



MEMORANDUM

Pima County Department of Environmental Quality

TO: Bernie Cohn
Assistant Superintendent of Operations

DATE: 12/30/13
FROM: Beth Gorman
Senior Program Manager

RE: Pima County DEQ Beryllium Monitoring Report 3rd Quarter 2013

Attached is the Pima County Department of Environmental Quality's (PDEQ) Air Monitoring Division Beryllium Monitoring Network Summary for the 3rd Quarter of 2013.

Highlights:

- 107 samples collected resulting in 92 valid and 15 invalid samples (85.98% 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

3rd Quarter 2013

*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 3rd quarter of 2013 there was a total of 107 PM₁₀ samples collected resulting in 92 valid and 15 invalid samples; for a data recovery of 85.98 %. Five 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 92 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 3rd quarter of 2013.

PM₁₀ /Beryllium Concentrations

Monthly Summary of PM₁₀/Beryllium Data

July 2013

Date	Location	Standard Concentration PM ₁₀ (µg/m ³)	24-hour NAAQS PM ₁₀ (µg/m ³)	Beryllium (ng/m ³)
07/01/13	Transportation Bldg	29.9	150	<0.225
07/02/13	Sunnyside H.S.	38.4	150	<0.225
07/03/13	Ocotillo #1	22.0	150	<0.225
07/03/13	Ocotillo #2	26.0	150	<0.225
07/04/13	Los Amigos	28.1	150	<0.225
07/05/13	Los Niños	33.9	150	<0.225
07/06/13	Chaparral M.S.	30.7	150	<0.225
07/07/13	Transportation Bldg	56.8	150	<0.225
07/08/13	Sunnyside H.S.	28.1	150	<0.225
07/09/13	Ocotillo #1	30.1	150	<0.225
07/09/13	Ocotillo #2	30.5	150	<0.225
07/10/13	Los Amigos	18.5	150	<0.225
07/11/13	Los Niños	13.6	150	<0.225
07/12/13	Chaparral M.S.	15.3	150	<0.225
07/13/13	Transportation Bldg	15.5	150	<0.225
07/14/13	Sunnyside H.S.	15.6	150	<0.225
07/15/13	Ocotillo #1	19.9	150	<0.225
07/15/13	Ocotillo #2	26.3	150	<0.225
07/16/13	Los Amigos	10.4	150	<0.225
07/17/13	Los Niños	16.8	150	<0.225
07/18/13	Chaparral M.S.	11.6	150	<0.225
07/19/13	Transportation Bldg.	7.9	150	<0.225
07/20/13	Sunnyside H.S.	11.5	150	<0.225
07/21/13	Ocotillo #1	13.2	150	<0.225
07/21/13	Ocotillo #2	14.6	150	<0.225
07/22/13	Los Amigos	19.0	150	<0.225
07/23/13	Los Niños	20.2	150	<0.225
07/24/13	Chaparral M.S.	19.1	150	<0.225
07/25/13	Transportation Bldg.	11.6	150	<0.225
07/26/13	Sunnyside H.S.	17.2	150	<0.225
07/27/13	Ocotillo #1	18.7	150	<0.225
07/27/13	Ocotillo #2	20.1	150	<0.225
07/28/13	Los Amigos	14.7	150	<0.225
07/29/13	Los Niños	16.9	150	<0.225
07/30/13	Chaparral M.S.	21.4	150	<0.225
07/31/13	Transportation Bldg.	23.3	150	<0.225

NAAQS = National Ambient Air Quality Standard for PM₁₀

PM₁₀ /Beryllium Concentrations (continued)

