



MEMORANDUM

Pima County Department of Environmental Quality

DATE: 7/17/2012

TO: Alex Gallego
Assistant Superintendent Operations & Facilities Planning

FROM: Beth Gorman
Program Manager

RE: Pima County DEQ Beryllium Monitoring Report 1st Quarter 2012

Attached is the Pima County Department of Environmental Quality's (PDEQ) Air Monitoring Division Beryllium Monitoring Network Summary for the 1st Quarter of 2012.

Highlights:

- 106 samples collected resulting in 105 valid and 1 invalid samples (99.05% data recovery). EPA requires monitoring data recovery at 75%.
- No beryllium values were detected over the Practical Quantitation Limit (PQL).
- 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

1st Quarter 2012



*Pima County Department of Environmental Quality
33 N. Stone Avenue, Suite 700
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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 2012 there was a total of 106 PM₁₀ samples collected resulting in 105 valid and 1 invalid samples; for a data recovery of 99.05 %. Twelve 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, and Beryllium analysis results, accompanying graphs and a brief explanation of all invalid samples for the 1st quarter of 2012.

PM₁₀ /Beryllium Concentrations**Monthly Summary of PM₁₀/Beryllium Data****January 2012**

Date	Location	Standard Concentration PM₁₀ (µg/m³)	24-hour NAAQS PM₁₀ (µg/m³)	Beryllium (ng/m³)
01/01/12	Chaparral M.S.	11.1	150	<0.225
01/02/12	Transportation Bldg	17.8	150	<0.225
01/03/12	Sunnyside H.S.	31.8	150	<0.225
01/04/12	Ocotillo #1	23.7	150	<0.225
01/04/12	Ocotillo #2	23.7	150	<0.225
01/05/12	Los Amigos	14.3	150	<0.225
01/06/12	Los Niños	23.7	150	<0.225
01/07/12	Chaparral M.S.	18.1	150	<0.225
01/08/12	Transportation Bldg	17.4	150	<0.225
01/09/12	Sunnyside H.S.	32.9	150	<0.225
01/10/12	Ocotillo #1	23.5	150	<0.225
01/10/12	Ocotillo #2	26.4	150	<0.225
01/11/12	Los Amigos	26.1	150	<0.225
01/12/12	Los Niños	39.4	150	<0.225
01/13/12	Chaparral M.S.	41.3	150	<0.225
01/14/12	Transportation Bldg	23.9	150	<0.225
01/15/12	Sunnyside H.S.	16.5	150	<0.225
01/16/12	Ocotillo #1	10.2	150	<0.225
01/16/12	Ocotillo #2	10.7	150	<0.225
01/17/12	Los Amigos	9.7	150	<0.225
01/18/12	Los Niños	13.9	150	<0.225
01/19/12	Chaparral M.S.	19.9	150	<0.225
01/20/12	Transportation Bldg.	24.6	150	<0.225
01/21/12	Sunnyside H.S.	15.1	150	<0.225
01/22/12	Ocotillo #1	97.8	150	<0.225
01/22/12	Ocotillo #2	98.6	150	<0.225
01/23/12	Los Amigos	35.0	150	<0.225
01/24/12	Los Niños	22.2	150	<0.225
01/25/12	Chaparral M.S.	23.4	150	<0.225
01/26/12	Transportation Bldg.	25.7	150	<0.225
01/27/12	Sunnyside H.S.	33.0	150	<0.225
01/28/12	Ocotillo #1	28.5	150	<0.225
01/28/12	Ocotillo #2	27.5	150	<0.225
01/39/12	Los Amigos	15.0	150	<0.225
01/30/12	Los Niños	23.6	150	<0.225
01/31/12	Chaparral M.S.	21.2	150	<0.225

NAAQS = National Ambient Air Quality Standard for PM₁₀

PM₁₀ /Beryllium Concentrations (continued)

