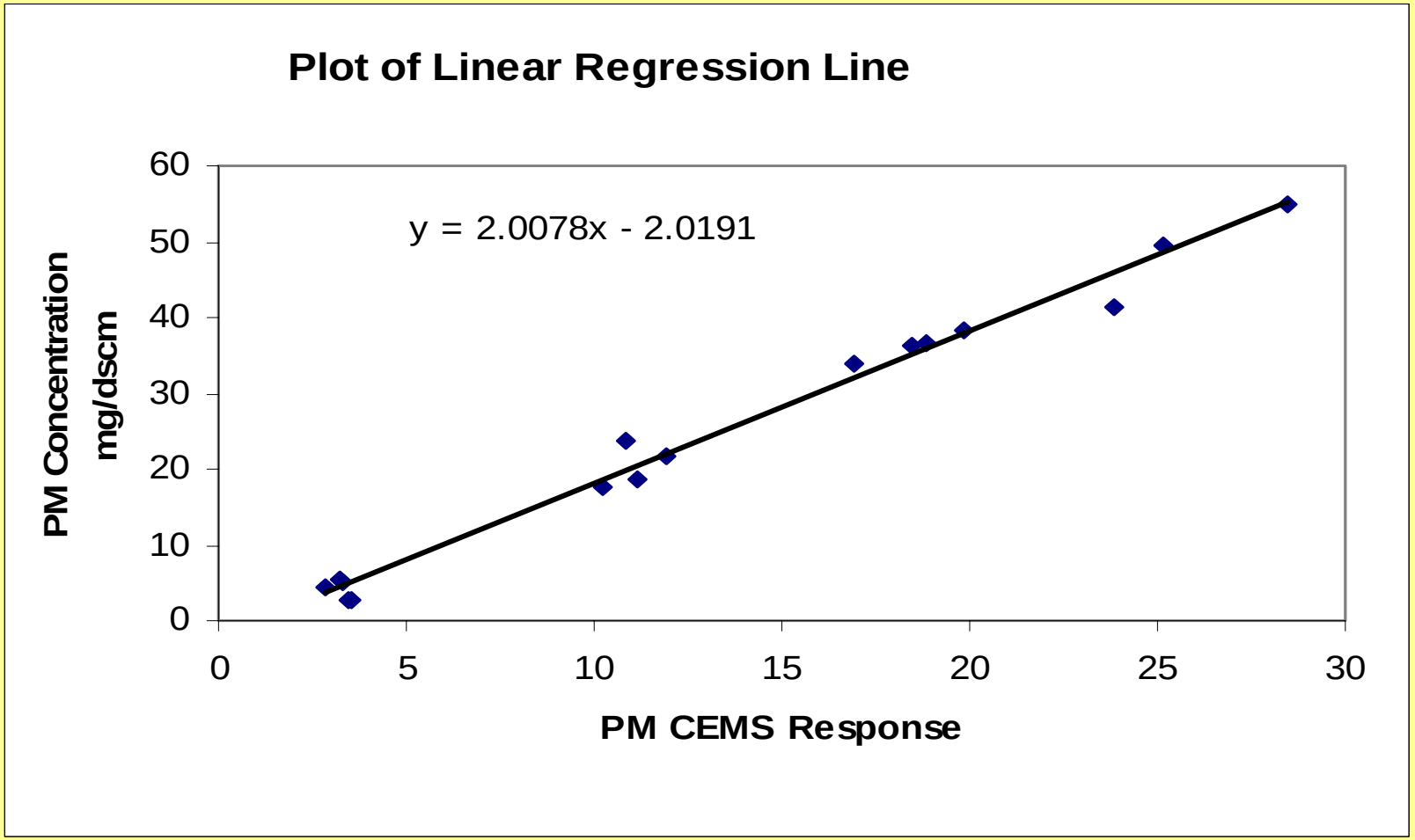
How - Mt Storm - MSI BetaGuard

- Total Cost $625K
  - PM Monitor Cost: $145K
  - Auxiliary Equipment Costs: $45K
  - Platform Mods, Shelter and Stack Port : $215K
  - Installation Costs: $55K
  - Engineering, Design and Consultants: $70K
  - Testing Costs: $95K

Correlation Testing - Mt Storm - MSI BetaGuard

- PM Limit 0.05 lb/mmBtu (55 mg/dscm)
- Protocol Based on PS11
- Used Paired R&P TEOM 7000 Systems
- 6 Runs Low Level 2.75 - 5.45 mg/dscm
- 5 Runs Mid Level 17.74 - 23.76 mg/dscm
- 7 Run High Level 34.05 - 54.77 mg/dscm
- FGD Out of Service During Mid and High

