



MEMORANDUM

Pima County Department of Environmental Quality

TO: Bernie Cohn
Assistant Superintendent of Operations

DATE:
FROM: Beth Gorman
Senior Program Manager

RE: Pima County DEQ Beryllium Monitoring Report 1st Quarter 2014

Attached is the Pima County Department of Environmental Quality's (PDEQ) Air Monitoring Division Beryllium Monitoring Network Summary for the 1st Quarter of 2014.

Highlights:

- 105 samples collected resulting in 67 valid and 38 invalid samples (63.81% 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

1st 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 1st quarter of 2014 there was a total of 105 PM₁₀ samples collected resulting in 67 valid and 38 invalid samples; for a data recovery of 63.81 %. Seven 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 105 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 1st quarter of 2014.

PM₁₀ /Beryllium Concentrations

Monthly Summary of PM₁₀/Beryllium Data

January 2014

Date	Location	Standard Concentration PM ₁₀ (µg/m ³)	24-hour NAAQS PM ₁₀ (µg/m ³)	Beryllium (ng/m ³)
01/01/14	Los Niño's	INVALID	INVALID	INVALID
01/02/14	Chaparral M.S.	14.1	150	<0.225
01/03/14	Transportation Bldg	15.5	150	<0.225
01/04/14	Sunnyside H.S.	31.8	150	<0.225
01/05/14	Ocotillo #1	20.6	150	<0.225
01/05/14	Ocotillo #2	23.0	150	<0.225
01/06/14	Los Amigos	INVALID	INVALID	INVALID
01/07/14	Los Niños	22.4	150	<0.225
01/08/14	Chaparral M.S.	29.5	150	<0.225
01/09/14	Transportation Bldg	28.7	150	<0.225
01/10/14	Sunnyside H.S.	27.7	150	<0.225
01/11/14	Ocotillo #1	24.5	150	<0.225
01/11/14	Ocotillo #2	25.3	150	<0.225
01/12/14	Los Amigos	INVALID	INVALID	INVALID
01/13/14	Los Niños	INVALID	INVALID	INVALID
01/14/14	Chaparral M.S.	INVALID	INVALID	INVALID
01/15/14	Transportation Bldg.	INVALID	INVALID	INVALID
01/16/14	Sunnyside H.S.	INVALID	INVALID	INVALID
01/17/14	Ocotillo #1	INVALID	INVALID	INVALID
01/17/14	Ocotillo #2	INVALID	INVALID	INVALID
01/18/14	Los Amigos	INVALID	INVALID	INVALID
01/19/14	Los Niños	INVALID	INVALID	INVALID
01/20/14	Chaparral M.S.	INVALID	INVALID	INVALID
01/21/14	Transportation Bldg.	INVALID	INVALID	INVALID
01/22/14	Sunnyside H.S.	INVALID	INVALID	INVALID
01/23/14	Ocotillo #1	INVALID	INVALID	INVALID
01/23/14	Ocotillo #2	INVALID	INVALID	INVALID
01/24/14	Los Amigos	28.9	150	<0.225
01/25/14	Los Niños	INVALID	INVALID	INVALID
01/26/14	Chaparral M.S.	INVALID	INVALID	INVALID
01/27/14	Transportation Bldg.	INVALID	INVALID	INVALID
01/28/14	Sunnyside H.S.	28.0	150	<0.225
01/29/14	Ocotillo #1	INVALID	INVALID	INVALID
01/29/14	Ocotillo #2	INVALID	INVALID	INVALID
01/30/14	Los Amigos	INVALID	INVALID	INVALID
01/31/14	Los Niño's	INVALID	INVALID	INVALID

Sample running on 01/01/14 was invalid due to sampler running on the wrong day.

Sample running on 01/06/14 was invalid due to a power failure.

Samples running on 01/12/14, 01/13/14, 01/15/14, 01/16/14, 01/17/14 invalid due to double exposure caused by the filter not being changed.

