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# MEMORANDUM

Pima County Department of Environmental Quality

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**TO:** Alex Gallego  
Assistant Superintendent Operations & Facilities Planning

**DATE:** 9/10/2012  
**FROM:** Beth Gorman  
Program Manager

**RE: Pima County DEQ Beryllium Monitoring Report 2nd Quarter 2012**

Attached is the Pima County Department of Environmental Quality's (PDEQ) Air Monitoring Division Beryllium Monitoring Network Summary for the 2nd Quarter of 2012.

**Highlights:**

- 106 samples collected resulting in 103 valid and 3 invalid samples (97.2% data recovery). EPA requires monitoring data recovery at 75%.
- No beryllium values were detected over the Practical Quantitation Limit (PQL).
- The PQL was updated from 0.265 to 0.225 to reflect the lowest standard used in the analysis.
- PDEQ and SUSD staff are continuing to employ stringent monitoring protocols to ensure quality data is being collected properly to better protect public health.

For additional information on this report, please contact me at Pima County Department of Environmental Quality at (520) 243-7400.

Attachment

Cc: Ursula Kramer, Pima County Department of Environmental Quality Director  
Richard Grimaldi, Pima County Department of Environmental Deputy Director



**Pima County**

**Department of Environmental Quality**

**Air Monitoring Division**

**Beryllium Monitoring Network Summary**

**2nd Quarter 2012**



*Pima County Department of Environmental Quality  
33 N. Stone Avenue, Suite 700  
Tucson, Arizona 85701*

## Summary

The Pima County Department of Environmental Quality has contracted with the Pima County Regional Wastewater Reclamation Department (RWRD) to perform analysis on filters sampled in the Beryllium Monitoring Network located in the Sunnyside Unified School District.

For the 2nd quarter of 2012 there was a total of 106 PM<sub>10</sub> samples collected resulting in 103 valid and 3 invalid samples; for a data recovery of 97.2 %. Thirteen samples were collected to be used as precision checks as recommended in *40 CFR, Part 58, Appendix A, Section 5.3.1*. All samples run for a 24-hour period as specified in *40 CFR, Part 50, Appendix B*.

There were a total of 103 samples analyzed for beryllium. Beryllium concentrations are reported as <0.225 ng/m<sup>3</sup> PQL (Practical Quantitation Level. In the preamble to a November 13, 1985 rulemaking (50 FR 46906), the PQL was defined as “the lowest concentration of an analyte that can be reliably measured within specific limits of precision and accuracy during routine laboratory operating conditions.” The Agency has used the PQL to estimate or evaluate the minimum concentration at which most laboratories can be expected to reliably measure a specific chemical contaminant during day-to-day analysis.

The following pages display the sampling dates, sampling locations, PM<sub>10</sub> concentrations (µg/m<sup>3</sup>) calculated in standard conditions, PM<sub>10</sub> 24-hour NAAQS standard, precision measurements, beryllium analysis results, accompanying graphs and a brief explanation of all invalid samples for the 2nd quarter of 2012.

## PM<sub>10</sub> /Beryllium Concentrations

### Monthly Summary of PM<sub>10</sub>/Beryllium Data

April 2012

Date	Location	Standard Concentration PM <sub>10</sub> (µg/m <sup>3</sup> )	24-hour NAAQS PM <sub>10</sub> (µg/m <sup>3</sup> )	Beryllium (ng/m <sup>3</sup> )
04/01/12	Transportation Bldg	25.0	150	<0.225
04/02/12	Sunnyside H.S.	36.0	150	<0.225
04/03/12	Ocotillo #1	22.1	150	<0.225
04/03/12	Ocotillo #2	24.4	150	<0.225
04/04/12	Los Amigos	25.8	150	<0.225
04/05/12	Los Niños	28.8	150	<0.225
04/06/12	Chaparral M.S.	34.7	150	<0.225
04/07/12	Transportation Bldg	28.1	150	<0.225
04/08/12	Sunnyside H.S.	25.3	150	<0.225
04/09/12	Ocotillo #1	26.3	150	<0.225
04/09/12	Ocotillo #2	26.9	150	<0.225
04/10/12	Los Amigos	24.4	150	<0.225
04/11/12	Los Niños	32.1	150	<0.225
04/12/12	Chaparral M.S.	22.8	150	<0.225
04/13/12	Transportation Bldg	7.5	150	<0.225
04/14/12	Sunnyside H.S.	30.1	150	<0.225
04/15/12	Ocotillo #1	23.1	150	<0.225
04/15/12	Ocotillo #2	23.8	150	<0.225
04/16/12	Los Amigos	15.5	150	<0.225
04/17/12	Los Niños	20.6	150	<0.225
04/18/12	Chaparral M.S.	24.3	150	<0.225
04/19/12	Transportation Bldg	17.8	150	<0.225
04/20/12	Sunnyside H.S.	24.6	150	<0.225
04/21/12	Ocotillo #1	20.3	150	<0.225
04/21/12	Ocotillo #2	INVALID	150	INVALID
04/22/12	Los Amigos	19.0	150	<0.225
04/23/12	Los Niños	31.5	150	<0.225
04/24/12	Chaparral M.S.	25.0	150	<0.225
04/25/12	Transportation Bldg.	25.4	150	<0.225
04/26/12	Sunnyside H.S.	45.7	150	<0.225
04/27/12	Ocotillo #1	26.7	150	<0.225
04/27/12	Ocotillo #2	INVALID	150	INVALID
04/28/12	Los Amigos	27.1	150	<0.225
04/29/12	Los Niños	20.1	150	<0.225
04/30/12	Chaparral M.S.	35.4	150	<0.225

