



MEMORANDUM

Pima County Department of Environmental Quality

TO: Bernie Cohn
Assistant Superintendent of Operations

DATE: 10/2/14
FROM: Beth Gorman
Senior Program Manager

RE: Pima County DEQ Beryllium Monitoring Report 2nd Quarter 2014

Attached is the Pima County Department of Environmental Quality's (PDEQ) Air Monitoring Division Beryllium Monitoring Network Summary for the 2nd Quarter of 2014.

Highlights:

- 106 samples collected resulting in 87 valid and 19 invalid samples (82.1% 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) 724-7400.

Attachment

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



PIMA COUNTY

ENVIRONMENTAL QUALITY

Pima County

Department of Environmental Quality

Air Monitoring Division

Beryllium Monitoring Network Summary

2nd Quarter 2014

*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 2014 there was a total of 106 PM₁₀ samples collected resulting in 87 valid and 19 invalid samples; for a data recovery of 82.1%. Ten 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 87 samples analyzed for beryllium. Beryllium concentrations are reported as <0.225 ng/m³ 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, PM₁₀ concentrations (µg/m³) calculated in standard conditions, PM₁₀ 24-hour NAAQS standard, precision measurements, beryllium analysis results, accompanying graphs and a brief explanation of all invalid samples for the 2nd quarter of 2014.

PM₁₀ /Beryllium Concentrations

Monthly Summary of PM₁₀/Beryllium Data

April 2014

Date	Location	Standard Concentration PM ₁₀ (µg/m ³)	24-hour NAAQS PM ₁₀ (µg/m ³)	Beryllium (ng/m ³)
04/01/14	Los Niños	34.5	150	<0.225
04/02/14	Chaparral M.S.	29.1	150	<0.225
04/03/14	Transportation Bldg	36.8	150	<0.225
04/04/14	Sunnyside H.S.	29.3	150	<0.225
04/05/14	Ocotillo #1	15.1	150	<0.225
04/05/14	Ocotillo #2	28.6	150	<0.225
04/06/14	Los Amigos	1.5	150	<0.225
04/07/14	Los Niños	23.2	150	<0.225
04/08/14	Chaparral M.S.	26.6	150	<0.225
04/09/14	Transportation Bldg	25.5	150	<0.225
04/10/14	Sunnyside H.S.	24.7	150	<0.225
04/11/14	Ocotillo #1	24.3	150	<0.225
04/11/14	Ocotillo #2	29.5	150	<0.225
04/12/14	Los Amigos	15.9	150	<0.225
04/13/14	Los Niños	17.9	150	<0.225
04/14/14	Chaparral M.S.	30.6	150	<0.225
04/15/14	Transportation Bldg.	34.2	150	<0.225
04/16/14	Sunnyside H.S.	32.9	150	<0.225
04/17/14	Ocotillo #1	INVALID	INVALID	INVALID
04/17/14	Ocotillo #2	28.9	150	<0.225
04/18/14	Los Amigos	13.1	150	<0.225
04/19/14	Los Niños	12.5	150	<0.225
04/20/14	Chaparral M.S.	14.2	150	<0.225
04/21/14	Transportation Bldg.	17.2	150	<0.225
04/22/14	Sunnyside H.S.	22.3	150	<0.225
04/23/14	Ocotillo #1	26.0	150	<0.225
04/23/14	Ocotillo #2	31.0	150	<0.225
04/24/14	Los Amigos	29.1	150	<0.225
04/25/14	Los Niños	25.2	150	<0.225
04/26/14	Chaparral M.S.	58.3	150	<0.225
04/27/14	Transportation Bldg.	31.6	150	<0.225
04/28/14	Sunnyside H.S.	20.9	150	<0.225
04/29/14	Ocotillo #1	22.2	150	<0.225
04/29/14	Ocotillo #2	23.9	150	<0.225
04/30/14	Los Amigos	53.7	150	<0.225

Sample running on 4/17/14 invalid due to sampler not running caused by improper set-up.