Samples running on 01/18/14, 01/19/14, 01/20/14, 01/21/14, 01/22/14, 01/23/14, 01/25/14, 01/26/14, 01/27/14 invalid due to no sample caused by the filter not being changed.

Sample running on 01/28/14 invalid due to the sampler only running 2 hours.

Sample running on 01/30/14 invalid due to the sampler only running for 6 minutes.

Sample running on 01/31/14 invalid due to the sampler only running for 16 hours.

NAAQS = National Ambient Air Quality Standard for PM₁₀

PM₁₀ /Beryllium Concentrations (continued)

Monthly Summary of PM₁₀/Beryllium Data

February 2014

Date	Location	Standard Concentration PM₁₀ (µg/m³)	24-hour NAAQS PM₁₀ (µg/m³)	Beryllium (ng/m³)
02/01/14	Chaparral M.S.	15.0	150	<0.225
02/02/14	Transportation Bldg	13.5	150	<0.225
02/03/14	Sunnyside H.S.	9.9	150	<0.225
02/04/14	Ocotillo #1	6.6	150	<0.225
02/04/14	Ocotillo #2	9.1	150	<0.225
02/05/14	Los Amigos	13.7	150	<0.225
02/06/14	Los Niños	INVALID	INVALID	INVALID
02/07/14	Chaparral M.S.	18.4	150	<0.225
02/08/14	Transportation Bldg	INVALID	INVALID	INVALID
02/09/14	Sunnyside H.S.	19.7	150	<0.225
02/10/14	Ocotillo #1	12.8	150	<0.225
02/10/14	Ocotillo #2	14.7	150	<0.225
02/11/14	Los Amigos	20.3	150	<0.225
02/12/14	Los Niños	INVALID	INVALID	INVALID
02/13/14	Chaparral M.S.	26.7	150	<0.225
02/14/14	Transportation Bldg	INVALID	INVALID	INVALID
02/15/14	Sunnyside H.S.	17.3	150	<0.225
02/16/14	Ocotillo #1	INVALID	INVALID	INVALID
02/16/14	Ocotillo #2	INVALID	INVALID	INVALID
02/17/14	Los Amigos	INVALID	INVALID	INVALID
02/18/14	Los Niños	INVALID	INVALID	INVALID
02/19/14	Chaparral M.S.	17.3	150	<0.225
02/20/14	Transportation Bldg.	INVALID	INVALID	INVALID
02/21/14	Sunnyside H.S.	32.5	150	<0.225
02/22/14	Ocotillo #1	INVALID	INVALID	INVALID
02/22/14	Ocotillo #2	INVALID	INVALID	INVALID
02/23/14	Los Amigos	INVALID	INVALID	INVALID
02/24/14	Los Niños	INVALID	INVALID	INVALID
02/25/14	Chaparral M.S.	29.4	150	<0.225
02/26/14	Transportation Bldg.	INVALID	INVALID	INVALID
02/27/14	Sunnyside H.S.	INVALID	INVALID	INVALID
02/28/14	Ocotillo #1	INVALID	INVALID	INVALID
02/28/14	Ocotillo #2	28.7	150	<0.225

Samples running on 02/06/14 and 02/12/14 invalid due to sample under-run caused by a power issue.

Samples running on 02/08/14 and 02/14/14 and 02/27/14 invalid due to sampler not running 24 hours.

Sample running on 02/16/14 and 02/17/14 invalid due to double exposure caused by filter not being changed.

Sample running on 02/18/14 invalid due to sampler running on wrong day.

Sample running on 02/20/14 invalid due to sampler not running.

Samples running on 02/22/14, 02/23/14, 02/24/14 invalid due to no sample caused by the filter not being changed.

Sample running on 02/26/14 invalid due to sampler timer not set to correct day.

Sample running on 02/28/14 invalid due to sampler not running caused by a tripped GFI outlet.