Sample running on 4/21/12 invalid due to no ending flow rate annotated resulting in not being able to calculate concentration.  
 Sample running on 4/27/12 invalid due to an equipment malfunction.

NAAQS = National Ambient Air Quality Standard for PM<sub>10</sub>

**PM<sub>10</sub> /Beryllium Concentrations (continued)**

**Monthly Summary of PM<sub>10</sub>/Beryllium Data**

**May 2012**

<b>Date</b>	<b>Location</b>	<b>Standard Concentration PM<sub>10</sub> (µg/m<sup>3</sup>)</b>	<b>24-hour NAAQS PM<sub>10</sub> (µg/m<sup>3</sup>)</b>	<b>Beryllium (ng/m<sup>3</sup>)</b>
05/01/12	Transportation Bldg	24.6	150	<0.225
05/02/12	Sunnyside H.S.	29.6	150	<0.225
05/03/12	Ocotillo #1	22.9	150	<0.225
05/03/12	Ocotillo #2	23.8	150	<0.225
05/04/12	Los Amigos	25.9	150	<0.225
05/05/12	Los Ninos	35.0	150	<0.225
05/06/12	Chaparral M.S.	27.4	150	<0.225
05/07/12	Transportation Bldg	26.5	150	<0.225
05/08/12	Sunnyside H.S.	53.9	150	<0.225
05/09/12	Ocotillo #1	97.7	150	<0.225
05/09/12	Ocotillo #2	99.7	150	<0.225
05/10/12	Los Amigos	26.3	150	<0.225
05/11/12	Los Ninos	24.0	150	<0.225
05/12/12	Chaparral M.S.	37.7	150	<0.225
05/13/12	Transportation Bldg	27.8	150	<0.225
05/14/12	Sunnyside H.S.	27.8	150	<0.225
05/15/12	Ocotillo #1	27.4	150	<0.225
05/15/12	Ocotillo #2	27.6	150	<0.225
05/16/12	Los Amigos	28.0	150	<0.225
05/17/12	Los Niños	34.8	150	<0.225
05/18/12	Chaparral M.S.	52.9	150	<0.225
05/19/12	Transportation Bldg	38.7	150	<0.225
05/20/12	Sunnyside H.S.	34.3	150	<0.225
05/21/12	Ocotillo #1	33.7	150	<0.225
05/21/12	Ocotillo #2	38.4	150	<0.225
05/22/12	Los Amigos	38.7	150	<0.225
05/23/12	Los Niños	87.1	150	<0.225
05/24/12	Chaparral M.S.	56.2	150	<0.225
05/25/12	Transportation Bldg	29.9	150	<0.225
05/26/12	Sunnyside H.S.	34.1	150	<0.225
05/27/12	Ocotillo #1	25.1	150	<0.225
05/27/12	Ocotillo #2	26.7	150	<0.225
05/28/12	Los Amigos	26.7	150	<0.225
05/29/12	Los Niños	28.3	150	<0.225
05/30/12	Chaparral M.S.	36.5	150	<0.225
05/31/12	Transportation Bldg	38.9	150	<0.225