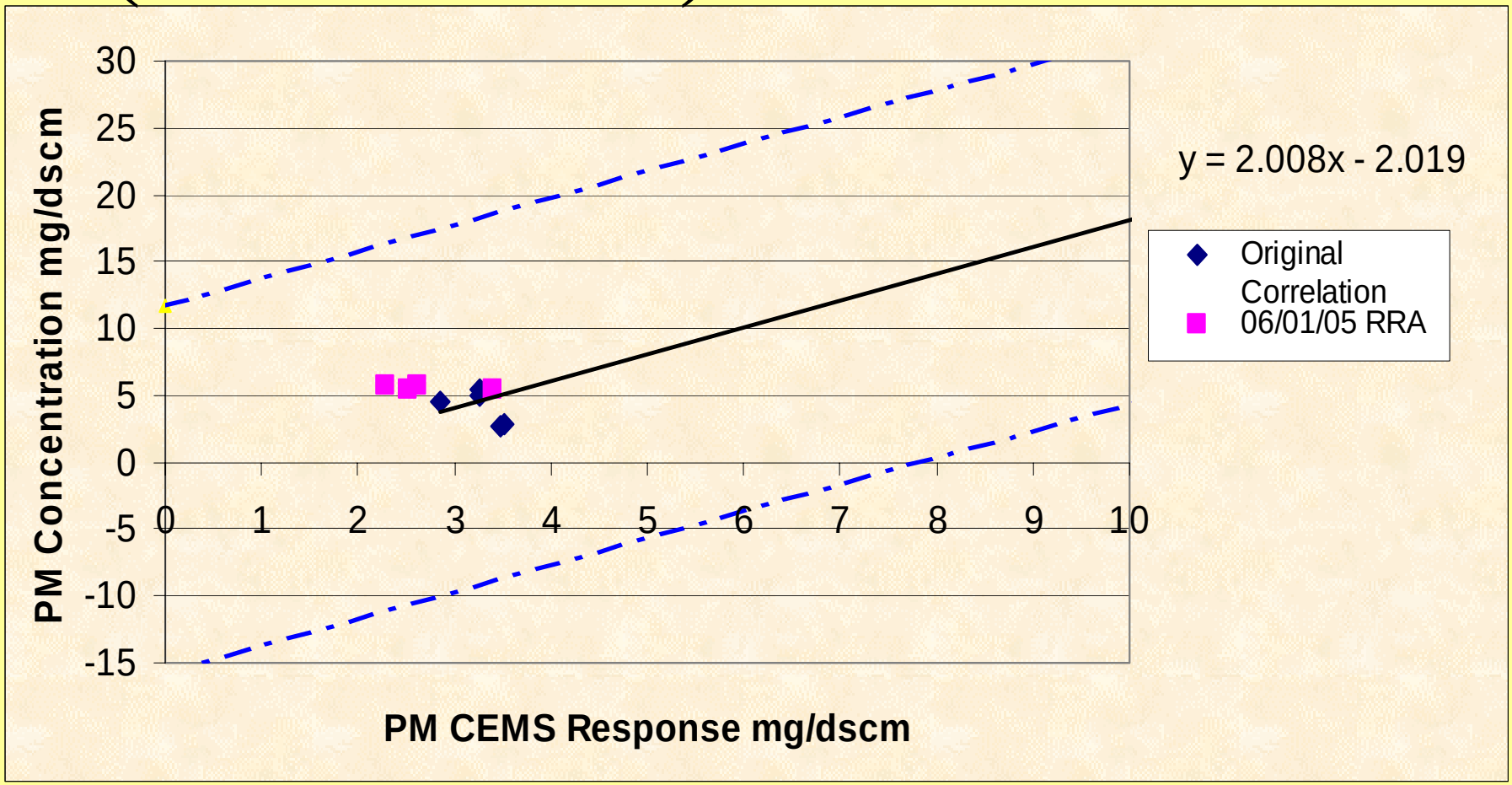
Correlation - Mt Storm



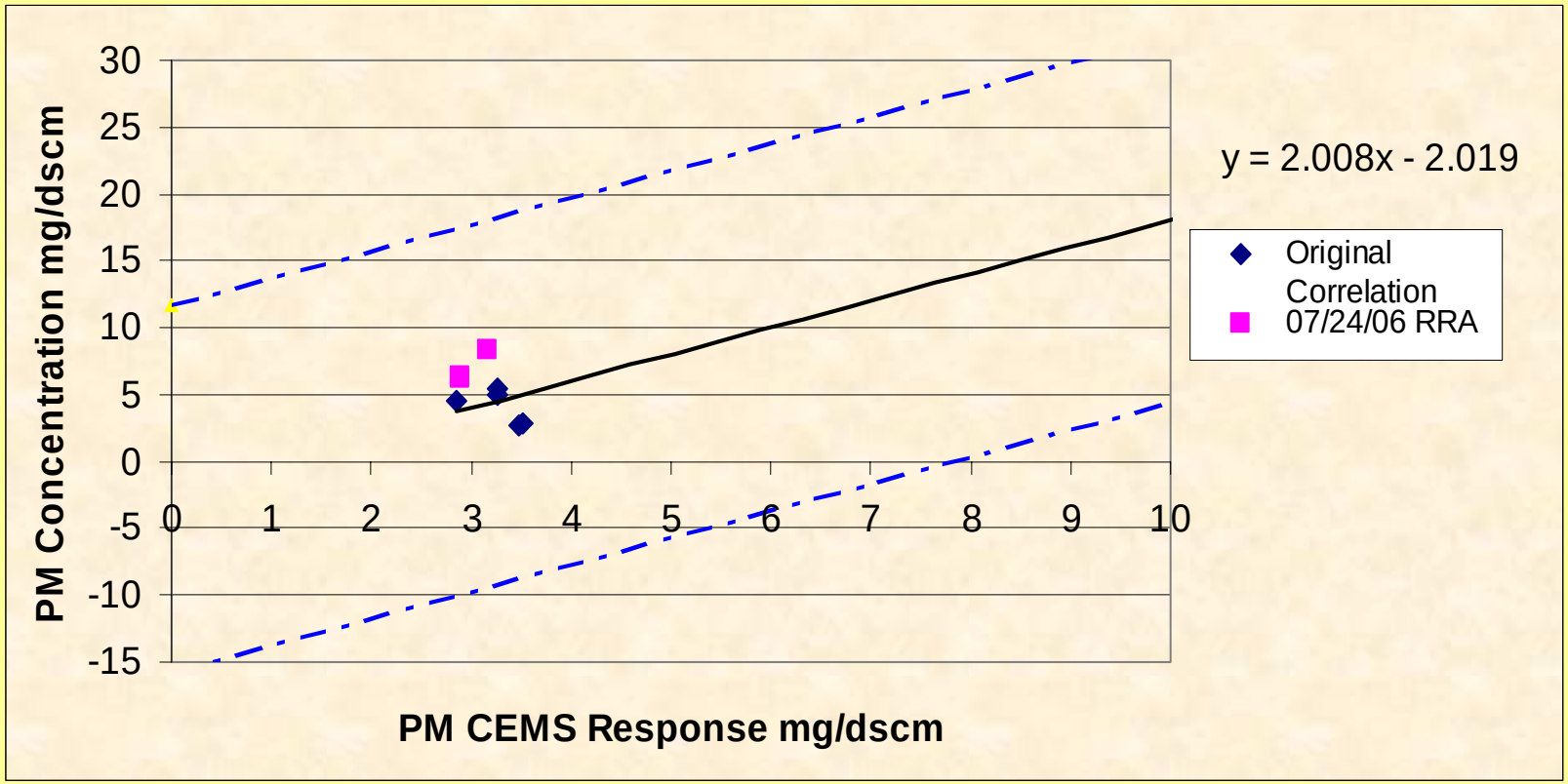
PM CEMS QA

- Quarterly Absolute Correlation Audit (ACA)
- Quarterly Sample Volume Audit (SVA)
- Annual Relative Response Audit (RRA)
- Response Correlation Audit (RCA) every 5 Years

RRA 2005 - Mt Storm MSI (Paired Method 5)



RRA 2006 - Mt Storm MSI (Paired Method 5)



Operation - Mt Storm - MSI BetaGuard

- Official Start Date 11/17/04
- Hours of Operation in 2006 = 8588
- Total Up Time = 84.1%
- Malfunction Down Time = 8.0%
- QA and Cal Down Time = 7.9%
- Average Emissions = 4.16 mg/dscm or 0.004 lb/mmBtu

