



MEMORANDUM

Pima County Department of Environmental Quality

DATE: 11/15/2011

TO: Alex Gallego
Assistant Superintendent Operations & Facilities Planning

FROM: Beth Gorman
Program Manager

RE: Pima County DEQ Beryllium Monitoring Report 3rd Quarter 2011

Attached is the Pima County Department of Environmental Quality's (PDEQ) Air Monitoring Division Beryllium Monitoring Network Summary for the 3rd Quarter of 2011.

Highlights:

- 109 samples collected resulting in 93 valid and 16 invalid samples (85.3% 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
3rd Quarter 2011



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 2011 there was a total of 109 PM₁₀ samples collected resulting in 93 valid and 16 invalid samples; for a data recovery of 85.3 %. Eleven 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 2011.

PM₁₀ /Beryllium Concentrations

Monthly Summary of PM₁₀/Beryllium Data

July 2011

Date	Location	Standard Concentration PM ₁₀ (µg/m ³)	24-hour NAAQS PM ₁₀ (µg/m ³)	Beryllium (ng/m ³)
07/01/11	Sunnyside H.S.	36.2	150	<0.225
07/02/11	Ocotillo #1	37.1	150	<0.225
07/02/11	Ocotillo #2	38.2	150	<0.225
07/03/11	Los Amigos	18.7	150	<0.225
07/04/11	Los Niños	INVALID	150	INVALID
07/05/11	Chaparral M.S.	INVALID	150	INVALID
07/06/11	Transportation Bldg	39.1	150	<0.225
07/07/11	Sunnyside H.S.	36.2	150	<0.225
07/08/11	Ocotillo #1	21.5	150	<0.225
07/08/11	Ocotillo #2	22.9	150	<0.225
07/09/11	Los Amigos	21.6	150	<0.225
07/10/11	Los Niños	21.0	150	<0.225
07/11/11	Chaparral M.S.	19.4	150	<0.225
07/12/11	Transportation Bldg	18.6	150	<0.225
07/13/11	Sunnyside H.S.	28.8	150	<0.225
07/14/11	Ocotillo #1	30.0	150	<0.225
07/14/11	Ocotillo #2	31.2	150	<0.225
07/15/11	Los Amigos	27.1	150	<0.225
07/16/11	Los Niños	21.4	150	<0.225
07/17/11	Chaparral M.S.	27.6	150	<0.225
07/18/11	Transportation Bldg	14.4	150	<0.225
07/19/11	Sunnyside H.S.	INVALID	150	INVALID
07/20/11	Ocotillo #1	INVALID	150	INVALID
07/20/11	Ocotillo #2	INVALID	150	INVALID
07/21/11	Los Amigos	INVALID	150	INVALID
07/22/11	Los Niños	INVALID	150	INVALID
07/23/11	Chaparral M.S.	INVALID	150	INVALID
07/24/11	Transportation Bldg.	9.2	150	<0.225
07/25/11	Sunnyside H.S.	INVALID	150	INVALID
07/26/11	Ocotillo #1	INVALID	150	INVALID
07/26/11	Ocotillo #2	INVALID	150	INVALID
07/27/11	Los Amigos	INVALID	150	INVALID
07/28/11	Los Niños	INVALID	150	INVALID
07/29/11	Chaparral M.S.	INVALID	150	INVALID
07/30/11	Transportation Bldg.	11.7	150	<0.225
07/31/11	Sunnyside H.S.	21.2	150	<0.225

Sample running on 7/4/11 invalid due to the sampler being damaged during a storm.

Sample running on 7/5/11 invalid due to a power failure caused from a storm.

Samples running on 7/19/11 thru 7/23/11 and 7/25/11 thru 7/29/11 are all invalid due to SUSD not changing the filters resulting in double exposures.

NAAQS = National Ambient Air Quality Standard for PM₁₀

PM₁₀ /Beryllium Concentrations (continued)