NAAQS = National Ambient Air Quality Standard for PM₁₀

PM₁₀ /Beryllium Concentrations (continued)

Monthly Summary of PM₁₀/Beryllium Data

March 2014

Date	Location	Standard Concentration PM₁₀ (µg/m³)	24-hour NAAQS PM₁₀ (µg/m³)	Beryllium (ng/m³)
03/01/14	Los Amigos	8.1	150	<0.225
03/02/14	Los Niños	6.6	150	<0.225
03/03/14	Chaparral M.S.	13.5	150	<0.225
03/04/14	Transportation Bldg.	12.2	150	<0.225
03/05/14	Sunnyside H.S.	18.8	150	<0.225
03/06/14	Ocotillo #1	15.2	150	<0.225
03/06/14	Ocotillo #2	17.9	150	<0.225
03/07/14	Los Amigos	19.8	150	<0.225
03/08/14	Los Niños	20.4	150	<0.225
03/09/14	Chaparral M.S.	16.5	150	<0.225
03/10/14	Transportation Bldg.	11.4	150	<0.225
03/11/14	Sunnyside H.S.	20.6	150	<0.225
03/12/14	Ocotillo #1	65.9	150	<0.225
03/12/14	Ocotillo #2	88.7	150	<0.225
03/13/14	Los Amigos	99.6	150	<0.225
03/14/14	Los Niños	28.0	150	<0.225
03/15/14	Chaparral M.S.	33.1	150	<0.225
03/16/14	Transportation Bldg.	18.0	150	<0.225
03/17/14	Sunnyside H.S.	17.6	150	<0.225
03/18/14	Ocotillo #1	33.3	150	<0.225
03/18/14	Ocotillo #2	41.0	150	<0.225
03/19/14	Los Amigos	32.3	150	<0.225
03/20/14	Los Niños	31.4	150	<0.225
03/21/14	Chaparral M.S.	25.4	150	<0.225
03/22/14	Transportation Bldg.	15.6	150	<0.225
03/23/14	Sunnyside H.S.	16.9	150	<0.225
03/24/14	Ocotillo #1	22.4	150	<0.225
03/24/14	Ocotillo #2	26.0	150	<0.225
03/25/14	Los Amigos	23.7	150	<0.225
03/26/14	Los Niños	40.5	150	<0.225
03/27/14	Chaparral M.S.	25.3	150	<0.225
03/28/14	Transportation Bldg.	26.7	150	<0.225
03/29/14	Sunnyside H.S.	28.1	150	<0.225
03/30/14	Ocotillo #1	28.5	150	<0.225
03/30/14	Ocotillo #2	34.9	150	<0.225
03/31/14	Los Amigos	34.5	150	<0.225