What's Next

- Reduce Probe Pluggage
- RCA in 2008

- Prepare to install 2007, 2008 and 2009 Monitors

What's Next

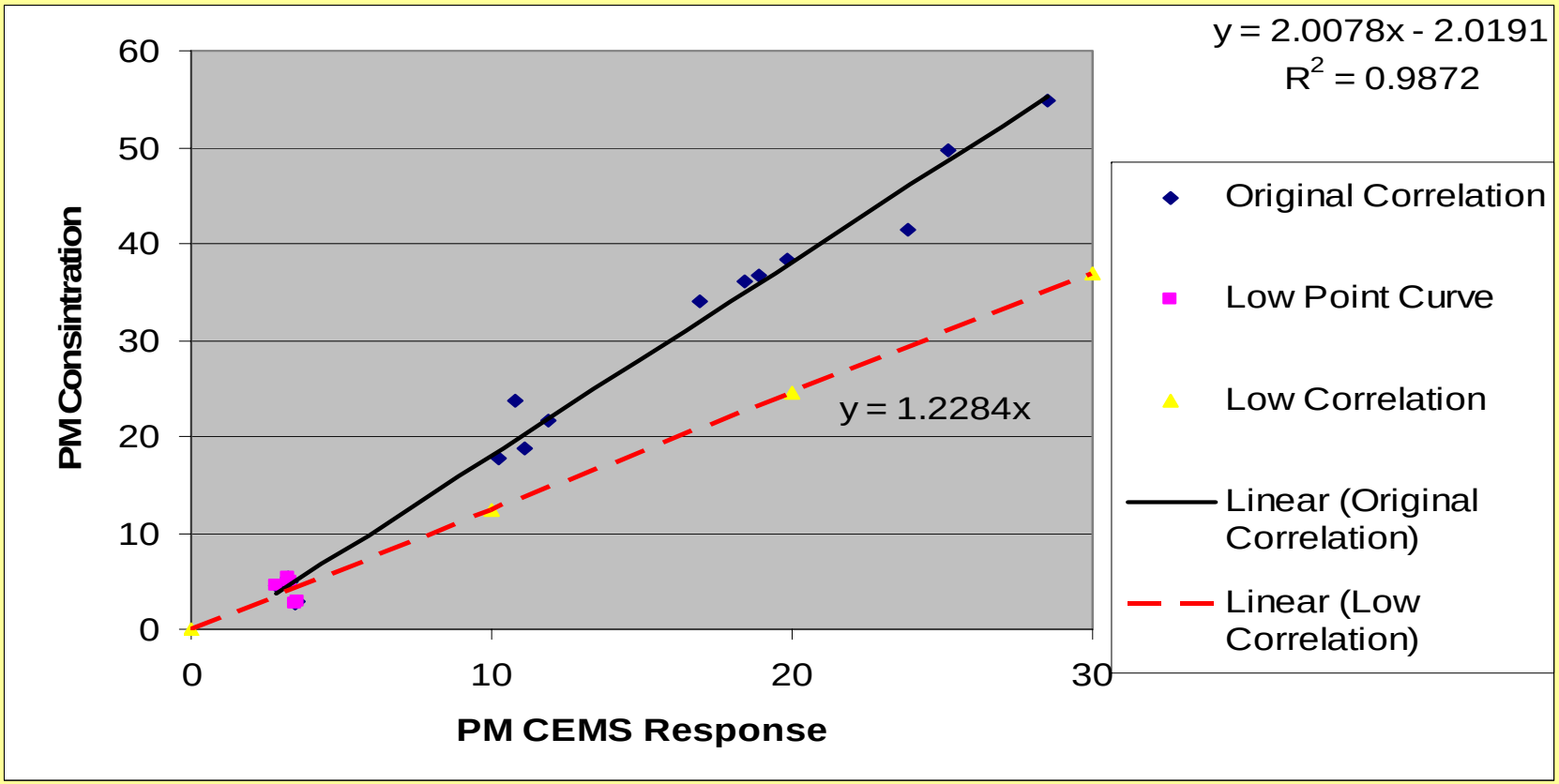
- Biggest challenge is how to achieve high PM levels on Wet Scrubbed Units and Units with Baghouse for Correlation.
- Very Difficult to force higher PM levels with Baghouse and/or Wet FGD
- Most new Baghouses and FGDs have no Bypass
- Regulatory and PR Issues with Bypassing Controls

What's Next

- PS11 §8.6(5) provides option to use Maximum Practical Range and Zero Point if you can not get three concentration levels.
- What would Mt. Storm 00 Correlation look like with this Option?