NAAQS = National Ambient Air Quality Standard for PM₁₀

PM₁₀ /Beryllium Concentrations (continued)

Monthly Summary of PM₁₀/Beryllium Data

May 2014

Date	Location	Standard Concentration PM₁₀ (µg/m³)	24-hour NAAQS PM₁₀ (µg/m³)	Beryllium (ng/m³)
05/01/14	Los Niños	117.5	150	<0.225
05/02/14	Chaparral M.S.	76.8	150	<0.225
05/03/14	Transportation Bldg	33.7	150	<0.225
05/04/14	Sunnyside H.S.	28.9	150	<0.225
05/05/14	Ocotillo #1	32.6	150	<0.225
05/05/14	Ocotillo #2	36.1	150	<0.225
05/06/14	Los Amigos	42.1	150	<0.225
05/07/14	Los Niños	36.3	150	<0.225
05/08/14	Chaparral M.S.	27.1	150	<0.225
05/09/14	Transportation Bldg	26.6	150	<0.225
05/10/14	Sunnyside H.S.	30.8	150	<0.225
05/11/14	Ocotillo #1	73.4	150	<0.225
05/11/14	Ocotillo #2	74.2	150	<0.225
05/12/14	Los Amigos	25.7	150	<0.225
05/13/14	Los Niños	35.4	150	<0.225
05/14/14	Chaparral M.S.	75.1	150	<0.225
05/15/14	Transportation Bldg	INVALID	150	INVALID
05/16/14	Sunnyside H.S.	INVALID	150	INVALID
05/17/14	Ocotillo #1	24.1	150	<0.225
05/17/14	Ocotillo #2	27.8	150	<0.225
05/18/14	Los Amigos	19.9	150	<0.225
05/19/14	Los Niños	28.8	150	<0.225
05/20/14	Chaparral M.S.	INVALID	150	INVALID
05/21/14	Transportation Bldg.	22.9	150	<0.225
05/22/14	Sunnyside H.S.	36.4	150	<0.225
05/23/14	Ocotillo #1	21.7	150	<0.225
05/23/14	Ocotillo #2	31.5	150	<0.225
05/24/14	Los Amigos	21.5	150	<0.225
05/25/14	Los Niños	5.8	150	<0.225
05/26/14	Chaparral M.S.	35.3	150	<0.225
05/27/14	Transportation Bldg.	26.7	150	<0.225
05/28/14	Sunnyside H.S.	INVALID	150	INVALID
05/29/14	Ocotillo #1	18.4	150	<0.225
05/29/14	Ocotillo #2	INVALID	150	INVALID
05/30/14	Los Amigos	18.8	150	<0.225
05/31/14	Los Niños	21.6	150	<0.225

Samples running on 5/15/14, 5/16/14, 5/20/14 and 5/29/14 are invalid due to the samplers not running caused by improper set-up.

Sample running on 5/28/14 invalid due to double exposure.

NAAQS = National Ambient Air Quality Standard for PM₁₀

PM₁₀ /Beryllium Concentrations (continued)**Monthly Summary of PM₁₀/Beryllium Data**

June 2014				
Date	Location	Standard Concentration PM₁₀ (µg/m³)	24-hour NAAQS PM₁₀ (µg/m³)	Beryllium (ng/m³)
06/01/14	Chaparral M.S.	INVALID	150	INVALID
06/02/14	Transportation Bldg.	INVALID	150	INVALID
06/03/14	Sunnyside H.S.	INVALID	150	INVALID
06/04/14	Ocotillo #1	INVALID	150	INVALID
06/04/14	Ocotillo #2	INVALID	150	INVALID
06/05/14	Los Amigos	INVALID	150	INVALID
06/06/14	Los Niños	25.2	150	INVALID
06/07/14	Chaparral M.S.	INVALID	150	INVALID
06/08/14	Transportation Bldg.	INVALID	150	INVALID
06/09/14	Sunnyside H.S.	INVALID	150	INVALID
06/10/14	Ocotillo #1	INVALID	150	INVALID
06/10/14	Ocotillo #2	50.2	150	<0.225
06/11/14	Los Amigos	37.8	150	<0.225
06/12/14	Los Niños	INVALID	150	INVALID
06/13/14	Chaparral M.S.	38.7	150	<0.225
06/14/14	Transportation Bldg.	23.8	150	<0.225
06/15/14	Sunnyside H.S.	33.0	150	<0.225
06/16/14	Ocotillo #1	24.2	150	<0.225
06/16/14	Ocotillo #2	33.6	150	<0.225
06/17/14	Los Amigos	28.3	150	<0.225
06/18/14	Los Niños	24.5	150	<0.225
06/19/14	Chaparral M.S.	24.8	150	<0.225
06/20/14	Transportation Bldg.	27.5	150	<0.225
06/21/14	Sunnyside H.S.	INVALID	150	INVALID
06/22/14	Ocotillo #1	INVALID	150	INVALID
06/22/14	Ocotillo #2	23.9	150	<0.225
06/23/14	Los Amigos	28.9	150	<0.225
06/24/14	Los Niños	31.7	150	<0.225
06/25/14	Chaparral M.S.	35.4	150	<0.225
06/26/14	Transportation Bldg.	29.9	150	<0.225
06/27/14	Sunnyside H.S.	32.6	150	<0.225
06/28/14	Ocotillo #1	28.3	150	<0.225
06/28/14	Ocotillo #2	19.4	150	<0.225
06/29/14	Los Amigos	37.9	150	<0.225
06/30/14	Los Niños	25.7	150	<0.225