Monthly Summary of PM₁₀/Beryllium Data

August 2013

Date	Location	Standard Concentration PM₁₀ (µg/m³)	24-hour NAAQS PM₁₀ (µg/m³)	Beryllium (ng/m³)
08/01/13	Sunnyside H.S.	22.8	150	<0.225
08/02/13	Ocotillo #1	11.8	150	<0.225
08/02/13	Ocotillo #2	13.8	150	<0.225
08/04/13	Los Amigos	13.3	150	<0.225
08/04/13	Los Niños	13.6	150	<0.225
08/05/13	Chaparral M.S.	12.0	150	<0.225
08/06/13	Transportation Bldg	INVALID	INVALID	INVALID
08/07/13	Sunnyside H.S.	20.8	150	<0.225
08/08/13	Ocotillo #1	22.0	150	<0.225
08/08/13	Ocotillo #2	22.3	150	<0.225
08/09/13	Los Amigos	19.8	150	<0.225
08/10/13	Los Niños	19.5	150	<0.225
08/11/13	Chaparral M.S.	19.1	150	<0.225
08/12/13	Transportation Bldg	28.2	150	<0.225
08/13/13	Sunnyside H.S.	33.1	150	<0.225
08/14/13	Ocotillo #1	35.6	150	<0.225
08/14/13	Ocotillo #2	INVALID	INVALID	INVALID
08/15/13	Los Amigos	32.4	150	<0.225
08/16/13	Los Niños	21.9	150	<0.225
08/17/13	Chaparral M.S.	28.4	150	<0.225
08/18/13	Transportation Bldg	20.3	150	<0.225
08/19/13	Sunnyside H.S.	25.9	150	<0.225
08/20/13	Ocotillo #1	23.5	150	<0.225
08/20/13	Ocotillo #2	INVALID	INVALID	INVALID
08/21/13	Los Amigos	18.4	150	<0.225
08/22/13	Los Niños	25.2	150	<0.225
08/23/13	Chaparral M.S.	19.3	150	<0.225
08/24/13	Transportation Bldg.	8.9	150	<0.225
08/25/13	Sunnyside H.S.	11.6	150	<0.225
08/26/13	Ocotillo #1	19.0	150	<0.225
08/26/13	Ocotillo #2	INVALID	INVALID	INVALID
08/27/13	Los Amigos	14.3	150	<0.225
08/28/13	Los Niños	14.2	150	<0.225
08/29/13	Chaparral M.S.	7.7	150	<0.225
08/30/13	Transportation Bldg.	8.3	150	<0.225
08/31/13	Sunnyside H.S.	11.2	150	<0.225

Sample running on 8/6/13 invalid due to sample time being < 23 hours.

Samples running on 8/14/13, 8/20/13 and 8/26/13 are invalid due to equipment malfunction.

NAAQS = National Ambient Air Quality Standard for PM₁₀

PM₁₀ /Beryllium Concentrations (continued)

Monthly Summary of PM₁₀/Beryllium Data

September 2013

Date	Location	Standard Concentration PM₁₀ (µg/m³)	24-hour NAAQS PM₁₀ (µg/m³)	Beryllium (ng/m³)
09/01/13	Ocotillo #1	10.2	150	<0.225
09/01/13	Ocotillo #2	INVALID	INVALID	INVALID
09/02/13	Los Amigos	14.2	150	<0.225
09/03/13	Los Niños	23.5	150	<0.225
09/04/13	Chaparral M.S.	INVALID	INVALID	INVALID
09/05/13	Transportation Bldg.	INVALID	INVALID	INVALID
09/06/13	Sunnyside H.S.	22.7	150	<0.225
09/07/13	Ocotillo #1	9.8	150	<0.225
09/07/13	Ocotillo #2	4.9	150	<0.225
09/08/13	Los Amigos	6.4	150	<0.225
09/09/13	Los Niños	5.5	150	<0.225
09/10/13	Chaparral M.S.	INVALID	INVALID	INVALID
09/11/13	Transportation Bldg.	INVALID	INVALID	INVALID
09/12/13	Sunnyside H.S.	19.6	150	<0.225
09/13/13	Ocotillo #1	5.9	150	<0.225
09/13/13	Ocotillo #2	INVALID	INVALID	INVALID
09/14/13	Los Amigos	7.2	150	<0.225
09/15/13	Los Niños	INVALID	INVALID	INVALID
09/16/13	Chaparral M.S.	13.5	150	<0.225
09/17/13	Transportation Bldg.	17.0	150	<0.225
09/18/13	Sunnyside H.S.	26.0	150	<0.225
09/19/13	Ocotillo #1	19.4	150	<0.225
09/19/13	Ocotillo #2	INVALID	INVALID	INVALID
09/20/13	Los Amigos	19.3	150	<0.225
09/21/13	Los Niños	INVALID	INVALID	INVALID
09/22/13	Chaparral M.S.	35.1	150	<0.225
09/23/13	Transportation Bldg.	22.5	150	<0.225
09/24/13	Sunnyside H.S.	29.1	150	<0.225
09/25/13	Ocotillo #1	18.6	150	<0.225
09/25/13	Ocotillo #2	INVALID	INVALID	INVALID
09/26/13	Los Amigos	36.1	150	<0.225
09/27/13	Los Niños	INVALID	INVALID	INVALID
09/28/13	Chaparral M.S.	25.1	150	<0.225
09/29/13	Transportation Bldg.	17.8	150	<0.225
09/30/13	Sunnyside H.S.	27.5	150	<0.225