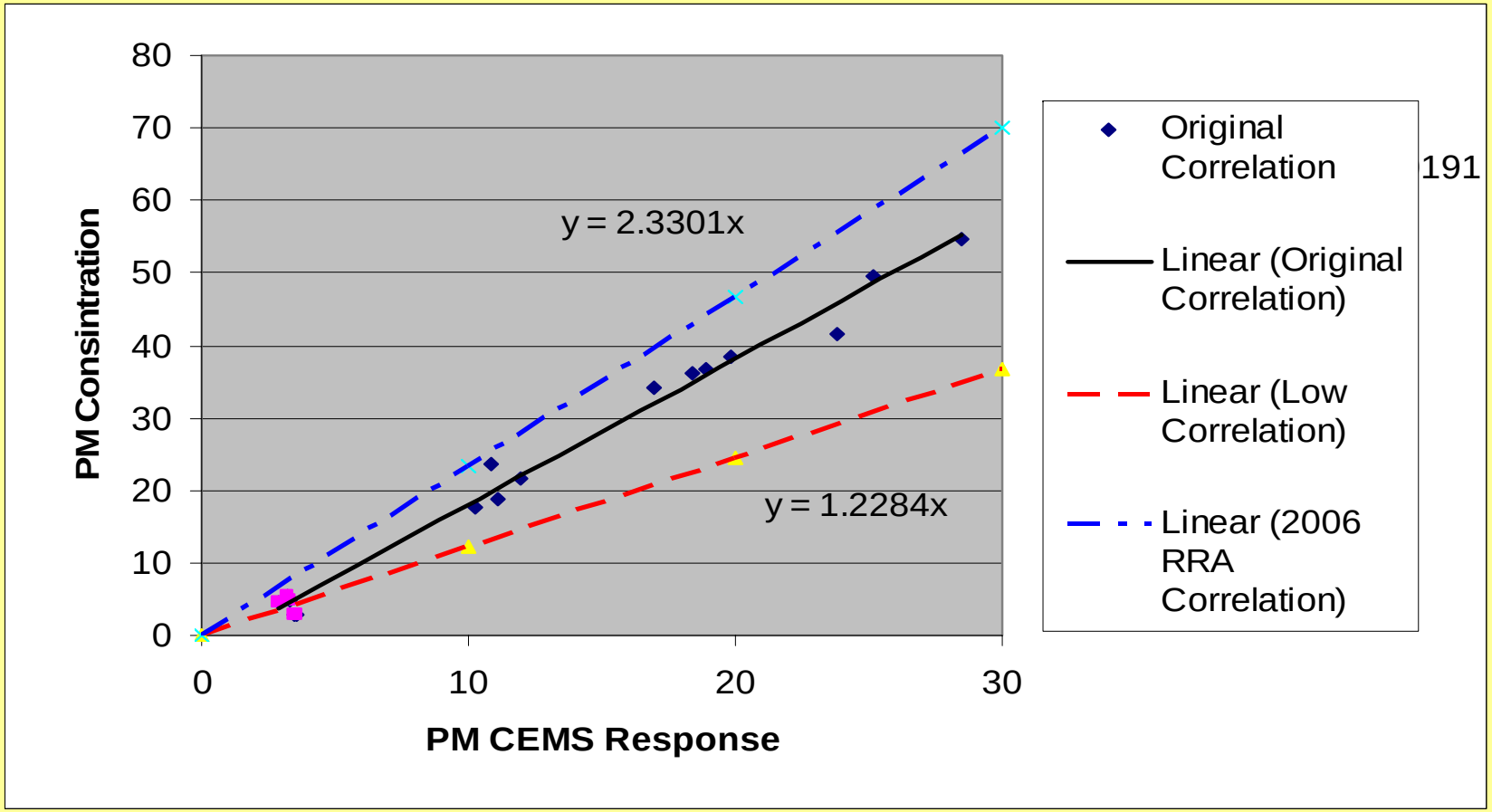
What's Next

- Using Original Correlation and Zero with Lower Level Points:



What's Next

- Using 2006 RRA Points and Zero



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What's Next

- Other Limitations of Limited Range
- Must do additional testing if:
  - You Record Reading of 125% of Maximum Test Point for 24 Consecutive Hours
  - You Record Reading of 125% of Maximum Test Point for More than 5% of the Operating Time in the Previous 30 Day Period
  - Low Emitting Source can use 50% Limit as Maximum Reading to trigger Retest.

Questions?