NAAQS = National Ambient Air Quality Standard for PM<sub>10</sub>

**PM<sub>10</sub> /Beryllium Concentrations (continued)**

**Monthly Summary of PM<sub>10</sub>/Beryllium Data**

<b>June 2012</b>				
<b>Date</b>	<b>Location</b>	<b>Standard Concentration PM<sub>10</sub> (µg/m<sup>3</sup>)</b>	<b>24-hour NAAQS PM<sub>10</sub> (µg/m<sup>3</sup>)</b>	<b>Beryllium (ng/m<sup>3</sup>)</b>
06/01/12	Sunnyside H.S.	INVALID	150	INVALID
06/02/12	Ocotillo #1	36.9	150	<0.225
06/02/12	Ocotillo #2	36.6	150	<0.225
06/03/12	Los Amigos	38.9	150	<0.225
06/04/12	Los Niños	39.9	150	<0.225
06/05/12	Chaparral M.S.	29.8	150	<0.225
06/06/12	Transportation Bldg	28.1	150	<0.225
06/07/12	Sunnyside H.S.	40.0	150	<0.225
06/08/12	Ocotillo #1	39.0	150	<0.225
06/08/12	Ocotillo #2	29.8	150	<0.225
06/09/12	Los Amigos	45.4	150	<0.225
06/10/12	Los Niños	37.3	150	<0.225
06/11/12	Chaparral M.S.	30.1	150	<0.225
06/12/12	Transportation Bldg	26.4	150	<0.225
06/13/12	Sunnyside H.S.	32.1	150	<0.225
06/14/12	Ocotillo #1	33.4	150	<0.225
06/14/12	Ocotillo #2	35.4	150	<0.225
06/15/12	Los Amigos	51.6	150	<0.225
06/16/12	Los Niños	50.2	150	<0.225
06/17/12	Chaparral M.S.	22.2	150	<0.225
06/18/12	Transportation Bldg	31.2	150	<0.225
06/19/12	Sunnyside H.S.	37.5	150	<0.225
06/20/12	Ocotillo #1	30.8	150	<0.225
06/20/12	Ocotillo #2	39.2	150	<0.225
06/21/12	Los Amigos	36.4	150	<0.225
06/22/12	Los Ninos	40.3	150	<0.225
06/23/12	Chaparral M.S.	31.9	150	<0.225
06/24/12	Transportation Bldg	26.5	150	<0.225
06/25/12	Sunnyside H.S.	32.6	150	<0.225
06/26/12	Ocotillo #1	21.1	150	<0.225
06/26/12	Ocotillo #2	25.1	150	<0.225
06/27/12	Los Amigos	29.7	150	<0.225
06/28/12	Los Ninos	23.6	150	<0.225
06/29/12	Chaparral M.S.	25.3	150	<0.225
06/30/12	Transportation Bldg	28.6	150	<0.225

Samples running on 06/1/12 invalid due no ending flow rate annotated resulting in not being able to calculate concentration.

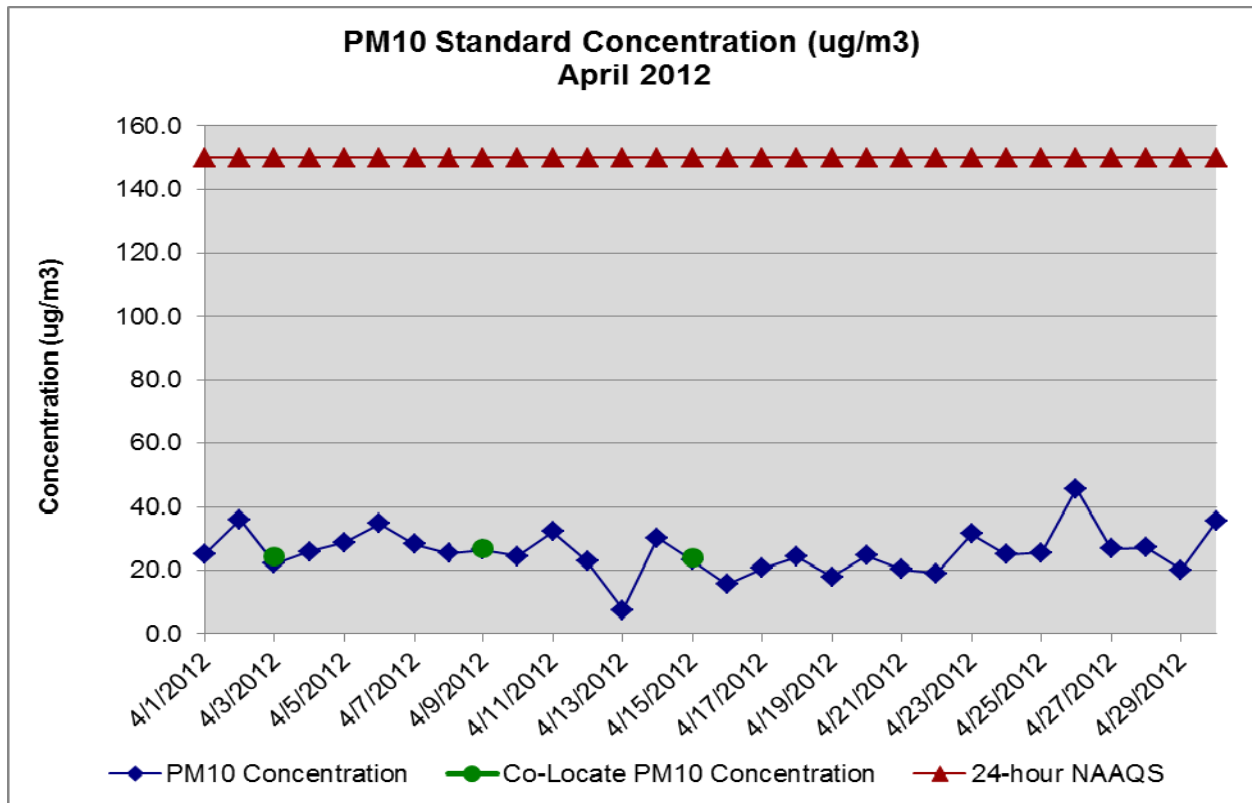
NAAQS = National Ambient Air Quality Standard for PM<sub>10</sub>