Sample running on 6/1/14 invalid due to double exposure

Sample running on 6/2/14 invalid due to sample time being >24hrs (27hrs).

Sample running on 6/3/14 invalid due to sample time being <24hrs (14.49hrs).

Sample running on 6/4/14 (Ocotillo #1) invalid due to sample time being <24hrs (11.27hrs).

Samples running on 6/4/14, 6/5/14, 6/7/14, 6/8/14, 6/9/14, 6/10/14, 6/12/14, 6/21/14 and 6/22/14 are invalid due to sampler not running because of improper set-up.

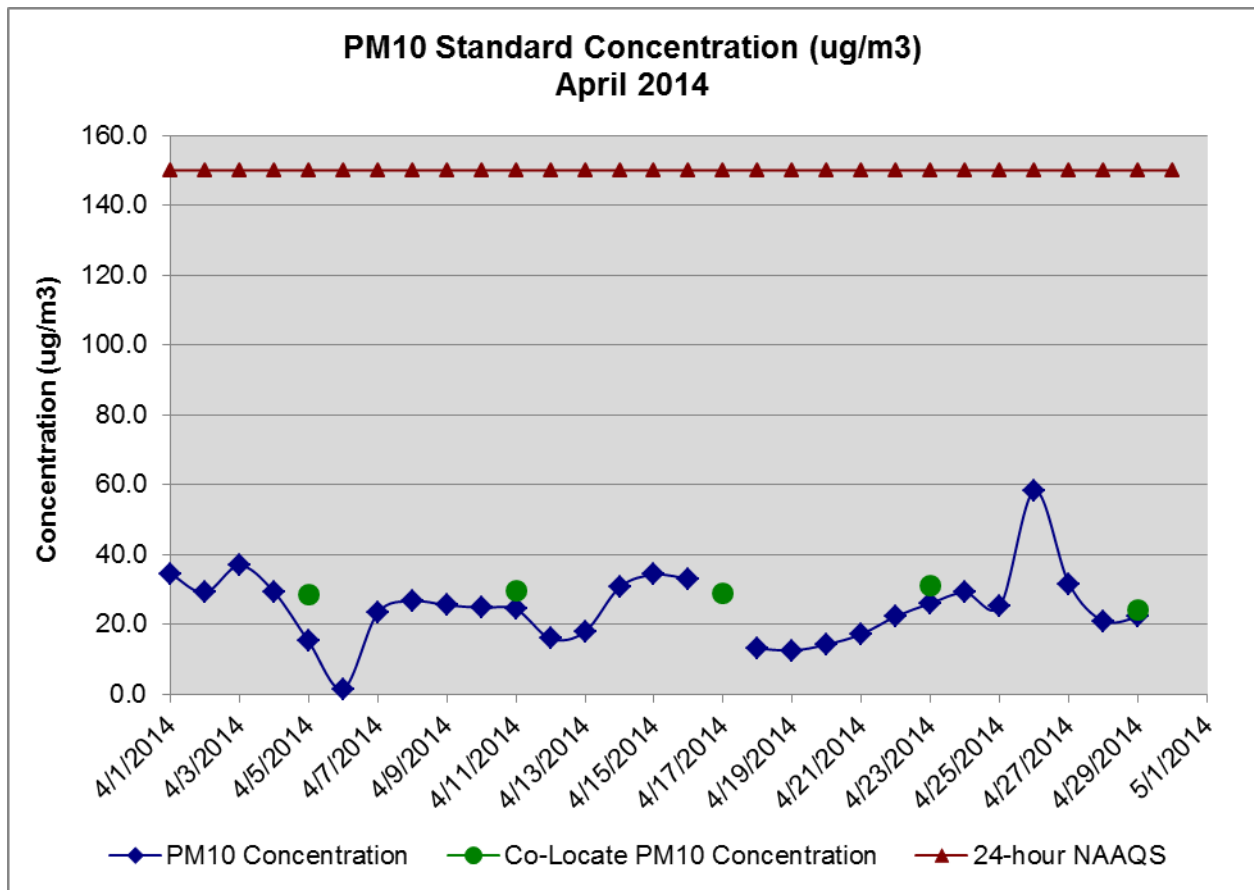
NAAQS = National Ambient Air Quality Standard for PM₁₀