Monthly Summary of PM₁₀/Beryllium Data

February 2012

Date	Location	Standard Concentration PM₁₀ (µg/m³)	24-hour NAAQS PM₁₀ (µg/m³)	Beryllium (ng/m³)
02/01/12	Transportation Bldg	17.0	150	<0.225
02/02/12	Sunnyside H.S.	41.3	150	<0.225
02/03/12	Ocotillo #1	19.0	150	<0.225
02/03/12	Ocotillo #2	19.2	150	<0.225
02/04/12	Los Amigos	23.8	150	<0.225
02/05/12	Los Ninos	36.2	150	<0.225
02/06/12	Chaparral M.S.	30.0	150	<0.225
02/07/12	Transportation Bldg	19.6	150	<0.225
02/08/12	Sunnyside H.S.	38.0	150	<0.225
02/09/12	Ocotillo #1	24.1	150	<0.225
02/09/12	Ocotillo #2	24.4	150	<0.225
02/10/12	Los Amigos	22.9	150	<0.225
02/11/12	Los Niños	18.4	150	<0.225
02/12/12	Chaparral M.S.	19.3	150	<0.225
02/13/12	Transportation Bldg	13.4	150	<0.225
02/14/12	Sunnyside H.S.	19.5	150	<0.225
02/15/12	Ocotillo #1	11.2	150	<0.225
02/15/12	Ocotillo #2	10.8	150	<0.225
02/16/12	Los Amigos	16.0	150	<0.225
02/17/12	Los Niños	4.3	150	<0.225
02/18/12	Chaparral M.S.	8.2	150	<0.225
02/19/12	Transportation Bldg	3.8	150	<0.225
02/20/12	Sunnyside H.S.	20.1	150	<0.225
02/21/12	Ocotillo #1	17.0	150	<0.225
02/21/12	Ocotillo #2	19.3	150	<0.225
02/22/12	Los Amigos	22.0	150	<0.225
02/23/12	Los Niños	17.2	150	<0.225
02/24/12	Chaparral M.S.	19.4	150	<0.225
02/25/12	Transportation Bldg	18.2	150	<0.225
02/26/12	Sunnyside H.S.	18.7	150	<0.225
02/27/12	Ocotillo #1	36.9	150	<0.225
02/27/12	Ocotillo #2	36.7	150	<0.225
02/28/12	Los Amigos	15.7	150	<0.225
02/29/12	Los Niños	20.9	150	<0.225

NAAQS = National Ambient Air Quality Standard for PM₁₀

PM₁₀ /Beryllium Concentrations (continued)

Monthly Summary of PM₁₀/Beryllium Data

March 2012

Date	Location	Standard Concentration PM₁₀ (µg/m³)	24-hour NAAQS PM₁₀ (µg/m³)	Beryllium (ng/m³)
03/01/12	Chaparral M.S.	19.7	150	<0.225
03/02/12	Transportation Bldg	35.8	150	<0.225
03/03/12	Sunnyside H.S.	23.4	150	<0.225
03/04/12	Ocotillo #1	21.9	150	<0.225
03/04/12	Ocotillo #2	22.6	150	<0.225
03/05/12	Los Amigos	30.9	150	<0.225
03/06/12	Los Niños	40.3	150	<0.225
03/07/12	Chaparral M.S.	76.3	150	<0.225
03/08/12	Transportation Bldg	28.6	150	<0.225
03/09/12	Sunnyside H.S.	49.6	150	<0.225
03/10/12	Ocotillo #1	27.0	150	<0.225
03/10/12	Ocotillo #2	28.0	150	<0.225
03/11/12	Los Amigos	26.7	150	<0.225
03/12/12	Los Niños	27.5	150	<0.225
03/13/12	Chaparral M.S.	25.5	150	<0.225
03/14/12	Transportation Bldg	19.0	150	<0.225
03/15/12	Sunnyside H.S.	29.5	150	<0.225
03/16/12	Ocotillo #1	25.5	150	<0.225
03/16/12	Ocotillo #2	24.4	150	<0.225
03/17/12	Los Amigos	34.8	150	<0.225
03/18/12	Los Ninos	31.9	150	<0.225
03/19/12	Chaparral M.S.	9.2	150	<0.225
03/20/12	Transportation Bldg	7.1	150	<0.225
03/21/12	Sunnyside H.S.	15.7	150	<0.225
03/22/12	Ocotillo #1	15.6	150	<0.225
03/22/12	Ocotillo #2	15.2	150	<0.225
03/23/12	Los Amigos	17.3	150	<0.225
03/24/12	Los Ninos	17.9	150	<0.225
03/25/12	Chaparral M.S.	14.6	150	<0.225
03/26/12	Transportation Bldg	26.1	150	<0.225
03/27/12	Sunnyside H.S.	24.2	150	<0.225
03/28/12	Ocotillo #1	30.0	150	<0.225
03/28/12	Ocotillo #2	35.6	150	<0.225
03/29/12	Los Amigos	INVALID	150	INVALID
03/30/12	Los Niños	28.3	150	<0.225
03/31/12	Chaparral M.S.	21.9	150	<0.225