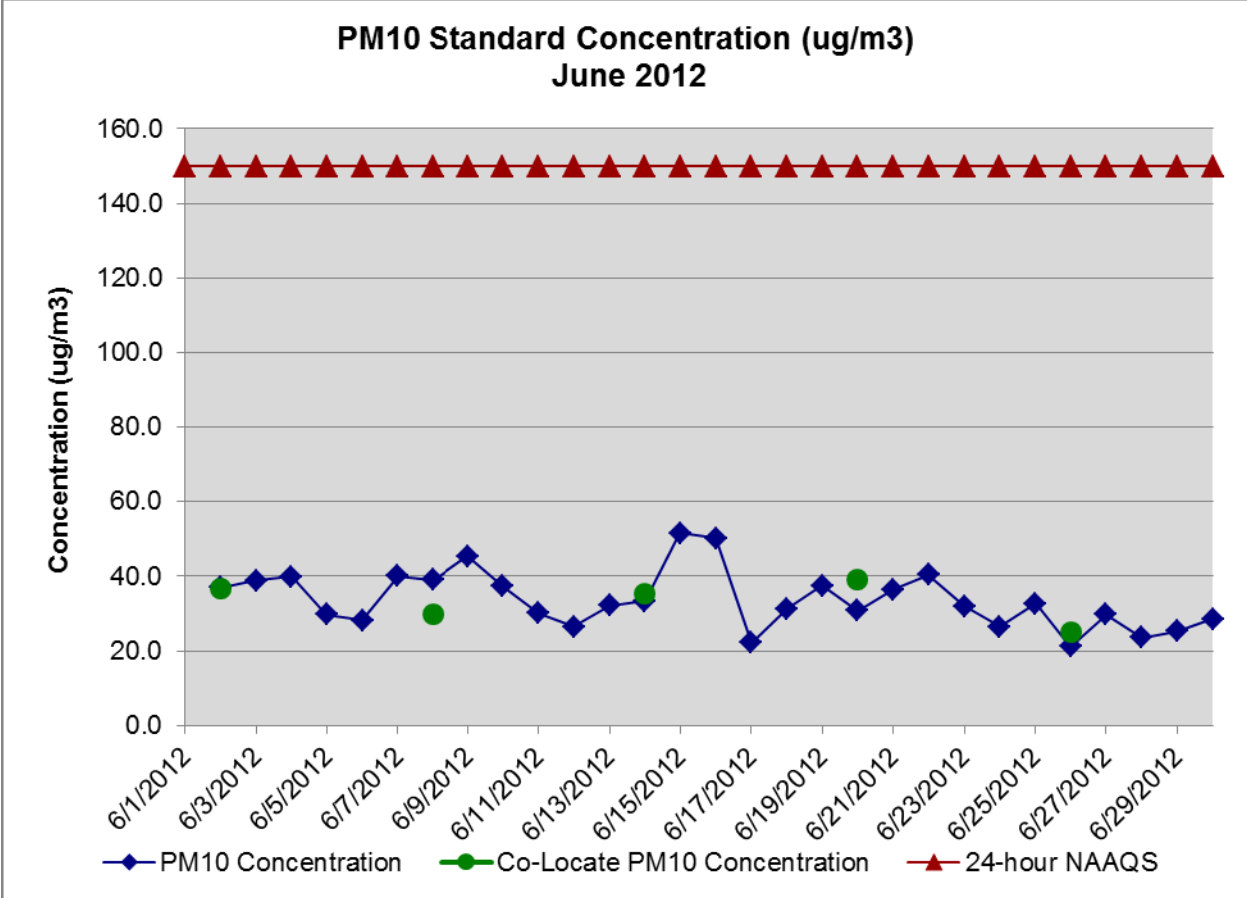