Monthly Summary of PM₁₀/Beryllium Data

August 2011

Date	Location	Standard Concentration PM₁₀ (µg/m³)	24-hour NAAQS PM₁₀ (µg/m³)	Beryllium (ng/m³)
08/01/11	Ocotillo #1	13.4	150	<0.225
08/01/11	Ocotillo #2	14.7	150	<0.225
08/02/11	Los Amigos	21.2	150	<0.225
08/03/11	Los Ninos	11.5	150	<0.225
08/04/11	Chaparral M.S.	24.5	150	<0.225
08/05/11	Transportation Bldg	21.0	150	<0.225
08/06/11	Sunnyside H.S.	25.1	150	<0.225
08/07/11	Ocotillo #1	25.5	150	<0.225
08/07/11	Ocotillo #2	25.2	150	<0.225
08/08/11	Los Amigos	17.7	150	<0.225
08/09/11	Los Ninos	25.1	150	<0.225
08/10/11	Chaparral M.S.	20.7	150	<0.225
08/11/11	Transportation Bldg	15.9	150	<0.225
08/12/11	Sunnyside H.S.	18.6	150	<0.225
08/13/11	Ocotillo #1	12.9	150	<0.225
08/13/11	Ocotillo #2	14.0	150	<0.225
08/14/11	Los Amigos	10.3	150	<0.225
08/15/11	Los Niños	16.3	150	<0.225
08/16/11	Chaparral M.S.	18.6	150	<0.225
08/17/11	Transportation Bldg	18.1	150	<0.225
08/18/11	Sunnyside H.S.	28.1	150	<0.225
08/19/11	Ocotillo #1	33.5	150	<0.225
08/19/11	Ocotillo #2	36.9	150	<0.225
08/20/11	Los Amigos	25.7	150	<0.225
08/21/11	Los Niños	21.6	150	<0.225
08/22/11	Chaparral M.S.	28.2	150	<0.225
08/23/11	Transportation Bldg	29.2	150	<0.225
08/24/11	Sunnyside H.S.	36.0	150	<0.225
08/25/11	Ocotillo #1	16.4	150	<0.225
08/25/11	Ocotillo #2	17.5	150	<0.225
08/26/11	Los Amigos	21.4	150	<0.225
08/27/11	Los Niños	36.0	150	<0.225
08/28/11	Chaparral M.S.	95.4	150	<0.225
08/29/11	Transportation Bldg	28.4	150	<0.225
08/30/11	Sunnyside H.S.	38.6	150	<0.225
08/31/11	Ocotillo #1	31.6	150	<0.225
08/31/11	Ocotillo #2	36.8	150	<0.225

NAAQS = National Ambient Air Quality Standard for PM₁₀

PM₁₀ /Beryllium Concentrations (continued)

Monthly Summary of PM₁₀/Beryllium Data

September 2011

Date	Location	Standard Concentration PM₁₀ (µg/m³)	24-hour NAAQS PM₁₀ (µg/m³)	Beryllium (ng/m³)
09/01/11	Los Amigos	20.2	150	<0.225
09/02/11	Los Niños	41.4	150	<0.225
09/03/11	Chaparral M.S.	40.6	150	<0.225
09/04/11	Transportation Bldg	27.6	150	<0.225
09/05/11	Sunnyside H.S.	29.9	150	<0.225
09/06/11	Ocotillo #1	34.1	150	<0.225
09/06/11	Ocotillo #2	23.4	150	<0.225
09/07/11	Los Amigos	27.0	150	<0.225
09/08/11	Los Niños	24.3	150	<0.225
09/09/11	Chaparral M.S.	24.7	150	<0.225
09/10/11	Transportation Bldg	8.7	150	<0.225
09/11/11	Sunnyside H.S.	21.7	150	<0.225
09/12/11	Ocotillo #1	14.6	150	<0.225
09/12/11	Ocotillo #2	24.5	150	<0.225
09/13/11	Los Amigos	19.1	150	<0.225
09/14/11	Los Niños	13.4	150	<0.225
09/15/11	Chaparral M.S.	13.3	150	<0.225
09/16/11	Transportation Bldg	14.4	150	<0.225
09/17/11	Sunnyside H.S.	33.5	150	<0.225
09/18/11	Ocotillo #1	22.7	150	<0.225
09/18/11	Ocotillo #2	25.1	150	<0.225
09/19/11	Los Amigos	20.7	150	<0.225
09/20/11	Los Ninos	INVALID	150	INVALID
09/21/11	Chaparral M.S.	24.4	150	<0.225
09/22/11	Transportation Bldg	20.2	150	<0.225
09/23/11	Sunnyside H.S.	32.6	150	<0.225
09/24/11	Ocotillo #1	29.2	150	<0.225
09/24/11	Ocotillo #2	33.2	150	<0.225
09/25/11	Los Amigos	21.9	150	<0.225
09/26/11	Los Ninos	29.8	150	<0.225
09/27/11	Chaparral M.S.	28.3	150	<0.225
09/28/11	Transportation Bldg	20.8	150	<0.225
09/29/11	Sunnyside H.S.	INVALID	150	INVALID
09/30/11	Ocotillo #1	69.8	150	<0.225
09/30/11	Ocotillo #2	85.3	150	<0.225

Sample running on 9/20/11 invalid due to a power failure.