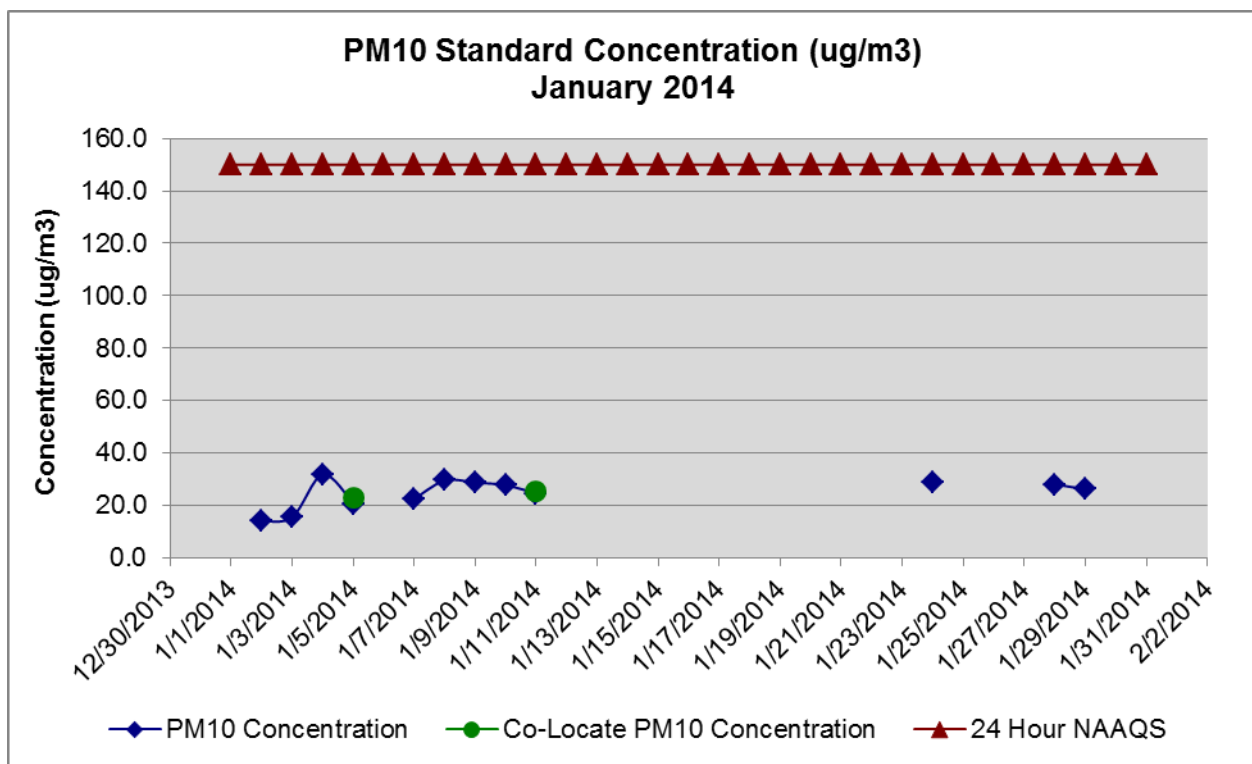
NAAQS = National Ambient Air Quality Standard for PM₁₀