Samples running on 09/01/13, 09/13/13, 09/19/13 and 09/25/13 invalid due to a bad motor.

Samples running on 09/04/13 and 09/05/13 invalid due to double exposure.

Samples running on 09/10/13 and 09/11/13 invalid due to no sample caused by the double exposure.

Samples running on 09/15/13, 09/21/13 and 09/27/13 invalid due to no power caused by a bad GFI outlet.

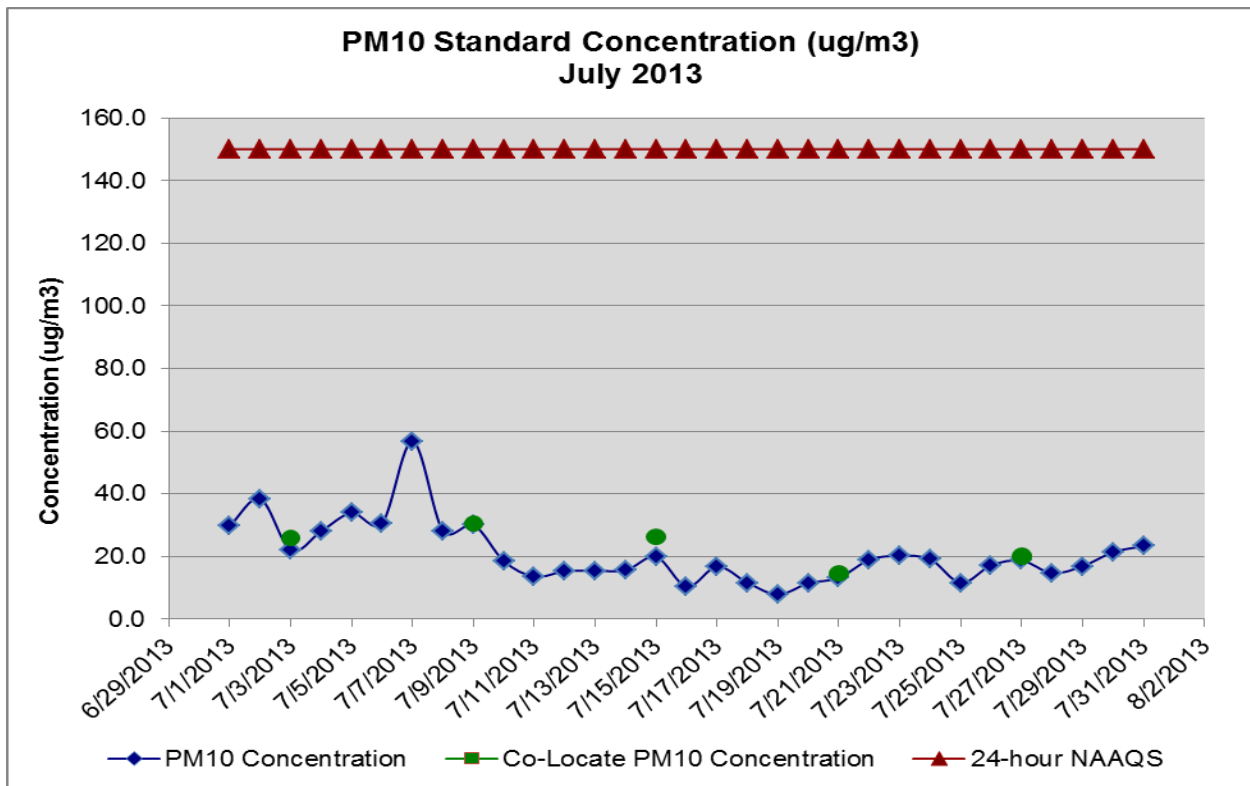
NAAQS = National Ambient Air Quality Standard for PM₁₀

