

Achieving New QC Levels

**How The EPA Turns Your
Entire Monitoring Program On Its Head**

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Maricopa County

Air Quality Department

Overview

- Determination of New Monitoring Levels
- Review of Current Equipment
- Testing, Testing and Yes More Testing
- New Levels Achieved by MCAQ-Monitoring Division
- Limits on Full Implementation of New Levels



Establishing New Levels

- Reference – QA Handbook Vol. II Sec.10 pg. 8-10

- Establishing Calibration Scale
 - 3 Years of 1 – Hour or 8 – Hour Data ; Maximum Reading Times 150%
 - Compare to 150% of NAAQS
 - Take Highest of Two to Establish High Point of Calibration Scale

- Establishing Span Point
 - 80% of High Point of Calibration Scale
 - May Require New “Slope Point”



Establishing New Levels

- Establishing 1 – Point QC Level
 - Must Fall Within CFR Guidelines for Pollutant
 - 5 to 80 ppb for O3, SO2, NO2 and .5 to 5 PPM for CO
 - Needs to Reflect Routine Concentrations
- Establishing Annual Performance Evaluation Levels
 - Lowest Audit Level Should Be 2 to 3 Times MDL for Analyzer
 - Highest Level Should Include Highest Routine Concentration for Site or Network
 - Should Cover 80% of Routine Data



MCAQD Example-Ozone

- Highest 8-Hour Max Over 3 Year Period 91 ppb
 - Above NAAQS of 70 ppb
 - High Point for Calibration Scale 137 ppb (91 x 150%)
 - Span Point 110 ppb (137 x 80%)
 - 1-Point QC Check 78 ppb (Mean 8-Hour Max)
 - Annual Performance Evaluation Levels
 - MDL T400 O3 Analyzer 0.4 ppb $0.4 \times 3 = 1.2$ ppb Audit Level1
 - 4 Other Audit Levels and ZERO Were Added Based Off 80% PE Box
 - 25 ppb – Level 3
 - 60 ppb – Level 4
 - 85 ppb – Level 5
 - 155 ppb – Level 8
 - Operation Range of Analyzer Set at 200 ppb



Testing New Levels

- Transfer Standards Unable to Reach Low Levels
 - Purchase of New Trace Transfer Standards
 - Require Additional Equipment – Air Dryers
- Trace Transfer Standards Unable to Reach Audit Level 1
 - Lowest Level Obtainable 25 ppb
 - New Annual PE Levels Set at 25, 60, 85, 115, 155 Covering Levels 3 – 6 and 8
- Create New “Slope Point” to Calibrate Slope of Analyzer
 - 80% of Operational Range 200 ppb = 160 ppb
- Calibration Points 160, 110, 78, 50, 30 ppb
 - Trace Transfer Standards Not Necessary for Calibration

More Testing

- Same Procedures Used for Other Pollutant Gases CO, SO₂ and NO₂
- CO Challenges
 - Required New Concentrations in All Gas Cylinders
 - Unable to Reach CFR MDLs; Lowest Level 1 PPM
 - 1-Point QC Level Set at 2 PPM
- SO₂ Challenges
 - Low Levels Required Separating SO₂ from Blend Cylinder
 - Added Second MFC to Multi-Gas Calibrator



And Yes More Testing

- SO₂ Challenges
 - Unable to Reach CFR MDL; Lowest Level 10 ppb
 - 1-Point QC Level Set at 10 ppb

- NO₂ Challenges
 - Unable to Reduce Operation Range
 - O₂ Generation from Multi-Gas Calibrator Required Additional MFC
 - Unable to Reach CFR MDL; Lowest Level 25 ppb
 - 1-Point QC Level Set at 60 ppb



Realized Conclusions

- CFR MDLs Unattainable Without Trace Monitors
- Concentrations of Blend Cylinders May Require Several Versions or Removal of One Gas
- New Operational Ranges Require Additional Test Points i.e. Slope Point
- Upgrades to Analyzers and Calibrators Unavoidable





Thank you.

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