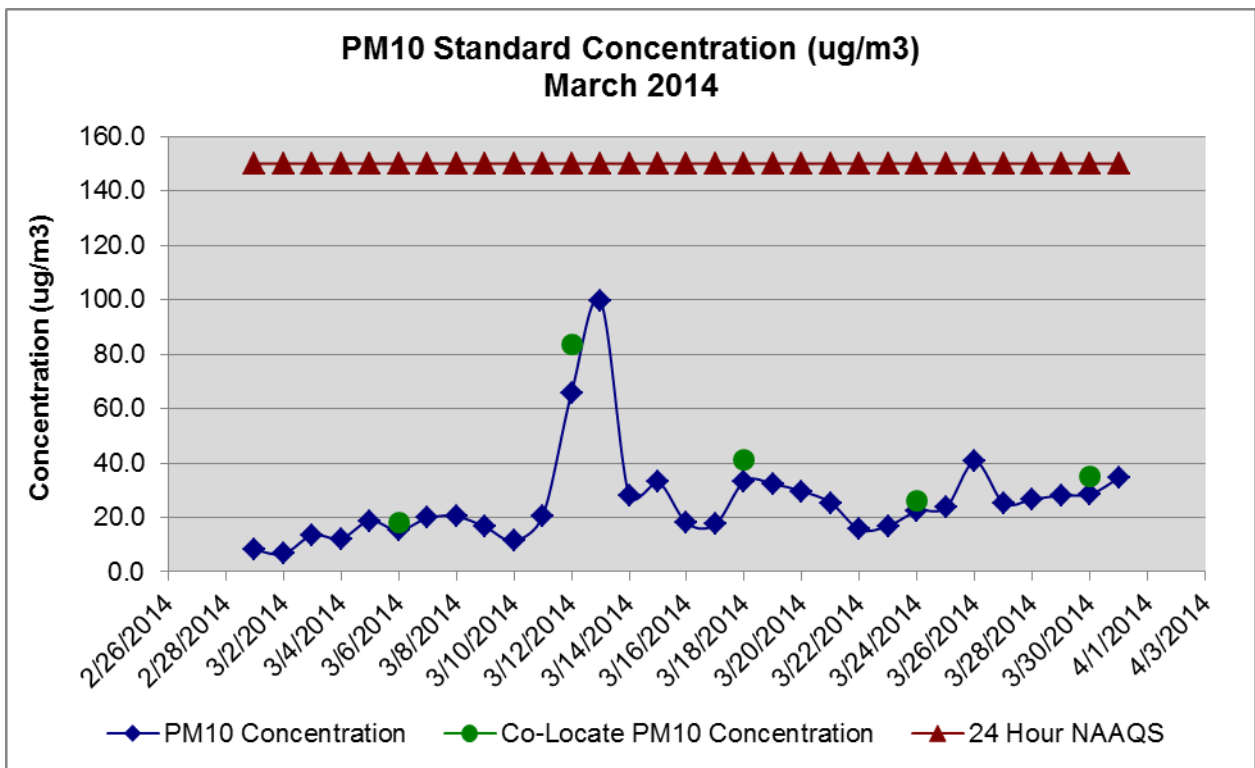
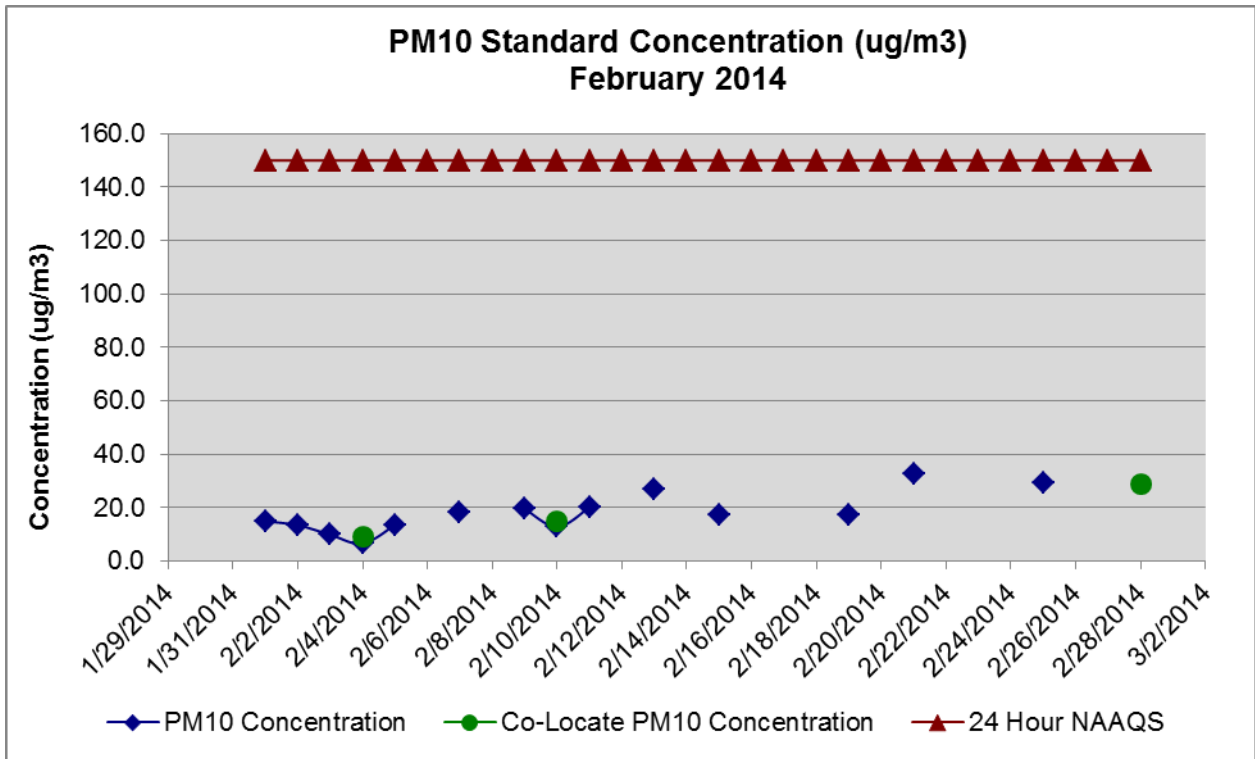
Precision of Duplicate Pairs – PM10