Sample running on 03/29/12 invalid due to no flow rate being annotated resulting in PDEQ not being able to calculate the PM10 concentration.

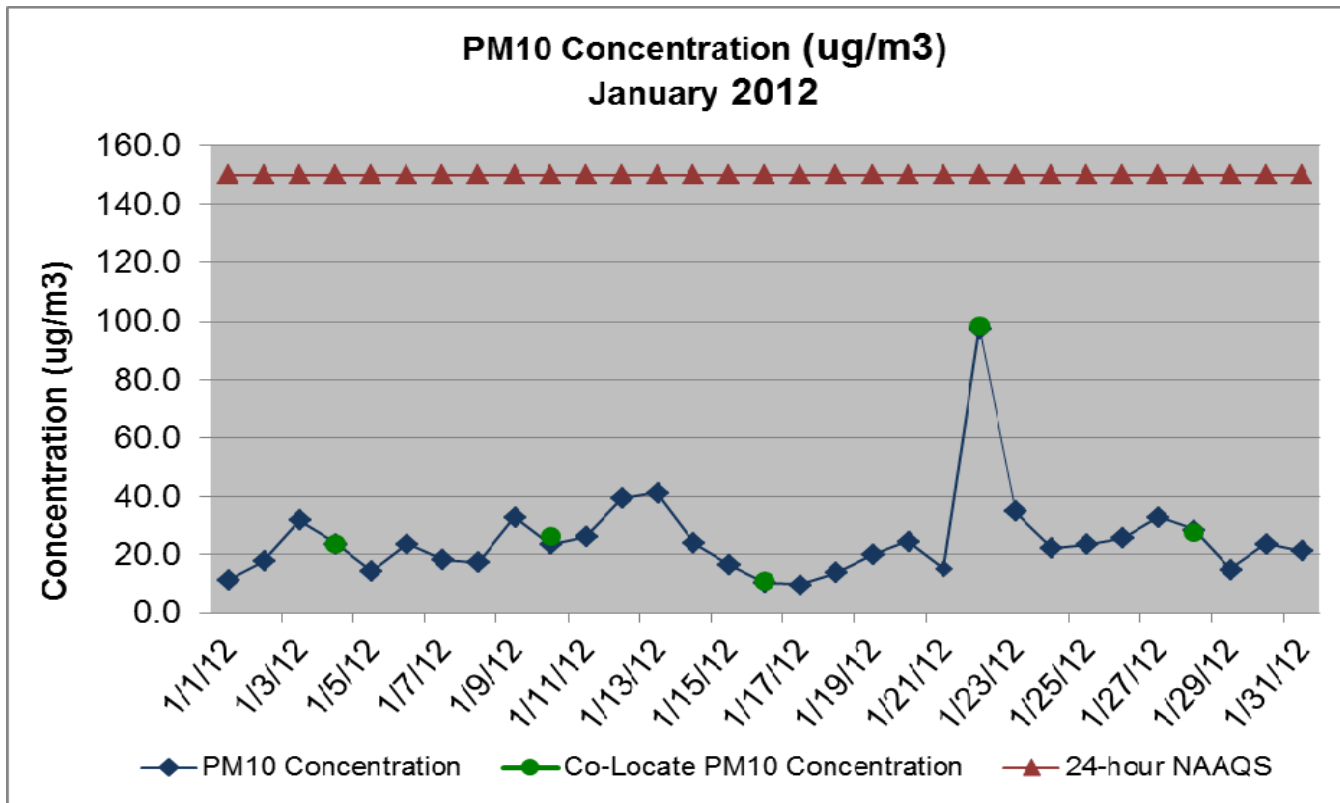
NAAQS = National Ambient Air Quality Standard for PM₁₀