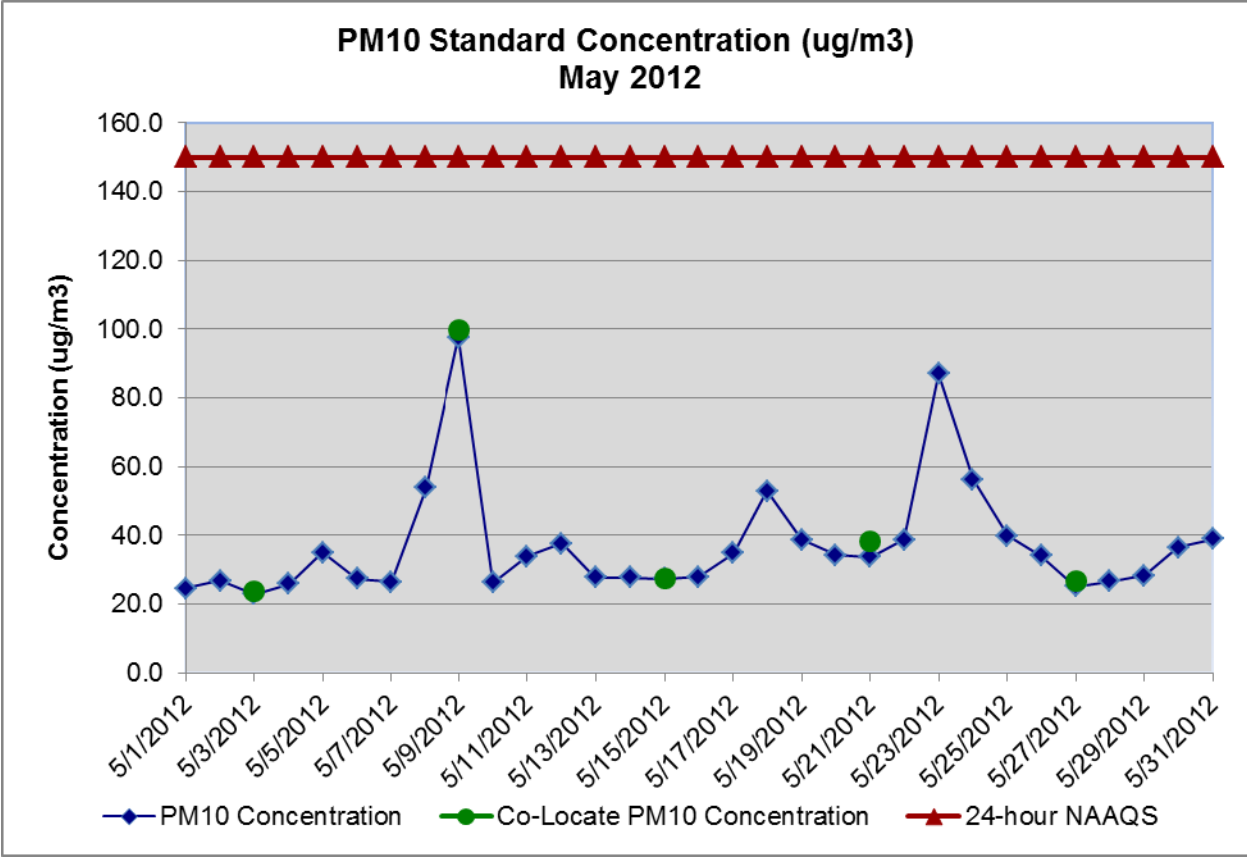
## Precision of Duplicate Pairs – PM10