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 %
01/05/14	1	20.6	2	23.0	2.4	11.01
01/11/14	1	24.5	2	25.3	0.8	3.21
03/06/14	1	15.2	2	17.9	2.7	16.31
03/12/04	1	65.9	2	83.5	17.6	23.56
03/18/14	1	33.3	2	41.0	7.7	20.73
03/24/14	1	22.4	2	26.0	3.6	14.88
03/30/14	1	28.5	2	34.9	6.4	20.19

PM₁₀ Concentration Charts





Audit Results

Audits were performed on all seven samplers for the 1st quarter of 2014. If the audit flow rate percent difference is $\leq \pm 7\%$, the sampler calibration is accepted. Differences exceeding $\pm 7\%$ require sampler recalibration. Differences exceeding $\pm 10\%$ 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 =** 296.0
Audit Date: 03/05/14 **Ps =** 692.8
Motor: 1424 **Temp c =** 23.70
 Ta = 296.7
 Pa = 693.0
Orifice Calibration Relationship
 m= 1.22644 b= 0.01572

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	5.76	44.8	3.21	1.17
13	4.82	40.9	2.68	1.07
10	3.96	37.0	2.23	0.98
7	2.63	30.1	1.56	0.82
5	1.67	23.9	1.10	0.69

Orifice dH2O 3.768
 Sample dPex 2.2
 Orifice Qa(m3/m) 1.0228
 Sample Qa dPex 36.0245

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
3.768	36.10	1.02

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
2.16	38.07	1.08

Sampler Audit Relationship		
m =	0.023	
b =	0.144	
r =	0.999	
	pm10	tsp
Set Point (cfm)	40.1	50.1
Set Point (H2O)	2.6	3.9

Audit flow rate % diff: 5.40 %

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 =** 296.0
Audit Date: 03/10/14 **Ps =** 692.8
Motor: 1418 **Temp c =** 18.50
 Ta = 291.5
 Pa = 696.0
Orifice Calibration Relationship
 m= 1.22644 b= 0.01572

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	4.47	38.9	2.59	1.04
13	3.75	35.6	2.28	0.98
10	3.17	32.7	1.90	0.89
7	2.12	26.7	1.34	0.75
5	1.37	21.4	0.93	0.62

Orifice dH2O 2.976
 Sample dPex 1.8
 Orifice Qa(m3/m) 0.89748
 Sample Qa dPex 31.6205

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.976	31.68	0.90

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
1.81	33.43	0.95

Sampler Audit Relationship		
m =	0.024	
b =	0.109	
r =	0.999	
	pm10	tsp
Set Point (cfm)	39.2	49.0
Set Point (H2O)	2.6	4.0

Audit flow rate % diff: 5.50 %

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 =** 296.0
Audit Date: 03/05/14 **Ps =** 692.9
Motor: 1419 **Temp c =** 24.70
 Ta = 297.7
 Pa = 695.0

Orifice Calibration Relationship
 m= 1.22644 b= 0.01572

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	4.36	38.9	1.96	0.92
13	3.64	35.5	1.56	0.82
10	3.01	32.2	1.25	0.73
7	2.06	26.6	0.73	0.56
5	1.33	21.3	0.35	0.39

Orifice dH2O 2.88
 Sample dPex 1.2
 Orifice Qa(m3/m) 0.8928
 Sample Qa dPex 31.7535

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.88	31.52	0.89

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
1.17	32.92	0.93

Sampler Audit Relationship		
m =	0.030	
b =	-0.243	
r =	0.999	
	pm10	tsp
Set Point (cfm)	40.1	50.1
Set Point (H2O)	2.1	3.7