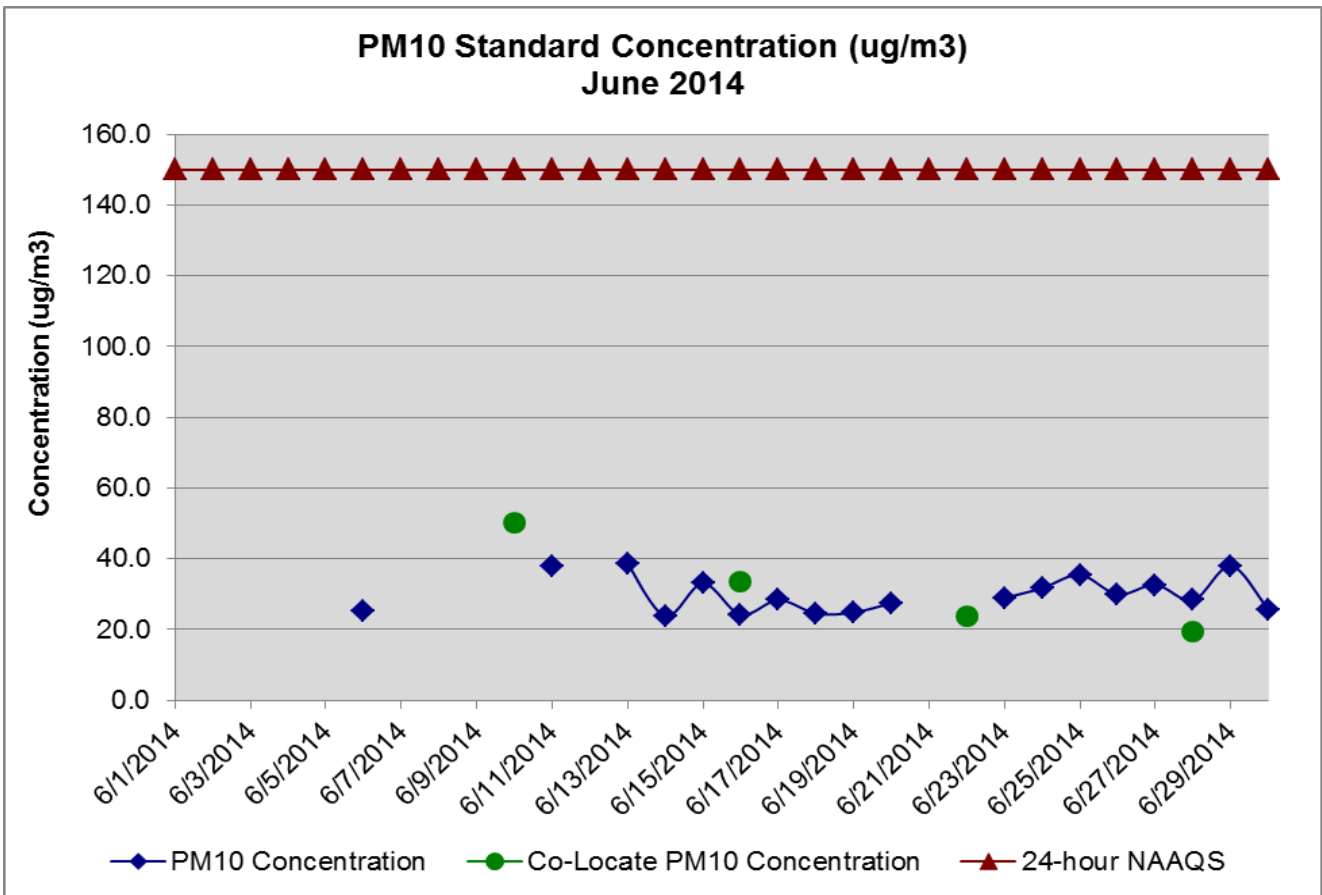