At low concentrations, agreement between the measurements of collocated samplers, expressed as relative percent difference, may be relatively poor. For this reason, collocated measurement pairs are selected for use in the precision and bias calculations only when both measurement pairs are equal to or above 15µg/m<sup>3</sup> (40CFR58, Appendix A, Section 4c).

Sample Date	Primary Sampler Number	Measured PM <sub>10</sub> (µg/m <sup>3</sup> )	Duplicate Sampler Number	Measured PM <sub>10</sub> (µg/m <sup>3</sup> )	Difference (µg/m <sup>3</sup> )	Percent Difference %
4/3/12	1	22.1	2	24.4	2.3	9.89
4/9/12	1	26.3	2	26.9	0.6	2.26
4/15/12	1	23.1	2	23.8	0.7	2.99
5/3/12	1	22.9	2	23.8	0.9	3.85
5/9/12	1	97.7	2	99.7	2.0	2.03
5/15/12	1	27.4	2	27.6	0.2	0.73
5/21/12	1	33.7	2	38.4	4.7	13.04
5/27/12	1	25.1	2	26.7	1.6	6.18
6/2/12	1	36.9	2	36.6	-0.3	-0.82
6/8/12	1	39.0	2	29.8	-9.2	-26.74
6/14/12	1	33.4	2	35.4	2.0	5.81
6/20/12	1	30.8	2	39.2	8.4	24.0
6/26/12	1	21.1	2	25.1	4.0	17.32

## PM<sub>10</sub> Concentration Charts







## Audit Results

Audits were performed on all of the samplers for the 2nd quarter of 2011. If the audit flow rate percent difference is  $\leq \pm 10\%$ , the sampler calibration is accepted. Differences exceeding  $\pm 10\%$  require sampler recalibration. Differences exceeding  $\pm 15\%$  will result in invalidation of all data subsequent to the last calibration or valid flow check. The following pages display the audit results for each sampling location.

### AUDIT SPREADSHEET FOR PARTICULATES

Month	Ts	Ps
Jan	288.8	693.9
Feb	292.4	693.2
Mar	296.0	692.8
Apr	298.9	692.9
May	300.6	692.9
June	300.3	693.4
Jul	297.6	694.0
Aug	293.8	694.5
Sep	290.1	694.9
Oct	287.2	695.3
Nov	285.8	695.2
Dec	286.5	694.7

**Sampler:** Chaparral M.S.      **Ts =** 300.3  
**Audit Date:** 06/22/12      **Ps =** 693.4  
**Motor:** 1424      **Temp c =** 32.4  
    **Ta =** 305.4  
    **Pa =** 689.0  
**Orifice Calibration Relationship**  
**m= 1.26505      b= -0.01422**

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	4.28	38.8	2.31	1.01
13	3.58	35.6	1.91	0.92
10	2.93	32.2	1.63	0.85
7	1.96	26.4	1.16	0.72
5	1.25	21.2	0.84	0.61

Orifice dH2O                      2.8  
 Sample dPex                      1.6  
 Orifice Qa(m3/m)                0.89188  
 Sample Qa dPex                 31.3869

Audit flow rate % diff: 5.30 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.8	31.48	0.89

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
1.57	33.16	0.94

Sampler Audit Relationship		
<b>m =</b>	0.023	
<b>b =</b>	0.127	
<b>r =</b>	0.998	
	<b>pm10</b>	<b>tsp</b>
<b>Set Point (cfm)</b>	40.9	51.2
<b>Set Point (H2O)</b>	2.5	3.7

### AUDIT SPREADSHEET FOR PARTICULATES

Month	Ts	Ps
Jan	288.8	693.9
Feb	292.4	693.2
Mar	296.0	692.8
Apr	298.9	692.9
May	300.6	692.9
June	300.3	693.4
Jul	297.6	694.0
Aug	293.8	694.5
Sep	290.1	694.9
Oct	287.2	695.3
Nov	285.8	695.2
Dec	286.5	694.7

**Sampler:** Sunnyside H.S.      **Ts =** 300.3  
**Audit Date:** 06/22/12      **Ps =** 693.4  
**Motor:** 1418      **Temp c =** 39.5  
    **Ta =** 312.5  
    **Pa =** 689.0  
**Orifice Calibration Relationship**  
**m= 1.26505      b= -0.01422**

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	4.16	38.7	2.39	1.04
13	3.50	35.6	2.09	0.97
10	2.89	32.4	1.76	0.89
7	1.91	26.4	1.21	0.74
5	1.24	21.3	0.79	0.60

Orifice dH2O                      2.74  
 Sample dPex                      1.6  
 Orifice Qa(m3/m)                0.89246  
 Sample Qa dPex                 31.4607

Audit flow rate % diff: 4.87 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.74	31.50	0.89