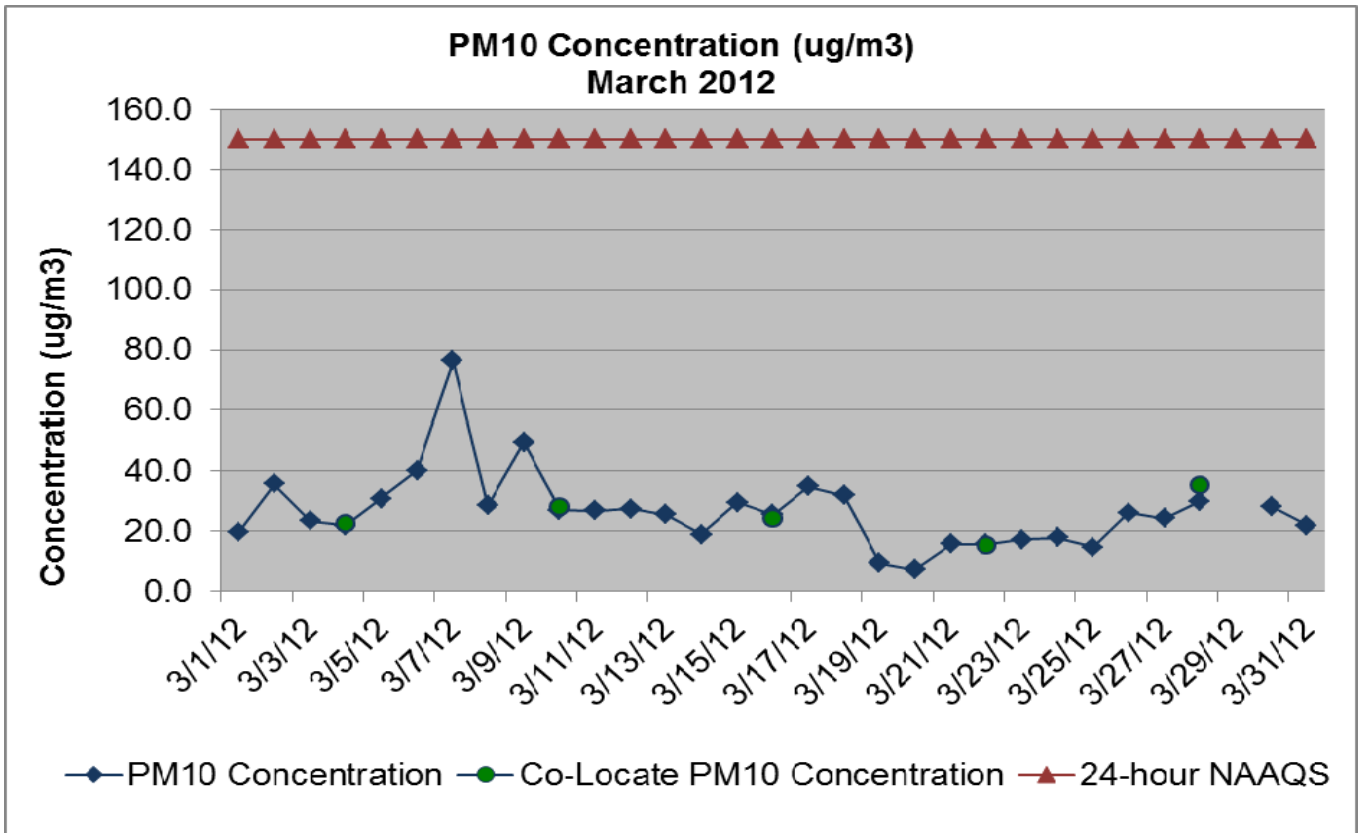