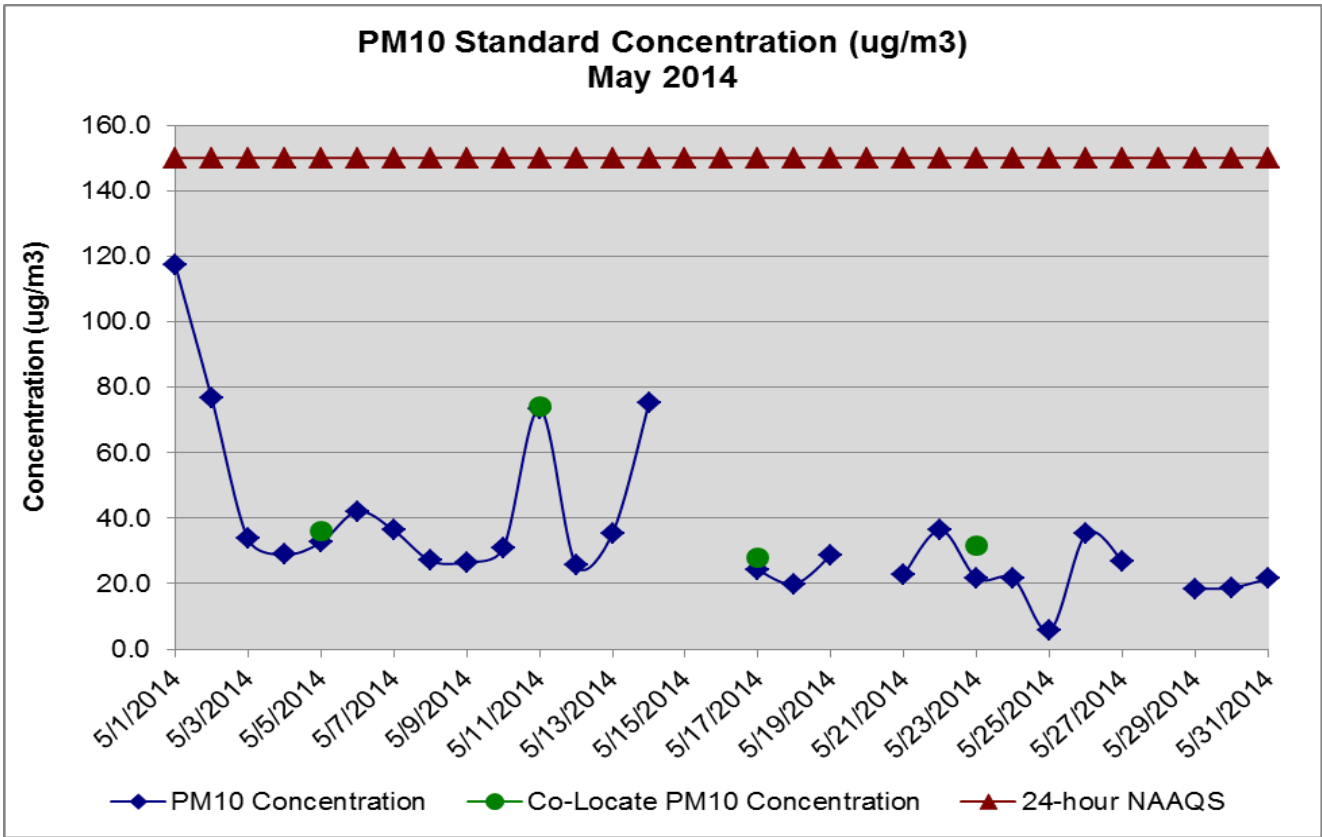
Precision of Duplicate Pairs – PM10