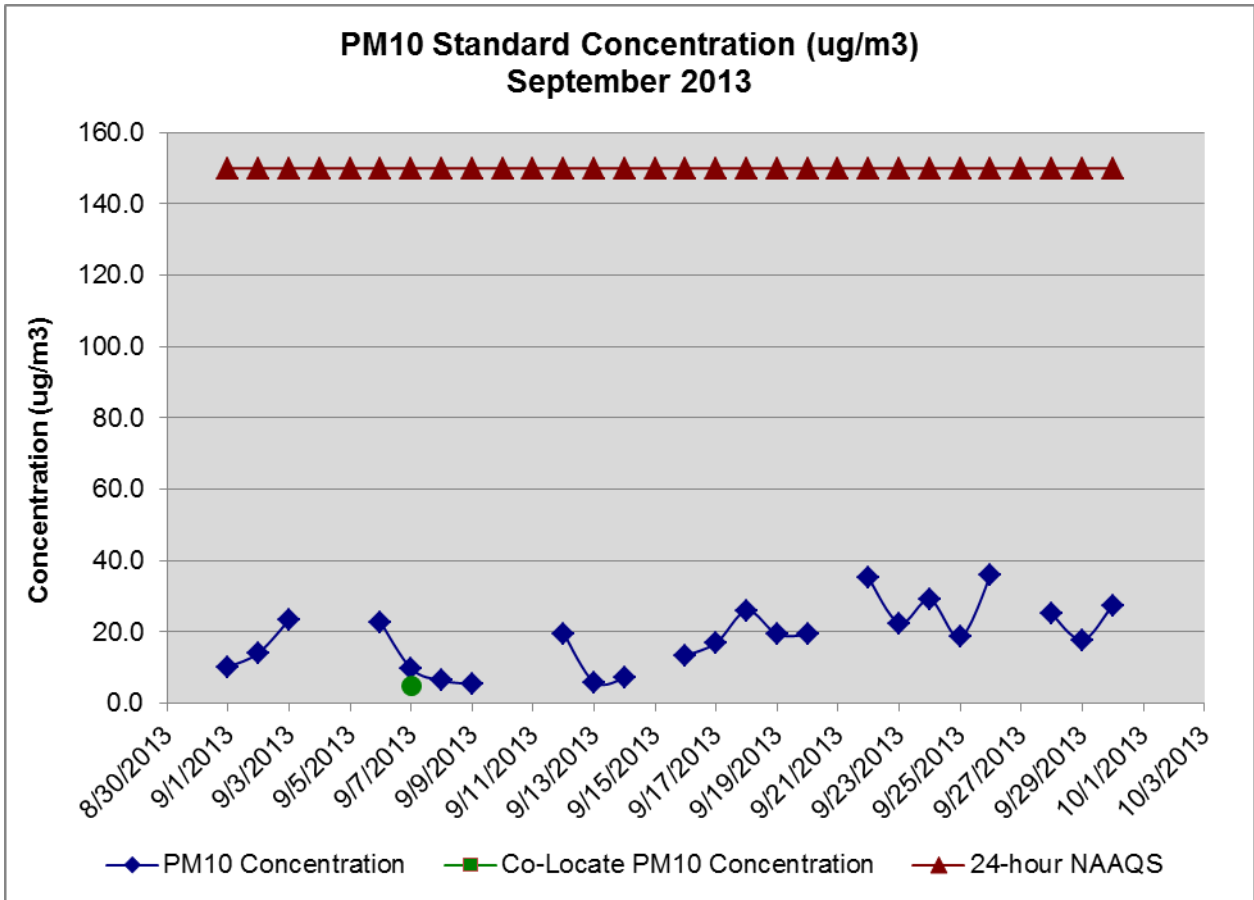