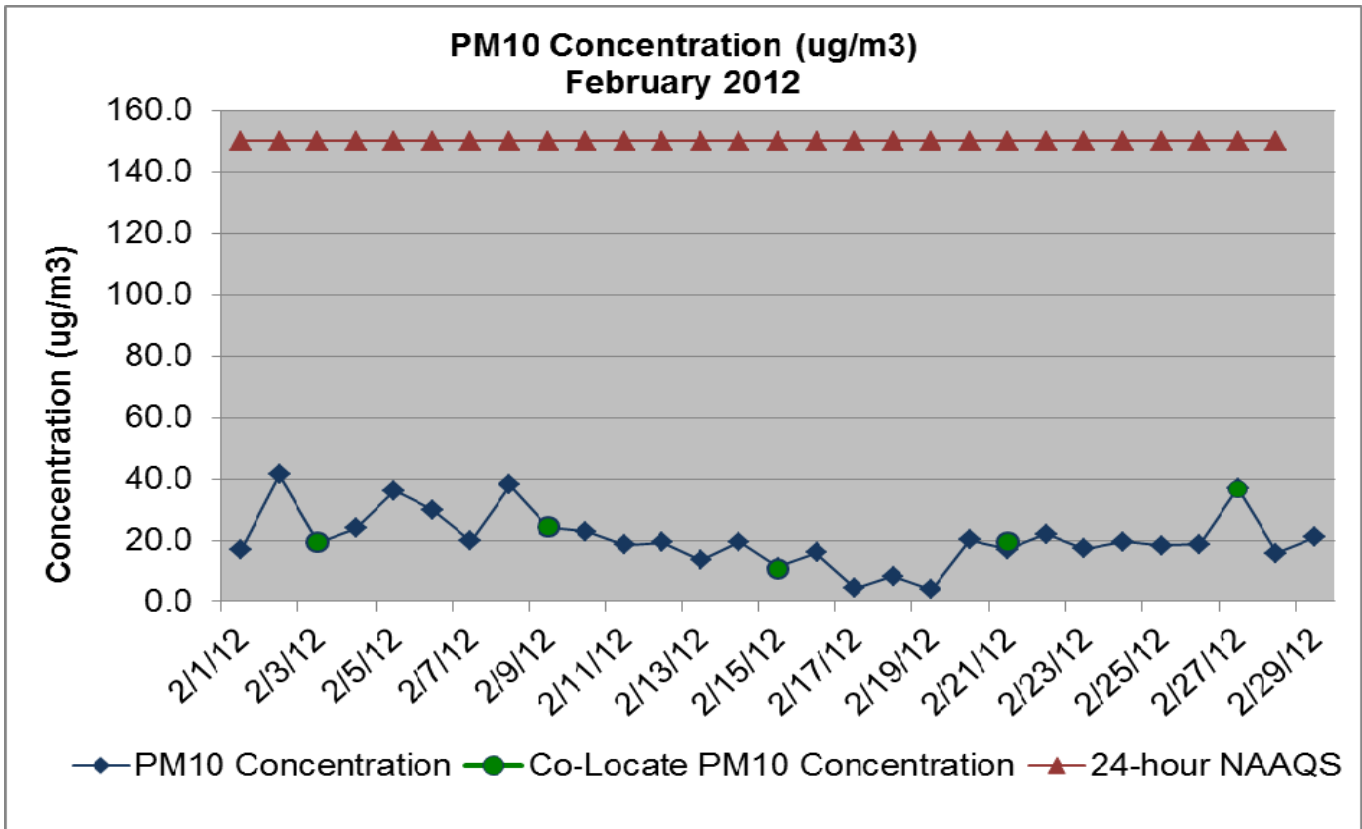
Precision of Duplicate Pairs – PM10