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 $15\mu\text{g}/\text{m}^3$ (40CFR58, Appendix A, Section 4c).

Sample Date	Primary Sampler Number	Measured PM ₁₀ ($\mu\text{g}/\text{m}^3$)	Duplicate Sampler Number	Measured PM ₁₀ ($\mu\text{g}/\text{m}^3$)	Difference ($\mu\text{g}/\text{m}^3$)	Percent Difference %
4/5/14	1	15.1	2	28.6	13.5	61.78
4/11/14	1	24.3	2	29.5	5.2	19.33
4/23/14	1	26.0	2	31.0	5.0	17.54
4/29/14	1	22.2	2	23.9	1.7	7.38
5/5/14	1	32.6	2	36.1	3.5	10.19
5/11/14	1	73.4	2	74.2	0.8	1.08
5/17/14	1	24.1	2	27.8	3.7	14.26
5/23/14	1	21.7	2	31.5	9.8	36.84
6/16/14	1	24.2	2	33.6	9.4	32.53
6/28/14	1	28.3	2	19.4	-8.9	-37.32

PM₁₀ Concentration Charts





Audit Results

Audits were performed on all of the samplers for the 2nd quarter of 2014. 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
Jun	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: 06/16/14 **Ps =** 693.4
Motor: 1424 **Temp c =** 34.44
 Ta = 307.4
 Pa = 693.0
Orifice Calibration Relationship
m= 1.22644 b= 0.01572

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	3.97	37.8	2.08	0.96
13	3.37	34.8	1.83	0.90
10	2.78	31.5	1.58	0.84
7	1.69	24.5	1.07	0.69
5	1.24	20.9	0.88	0.62

Orifice dH2O 2.61
 Sample dPex 1.5
 Orifice Qa(m3/m) 0.86456
 Sample Qa dPex 30.3754

Audit flow rate % diff: 5.80 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.61	30.52	0.86

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
1.49	32.30	0.91

Sampler Audit Relationship		
m =	0.020	
b =	0.201	
r =	1.000	
	pm10	tsp
Set Point (cfm)	41.0	51.2
Set Point (H2O)	2.4	3.4

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
Jun	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: 06/16/14 **Ps =** 693.4
Motor: 1418 **Temp c =** 35.56
 Ta = 308.6
 Pa = 693.0
Orifice Calibration Relationship
m= 1.22644 b= 0.01572

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	4.18	38.8	2.40	1.03
13	3.40	35.0	2.01	0.95
10	2.72	31.2	1.60	0.84
7	1.92	26.2	1.20	0.73
5	1.30	21.5	0.76	0.58

Orifice dH2O 2.704
 Sample dPex 1.6
 Orifice Qa(m3/m) 0.88185
 Sample Qa dPex 31.1184

Audit flow rate % diff: 4.93 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.704	31.13	0.88

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
1.59	32.67	0.93

Sampler Audit Relationship		
m =	0.026	
b =	0.042	
r =	0.996	
	pm10	tsp
Set Point (cfm)	41.1	51.4
Set Point (H2O)	2.7	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
Jun	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: 06/16/14 **Ps =** 693.4
Motor: 1419 **Temp c =** 34.44
 Ta = 307.4
 Pa = 693.0
Orifice Calibration Relationship
m= 1.22644 b= 0.01572

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	3.42	35.0	1.60	0.84
13	3.05	33.0	1.30	0.76
10	2.46	29.6	1.05	0.68
7	1.76	25.0	0.62	0.52
5	1.13	19.9	0.29	0.36

Orifice dH2O 2.364
 Sample dPex 1.0
 Orifice Qa(m3/m) 0.82219
 Sample Qa dPex 29.2534

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.364	29.02	0.82

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
0.97	30.25	0.86

Sampler Audit Relationship		
m =	0.032	
b =	-0.265	
r =	0.997	
	pm10	tsp
Set Point (cfm)	41.0	51.2
Set Point (H2O)	2.4	4.1