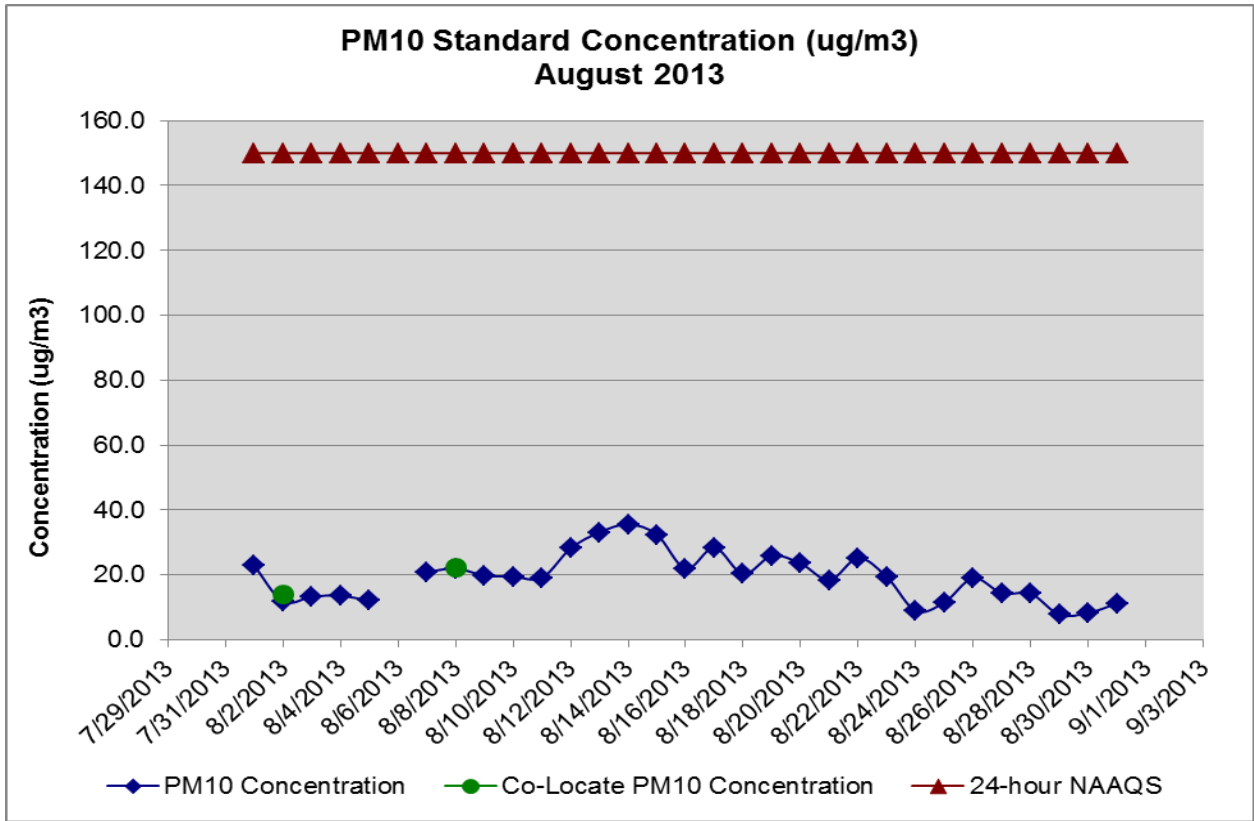
Precision of Duplicate Pairs – PM10