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 %
01/04/12	1	23.7	2	23.7	0.0	0.0
01/10/12	1	23.5	2	26.4	2.9	11.62
01/22/12	1	97.8	2	98.6	0.9	0.81
01/28/12	1	28.5	2	27.5	-1.0	-3.57
02/03/12	1	19.0	2	19.2	0.2	1.05
02/09/12	1	24.1	2	24.4	0.3	1.24
02/21/12	1	17.0	2	19.3	2.3	12.67
02/27/12	1	36.9	2	36.7	-0.2	-0.54
03/04/12	1	21.9	2	22.6	0.7	3.15
03/10/12	1	27.0	2	28.0	1.0	3.64
3/16/12	1	25.5	2	24.4	-1.1	-4.41
03/22/12	1	15.6	2	15.2	-0.4	-2.60
03/28/12	1	30.0	2	35.6	5.6	17.07

PM₁₀ Concentration Charts





Audit Results

Audits were performed on all of the samplers for the 1st quarter of 2012. 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 =** 296.0
Audit Date: 03/14/12 **Ps =** 692.8
Motor: 1424 **Temp c =** 28.00
 Ta = 301.0
 Pa = 693.0
Orifice Calibration Relationship
m= 1.31697 b= -0.05235

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	3.28	33.4	1.82	0.89
13	2.79	30.9	1.58	0.83
10	2.36	28.5	1.34	0.76
7	1.63	24.0	1.00	0.66
5	1.07	19.7	0.71	0.56

Orifice dH2O 2.226
 Sample dPex 1.3
 Orifice Qa(m3/m) 0.786377
 Sample Qa dPex 27.69855

Audit flow rate % diff: 5.16 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.226	27.76	0.79
Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
1.29	29.20	0.83

Sampler Audit Relationship
m = 0.024
b = 0.077
r = 0.999

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 =** 296.0
Audit Date: 03/14/12 **Ps =** 692.8
Motor: 1418 **Temp c =** 23.80
 Ta = 296.8
 Pa = 695.0
Orifice Calibration Relationship
m= 1.31697 b= -0.05235

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	3.96	36.3	2.36	1.00
13	3.39	33.7	2.04	0.93
10	2.83	30.9	1.72	0.86
7	1.94	25.8	1.26	0.73
5	1.30	21.4	0.86	0.61

Orifice dH2O 2.684
 Sample dPex 1.6
 Orifice Qa(m3/m) 0.852684
 Sample Qa dPex 30.05927

Audit flow rate % diff: 5.03 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.684	30.10	0.85
Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
1.65	31.62	0.90

Sampler Audit Relationship
m = 0.026
b = 0.044
r = 0.999

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 =** 296.0
Audit Date: 03/14/12 **Ps =** 692.8
Motor: 1419

Temp c = 24.80
Ta = 297.8
Pa = 695.0

Orifice Calibration Relationship
m= 1.31697 b= -0.05235

Plate No.	Orifice dH20	Qa Orifice	Sampler dPex	Sampler dPext
18	3.00	31.8	1.27	0.74
13	2.56	29.5	1.04	0.67
10	2.16	27.2	0.83	0.60
7	1.46	22.6	0.49	0.46
5	1.00	19.0	0.21	0.30