Audit flow rate % diff: 4.41 %

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 =** 296.0
Audit Date: 03/05/14 **Ps =** 692.8
Motor: 1420 **Temp c =** 19.50
 Ta = 292.5
 Pa = 695.0

Orifice Calibration Relationship
 m= 1.22644 b= 0.01572

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	4.18	37.7	1.76	0.86
13	3.53	34.6	1.45	0.78
10	2.94	31.6	1.10	0.68
7	1.96	25.7	0.65	0.52
5	1.30	20.8	0.28	0.34

Orifice dH2O 2.782
 Sample dPex 1.0
 Orifice Qa(m3/m) 0.86946
 Sample Qa dPex 30.9679

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.782	30.69	0.87

Sampler w/Orifice		
dPex	Qa(CFM)	Qa(M3/m)
1.05	32.06	0.91

Sampler Audit Relationship		
m =	0.030	
b =	-0.275	
r =	0.996	
	pm10	tsp
Set Point (cfm)	39.4	49.3
Set Point (H2O)	2.0	3.5

Audit flow rate % diff: 4.44 %

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 =** 296.0
Audit Date: 03/05/14 **Ps =** 692.8
Motor: 1425 **Temp c =** 19.50
 Ta = 292.5
 Pa = 695.0
Orifice Calibration Relationship
 m= 1.22644 b= 0.01572

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	5.47	43.2	1.96	0.91
13	4.54	39.3	1.72	0.85
10	3.75	35.7	1.41	0.77
7	2.51	29.1	1.02	0.66
5	1.60	23.2	0.60	0.50

Orifice dH2O 3.574
 Sample dPex 1.3
 Orifice Qa(m3/m) 0.98719
 Sample Qa dPex 34.8218

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.574	34.85	0.99

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
1.34	36.69	1.04

Sampler Audit Relationship		
m =	0.020	
b =	0.051	
r =	0.993	
	pm10	tsp
Set Point (cfm)	39.4	49.3
Set Point (H2O)	1.7	2.6

Audit flow rate % diff: 5.25 %

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
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 =** 296.0
Audit Date: 03/05/14 **Ps =** 692.8
Motor: 1422 **Temp c =** 24.20
 Ta = 297.2
 Pa = 694.0
Orifice Calibration Relationship
 m= 1.22644 b= 0.01572

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	3.78	36.2	1.68	0.85
13	3.14	32.9	1.34	0.76
10	2.62	30.0	1.08	0.68
7	1.77	24.6	0.68	0.54
5	1.17	19.9	0.39	0.41

Orifice dH2O 2.496
 Sample dPex 1.0
 Orifice Qa(m3/m) 0.83017
 Sample Qa dPex 29.432

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.496	29.30	0.83

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
1.03	30.65	0.87

Sampler Audit Relationship		
m =	0.027	
b =	-0.125	
r =	1.000	
	pm10	tsp
Set Point (cfm)	40.1	50.1
Set Point (H2O)	2.1	3.5

Audit flow rate % diff: 4.57 %

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 =** 296.0
Audit Date: 03/10/14 **Ps =** 692.8
Motor: 1421 **Temp c =** 20.90
 Ta = 293.9
 Pa = 694.0
Orifice Calibration Relationship
 m= 1.22644 b= 0.01572

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	3.52	34.7	1.55	0.81
13	3.05	32.3	1.24	0.72
10	2.50	29.2	0.94	0.63
7	1.70	24.0	0.55	0.48
5	1.12	19.4	0.27	0.34

Orifice dH2O 2.378
 Sample dPex 0.9
 Orifice Qa(m3/m) 0.80542
 Sample Qa dPex 28.6711

Audit flow rate % diff: 4.39 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.378	28.43	0.81

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
0.91	29.69	0.84

Sampler Audit Relationship		
m =	0.030	
b =	-0.250	
r =	0.999	
	pm10	tsp
Set Point (cfm)	39.6	49.6
Set Point (H2O)	2.1	3.7