Audit flow rate % diff: 4.18 %

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
Jun	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: 06/16/14 **Ps =** 693.4
Motor: 1421 **Temp c =** 34.4
 Ta = 307.4
 Pa = 693.0
Orifice Calibration Relationship
m= 1.22644 b= 0.01572

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	3.93	37.6	1.81	0.90
13	3.25	34.1	1.37	0.78
10	2.61	30.5	1.09	0.70
7	1.72	24.7	0.67	0.55
5	1.11	19.8	0.33	0.38

Orifice dH2O 2.524
 Sample dPex 1.1
 Orifice Qa(m3/m) 0.84999
 Sample Qa dPex 30.1898

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.524	30.00	0.85

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
1.05	31.35	0.89

Sampler Audit Relationship		
m =	0.028	
b =	-0.161	
r =	0.997	
	pm10	tsp
Set Point (cfm)	41.0	51.2
Set Point (H2O)	2.2	3.6

Audit flow rate % diff: 4.47 %

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
Jun	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: 06/30/14 **Ps =** 693.4
Motor: 1420 **Temp c =** 31.67
 Ta = 304.7
 Pa = 694.0
Orifice Calibration Relationship
m= 1.22644 b= 0.01572

Plate No.	Orifice dH20	Qa Orifice	Sampler dPex	Sampler dPext
18	3.20	33.7	1.30	0.76
13	2.70	30.9	1.06	0.68
10	2.22	28.0	0.83	0.60
7	1.52	23.1	0.43	0.43
5	1.03	18.9	0.22	0.31

Orifice dH2O 2.134
 Sample dPex 0.8
 Orifice Qa(m3/m) 0.77638
 Sample Qa dPex 27.6644

Audit flow rate % diff: 4.24 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.134	27.41	0.78

Sampler w/Orifice		
dPex	Qa(CFM)	Qa(M3/m)
0.77	28.58	0.81

Sampler Audit Relationship		
m =	0.031	
b =	-0.266	
r =	0.998	
	pm10	tsp
Set Point (cfm)	40.5	50.7
Set Point (H2O)	2.2	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
Jun	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: 06/26/13 **Ps =** 693.4
Motor: 1425 **Temp c =** 31.67
 Ta = 304.7
 Pa = 694.0
Orifice Calibration Relationship
m= 1.22644 b= 0.01572

Plate No.	Orifice dH20	Qa Orifice	Sampler dPex	Sampler dPext
18	4.11	38.2	1.48	0.81
13	3.49	35.2	1.22	0.73
10	2.93	32.2	1.04	0.68
7	1.97	26.3	0.79	0.59
5	1.27	21.0	0.47	0.45

Orifice dH2O 2.754
 Sample dPex 1.0
 Orifice Qa(m3/m) 0.88372
 Sample Qa dPex 31.1688

Audit flow rate % diff: 5.11 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.754	31.20	0.88

Sampler w/Orifice		
dPex	Qa(CFM)	Qa(M3/m)
1.00	32.80	0.93

Sampler Audit Relationship		
m =	0.020	
b =	0.053	
r =	0.990	
	pm10	tsp
Set Point (cfm)	40.5	50.7
Set Point (H2O)	1.6	2.5

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
Jun	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: 06/21/13 **Ps =** 693.4
Motor: 1422 **Temp c =** 35.00
 Ta = 308.0
 Pa = 693.0
Orifice Calibration Relationship
m= 1.22644 b= 0.01572

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	4.05	38.2	1.89	0.92
13	3.33	34.6	1.46	0.81
10	2.75	31.4	1.18	0.72
7	1.76	25.0	0.81	0.60
5	1.13	20.0	0.49	0.47

Orifice dH2O 2.604
 Sample dPex 1.2
 Orifice Qa(m3/m) 0.86435
 Sample Qa dPex 30.5427

Audit flow rate % diff: 4.78 %

dH2O	Orifice	
	Qa (CFM)	Qa (M3/m)
2.604	30.51	0.86

dPex	Sampler w/Orifice	
	Qa (CFM)	Qa (M3/m)
1.17	31.98	0.91

Sampler Audit Relationship		
m =	0.024	
b =	-0.008	
r =	0.994	
	pm10	tsp
Set Point (cfm)	41.0	51.3
Set Point (H2O)	2.1	3.3