Orifice dH2O 2.036
 Sample dPex 0.8
 Orifice Qa(m3/m) 0.748974
 Sample Qa dPex 26.65804

Audit flow rate % diff: 3.99 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.036	26.44	0.75

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
0.77	27.50	0.78

Sampler Audit Relationship	
m =	0.033
b =	-0.318
r =	0.994

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 =** 296.0
Audit Date: 03/14/12 **Ps =** 692.8
Motor: 1421

Temp c = 28.10
Ta = 301.1
Pa = 693.0

Orifice Calibration Relationship
m= 1.31697 b= -0.05235

Plate No.	Orifice dH20	Qa Orifice	Sampler dPex	Sampler dPext
18	2.76	30.8	1.09	0.69
13	2.38	28.7	0.88	0.62
10	2.00	26.4	0.72	0.56
7	1.41	22.4	0.42	0.43
5	0.96	18.7	0.22	0.31

Orifice dH2O 1.902
 Sample dPex 0.7
 Orifice Qa(m3/m) 0.730019
 Sample Qa dPex 25.94569

Audit flow rate % diff: 3.89 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
1.902	25.77	0.73

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
0.67	26.78	0.76

Sampler Audit Relationship	
m =	0.031
b =	-0.275
r =	0.999

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 =** 296.0
Audit Date: 03/14/12 **Ps =** 692.8
Motor: 1420 **Temp c =** 23.80
 Ta = 296.8
 Pa = 695.0
Orifice Calibration Relationship
 m= 1.31697 b= -0.05235

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	3.24	32.9	1.32	0.75
13	2.79	30.7	1.04	0.67
10	2.33	28.1	0.83	0.60
7	1.61	23.6	0.47	0.45
5	1.06	19.4	0.18	0.28

Orifice dH2O 2.206
 Sample dPex 0.8
 Orifice Qa(m3/m) 0.776749
 Sample Qa dPex 27.69781

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.206	27.42	0.78
Sampler w/Orifice		
dPex	Qa(CFM)	Qa(M3/m)
0.77	28.52	0.81

Sampler Audit Relationship	
m =	0.034
b =	-0.380
r =	0.997

Audit flow rate % diff: 3.98 %

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 =** 296.0
Audit Date: 03/14/12 **Ps =** 692.8
Motor: 1417 **Temp c =** 23.80
 Ta = 296.8
 Pa = 695.0
Orifice Calibration Relationship
 m= 1.31697 b= -0.05235

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	3.31	33.3	1.46	0.79
13	2.86	31.0	1.25	0.73
10	2.42	28.7	1.01	0.66
7	1.69	24.2	0.66	0.53
5	1.14	20.1	0.36	0.39

Orifice dH2O 2.284
 Sample dPex 0.9
 Orifice Qa(m3/m) 0.789665
 Sample Qa dPex 29.99462

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.284	27.88	0.79
Sampler w/Orifice		
dPex	Qa(CFM)	Qa(M3/m)
0.95	29.04	0.82

Sampler Audit Relationship	
m =	0.030
b =	-0.206
r =	0.998

Audit flow rate % diff: 4.14 %

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 =** 296.0
Audit Date: 03/16/12 **Ps =** 692.8
Motor: 1422 **Temp c =** 27.00
 Ta = 300.0
 Pa = 692.0
Orifice Calibration Relationship
 m= 1.31697 b= -0.05235

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	2.82	31.0	1.20	0.72
13	2.41	28.8	0.99	0.66
10	1.96	26.1	0.82	0.60
7	1.29	21.5	0.54	0.48
5	0.84	17.6	0.31	0.37

Orifice dH2O 1.864
 Sample dPex 0.8
 Orifice Qa(m3/m) 0.722332
 Sample Qa dPex 25.5436

Audit flow rate % diff: 4.45 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
1.864	25.50	0.72

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
0.77	26.64	0.75

Sampler Audit Relationship	
m =	0.026
b =	-0.078
r =	0.997