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
1.65	33.05	0.94

Sampler Audit Relationship		
<b>m =</b>	0.026	
<b>b =</b>	0.061	
<b>r =</b>	0.998	
	<b>pm10</b>	<b>tsp</b>
<b>Set Point (cfm)</b>	41.9	52.4
<b>Set Point (H2O)</b>	2.8	4.3

**AUDIT SPREADSHEET FOR PARTICULATES**

Month	Ts	Ps
Jan	288.8	693.9
Feb	292.4	693.2
Mar	296.0	692.8
Apr	298.9	692.9
May	300.6	692.9
June	300.3	693.4
Jul	297.6	694.0
Aug	293.8	694.5
Sep	290.1	694.9
Oct	287.2	695.3
Nov	285.8	695.2
Dec	286.5	694.7

**Sampler:** Los Amigos      **Ts =** 300.3  
**Audit Date:** 06/25/12      **Ps =** 693.4  
**Motor:** 1419      **Temp c =** 33.40

**Ta =** 306.4  
**Pa =** 693.0

**Orifice Calibration Relationship**  
**m= 1.26505      b= -0.01422**

Plate No.	Orifice dH20	Qa Orifice	Sampler dPex	Sampler dPext
18	3.85	36.8	1.73	0.87
13	3.24	33.8	1.38	0.78
10	2.66	30.7	1.10	0.70
7	1.76	25.0	0.64	0.53
5	1.15	20.3	0.31	0.37

Orifice dH2O      2.532  
 Sample dPex      1.0  
 Orifice Qa(m3/m)      0.84762  
 Sample Qa dPex      30.1309

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.532	29.92	0.85

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
1.03	31.20	0.88

Sampler Audit Relationship		
<b>m =</b>	0.030	
<b>b =</b>	-0.233	
<b>r =</b>	0.998	
	<b>pm10</b>	<b>tsp</b>
<b>Set Point (cfm)</b>	40.8	51.0
<b>Set Point (H2O)</b>	2.3	3.9

Audit flow rate % diff: 4.25 %

**AUDIT SPREADSHEET FOR PARTICULATES**

Month	Ts	Ps
Jan	288.8	693.9
Feb	292.4	693.2
Mar	296.0	692.8
Apr	298.9	692.9
May	300.6	692.9
June	300.3	693.4
Jul	297.6	694.0
Aug	293.8	694.5
Sep	290.1	694.9
Oct	287.2	695.3
Nov	285.8	695.2
Dec	286.5	694.7

**Sampler:** Los Niños      **Ts =** 300.3  
**Audit Date:** 06/25/12      **Ps =** 693.4  
**Motor:** 1421      **Temp c =** 35.50

**Ta =** 308.5  
**Pa =** 693.0

**Orifice Calibration Relationship**  
**m= 1.26505      b= -0.01422**

Plate No.	Orifice dH20	Qa Orifice	Sampler dPex	Sampler dPext
18	3.58	35.6	1.56	0.83
13	3.00	32.7	1.24	0.74
10	2.47	29.7	1.04	0.68
7	1.66	24.4	0.66	0.54
5	1.08	19.8	0.32	0.38

Orifice dH2O      2.358  
 Sample dPex      1.0  
 Orifice Qa(m3/m)      0.82113  
 Sample Qa dPex      29.1289

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.358	28.99	0.82

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
0.96	30.24	0.86

Sampler Audit Relationship		
<b>m =</b>	0.028	
<b>b =</b>	-0.159	
<b>r =</b>	0.993	
	<b>pm10</b>	<b>tsp</b>
<b>Set Point (cfm)</b>	41.1	51.4
<b>Set Point (H2O)</b>	2.2	3.7

Audit flow rate % diff: 4.30 %

**AUDIT SPREADSHEET FOR PARTICULATES**

Month	Ts	Ps
Jan	288.8	693.9
Feb	292.4	693.2
Mar	296.0	692.8
Apr	298.9	692.9
May	300.6	692.9
June	300.3	693.4
Jul	297.6	694.0
Aug	293.8	694.5
Sep	290.1	694.9
Oct	287.2	695.3
Nov	285.8	695.2
Dec	286.5	694.7

**Sampler:** Ocotillo #1      **Ts =** 300.3  
**Audit Date:** 06/22/12      **Ps =** 693.4  
**Motor:** 1420      **Temp c =** 40.4  
    **Ta =** 313.4  
    **Pa =** 689.0  
**Orifice Calibration Relationship**  
**m= 1.26505      b= -0.01422**

Plate No.	Orifice dH20	Qa Orifice	Sampler dPex	Sampler dPext
18	3.35	34.9	1.47	0.82
13	2.84	32.1	1.14	0.72
10	2.36	29.3	0.92	0.65
7	1.61	24.3	0.51	0.48
5	1.06	19.8	0.23	0.32