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 %
7/3/13	1	22.0	2	26.0	4.0	16.67
7/9/13	1	30.1	2	30.5	0.4	1.32
7/15/13	1	19.9	2	26.3	6.4	27.71
7/27/13	1	18.7	2	20.1	1.4	7.22
8/8/13	1	22.0	2	22.3	0.3	1.35

PM₁₀ Concentration Charts





Audit Results

Audits were performed on five of the seven samplers for the 3rd quarter of 2013. The Los Nino's site was not audited due to not having any power at the site, and the Ocotillo #2 sampler was not audited because the sampler motor was replaced and a calibration performed on September 24, 2013. 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 =** 290.1
Audit Date: 09/27/13 **Ps =** 694.9
Motor: 1424 **Temp c =** 21.7
 Ta = 294.7
 Pa = 692.5
Orifice Calibration Relationship
m= 1.22644 b= 0.01572

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	4.26	38.3	2.32	0.99
13	3.59	35.1	2.01	0.92
10	3.00	32.1	1.67	0.84
7	2.03	26.3	1.18	0.71
5	1.31	21.0	0.83	0.59

Orifice dH2O 2.838
 Sample dPex 1.6
 Orifice Qa(m3/m) 0.88325
 Sample Qa dPex 31.1225

Audit flow rate % diff: 5.42 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.838	31.18	0.88

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
1.60	32.88	0.93

Sampler Audit Relationship		
m =	0.023	
b =	0.099	
r =	0.999	
	pm10	tsp
Set Point (cfm)	40.8	51.0
Set Point (H2O)	2.6	3.9

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 =** 290.1
Audit Date: 09/23/13 **Ps =** 694.9
Motor: 1418 **Temp c =** 26.67
 Ta = 299.7
 Pa = 693.0
Orifice Calibration Relationship
m= 1.22644 b= 0.01572

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	5.33	43.3	3.06	1.15
13	4.47	39.6	2.60	1.06
10	3.75	36.2	2.26	0.99
7	2.46	29.2	1.58	0.83
5	1.59	23.4	1.03	0.67

Orifice dH2O 3.52
 Sample dPex 2.1
 Orifice Qa(m3/m) 0.99314
 Sample Qa dPex 34.9913

Audit flow rate % diff: 5.31 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
3.52	35.06	0.99

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
2.11	36.93	1.05

Sampler Audit Relationship		
m =	0.024	
b =	0.112	
r =	0.998	
	pm10	tsp
Set Point (cfm)	41.4	51.8
Set Point (H2O)	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
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 = 290.1
Audit Date: 09/23/13 Ps = 694.9
Motor: 1419 Temp c = 26.67
 Ta = 299.7
 Pa = 693.0

Orifice Calibration Relationship
 m= 1.22644 b= 0.01572

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	2.95	32.1	1.30	0.75
13	2.51	29.5	1.05	0.67
10	2.13	27.2	0.84	0.60
7	1.43	22.2	0.50	0.46
5	1.00	18.5	0.28	0.35

Orifice dH2O 2.004
 Sample dPex 0.8
 Orifice Qa(m3/m) 0.74621
 Sample Qa dPex 26.5088

Audit flow rate % diff: 4.32 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.004	26.34	0.75

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
0.79	27.49	0.78

Sampler Audit Relationship		
m =	0.029	
b =	-0.190	
r =	1.000	
	pm10	tsp
Set Point (cfm)	41.4	51.8
Set Point (H2O)	2.4	4.1

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 = 290.1
Audit Date: 09/23/13 Ps = 694.9
Motor: 1420 Temp c = 26.67
 Ta = 299.7
 Pa = 693.0

Orifice Calibration Relationship
 m= 1.22644 b= 0.01572

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	2.74	30.9	1.10	0.69
13	2.32	28.4	0.88	0.62
10	1.94	25.9	0.68	0.54
7	1.33	21.4	0.42	0.43
5	0.90	17.5	0.20	0.29

Orifice dH2O 1.846
 Sample dPex 0.7
 Orifice Qa(m3/m) 0.71567
 Sample Qa dPex 25.4617

Audit flow rate % diff: 4.30 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
1.846	25.26	0.72

Sampler w/Orifice		
dPex	Qa(CFM)	Qa(M3/m)
0.66	26.36	0.75

Sampler Audit Relationship		
m =	0.029	
b =	-0.208	
r =	0.998	
	pm10	tsp
Set Point (cfm)	41.4	51.8
Set Point (H2O)	2.3	3.9

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 =** 290.1
Audit Date: 09/27/13 **Ps =** 694.9
Motor: 1422 **Temp c =** 21.70
 Ta = 294.7
 Pa = 692.5
Orifice Calibration Relationship
m= 1.22644 b= 0.01572

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	4.29	38.4	2.01	0.92
13	3.60	35.2	1.61	0.83
10	3.00	32.1	1.31	0.75
7	2.04	26.4	0.83	0.59
5	1.31	21.0	0.48	0.45

Orifice dH2O 2.848
 Sample dPex 1.2
 Orifice Qa(m3/m) 0.88483
 Sample Qa dPex 31.3536

Audit flow rate % diff: 4.64 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.848	31.32	0.88

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
1.25	32.65	0.93

Sampler Audit Relationship		
m =	0.027	
b =	-0.117	
r =	1.000	
	pm10	tsp
Set Point (cfm)	40.8	51.0
Set Point (H2O)	2.3	3.7