Orifice dH2O                      2.244  
 Sample dPex                      0.9  
 Orifice Qa(m3/m)              0.80987  
 Sample Qa dPex                28.8512  
**Audit flow rate % diff: 4.04 %**

dH2O	Orifice	
	Qa (CFM)	Qa (M3/m)
2.244	28.59	0.81

dPex	Sampler w/Orifice	
	Qa(CFM)	Qa(M3/m)
0.85	29.75	0.84

Sampler Audit Relationship		
<b>m =</b>	0.032	
<b>b =</b>	-0.311	
<b>r =</b>	0.999	
	<b>pm10</b>	<b>tsp</b>
<b>Set Point (cfm)</b>	42.0	52.5
<b>Set Point (H2O)</b>	2.4	4.2

**AUDIT SPREADSHEET FOR PARTICULATES**

Month	Ts	Ps
Jan	288.8	693.9
Feb	292.4	693.2
Mar	296.0	692.8
Apr	298.9	692.9
May	300.6	692.9
June	300.3	693.4
Jul	297.6	694.0
Aug	293.8	694.5
Sep	290.1	694.9
Oct	287.2	695.3
Nov	285.8	695.2
Dec	286.5	694.7

**Sampler:** Ocotillo #2      **Ts =** 300.3  
**Audit Date:** 06/22/12      **Ps =** 693.4  
**Motor:** 1417      **Temp c =** 40.40  
    **Ta =** 313.4  
    **Pa =** 689.0  
**Orifice Calibration Relationship**  
**m= 1.26505      b= -0.01422**

Plate No.	Orifice dH20	Qa Orifice	Sampler dPex	Sampler dPext
18	3.45	35.4	1.56	0.84
13	2.92	32.6	1.29	0.77
10	2.35	29.3	1.05	0.69
7	1.62	24.4	0.63	0.54
5	1.06	19.8	0.38	0.42

Orifice dH2O                      2.28  
 Sample dPex                      1.0  
 Orifice Qa(m3/m)              0.81625  
 Sample Qa dPex                28.9233  
**Audit flow rate % diff: 4.28 %**

dH2O	Orifice	
	Qa (CFM)	Qa (M3/m)
2.28	28.81	0.82

dPex	Sampler w/Orifice	
	Qa (CFM)	Qa (M3/m)
0.98	30.05	0.85

Sampler Audit Relationship		
<b>m =</b>	0.028	
<b>b =</b>	-0.131	
<b>r =</b>	0.998	
	<b>pm10</b>	<b>tsp</b>
<b>Set Point (cfm)</b>	42.0	52.5
<b>Set Point (H2O)</b>	2.3	3.8

**AUDIT SPREADSHEET FOR PARTICULATES**

Month	Ts	Ps
Jan	288.8	693.9
Feb	292.4	693.2
Mar	296.0	692.8
Apr	298.9	692.9
May	300.6	692.9
June	300.3	693.4
Jul	297.6	694.0
Aug	293.8	694.5
Sep	290.1	694.9
Oct	287.2	695.3
Nov	285.8	695.2
Dec	286.5	694.7

**Sampler:** Transportation      **Ts =** 300.3  
**Audit Date:** 06/22/12      **Ps =** 693.4  
**Motor:** 1422      **Temp c =** 36.00  
    **Ta =** 309.0  
    **Pa =** 689.0  
**Orifice Calibration Relationship**  
    **m= 1.26505      b= -0.01422**

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	3.92	37.4	1.82	0.90
13	3.27	34.2	1.44	0.80
10	2.69	31.1	1.13	0.71
7	1.80	25.5	0.71	0.56
5	1.14	20.4	0.41	0.43

Orifice dH2O                      2.564  
 Sample dPex                      1.1  
 Orifice Qa(m3/m)                0.8589  
 Sample Qa dPex                 30.4429

Audit flow rate % diff: 4.36 %

dH2O	Orifice	
	Qa (CFM)	Qa (M3/m)
2.564	30.32	0.86

dPex	Sampler w/Orifice	
	Qa (CFM)	Qa (M3/m)
1.10	31.65	0.90

Sampler Audit Relationship		
<b>m =</b>	0.028	
<b>b =</b>	-0.138	
<b>r =</b>	0.999	
	<b>pm10</b>	<b>tsp</b>
<b>Set Point (cfm)</b>	41.4	51.8
<b>Set Point (H2O)</b>	2.3	3.7