Sample running on 9/29/11 invalid due to SUSD not changing filters resulting in a double exposure.

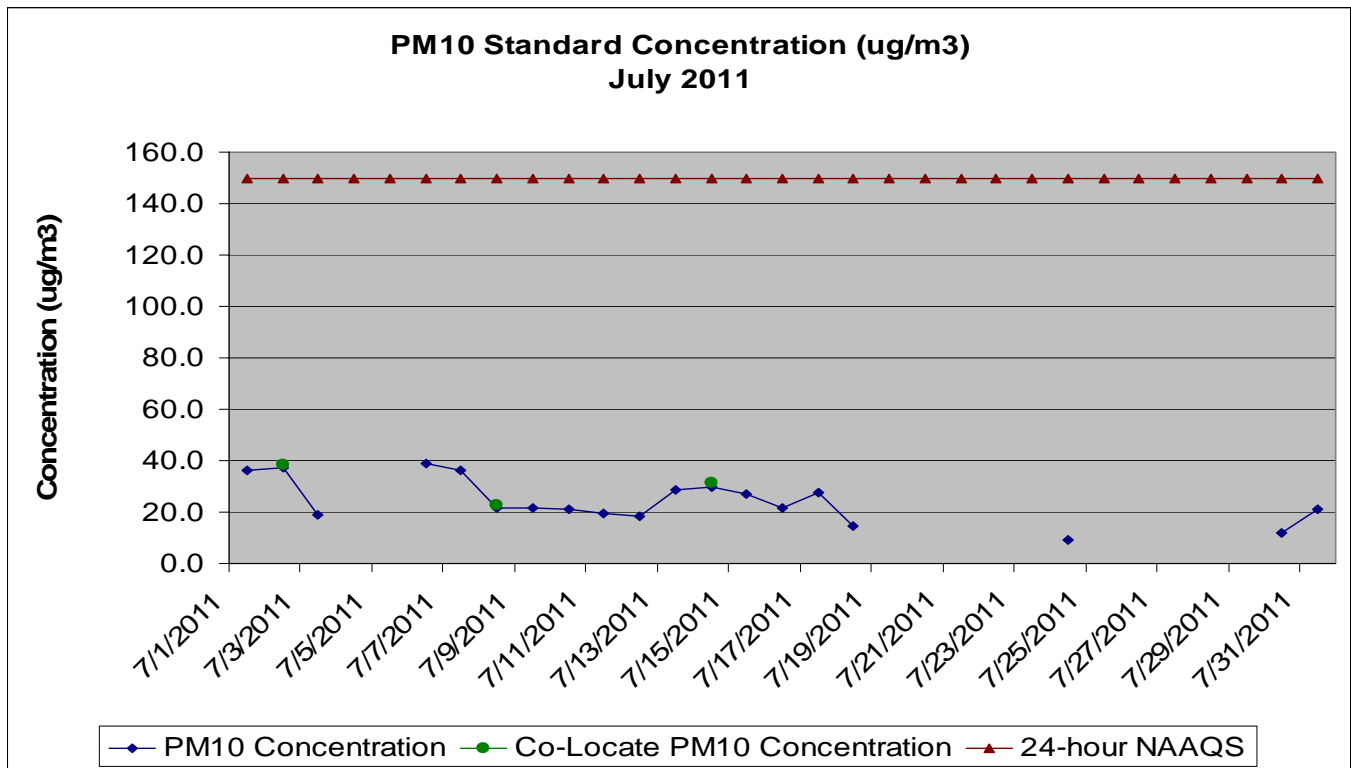
NAAQS = National Ambient Air Quality Standard for PM₁₀

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 15µg/m³ (40CFR58, Appendix A, Section 4c).

Sample Date	Primary Sampler Number	Measured PM ₁₀ (µg/m ³)	Duplicate Sampler Number	Measured PM ₁₀ (µg/m ³)	Difference (µg/m ³)	Percent Difference %
7/2/11	1	37.1	2	38.2	1.2	2.92
7/8/11	1	21.5	2	22.9	1.4	6.31
7/14/11	1	30.0	2	31.2	1.2	3.92
8/7/11	1	25.5	2	25.2	-0.3	-1.18
8/19/11	1	33.5	2	36.9	3.4	9.66
8/25/11	1	16.4	2	17.5	1.1	6.49
8/31/11	1	31.6	2	36.8	5.2	15.20
9/6/11	1	34.1	2	23.4	-10.7	-37.22
9/18/11	1	22.7	2	25.1	2.4	10.04
9/24/11	1	29.2	2	33.2	3.1	12.82
9/30/11	1	69.8	2	85.3	15.5	19.99

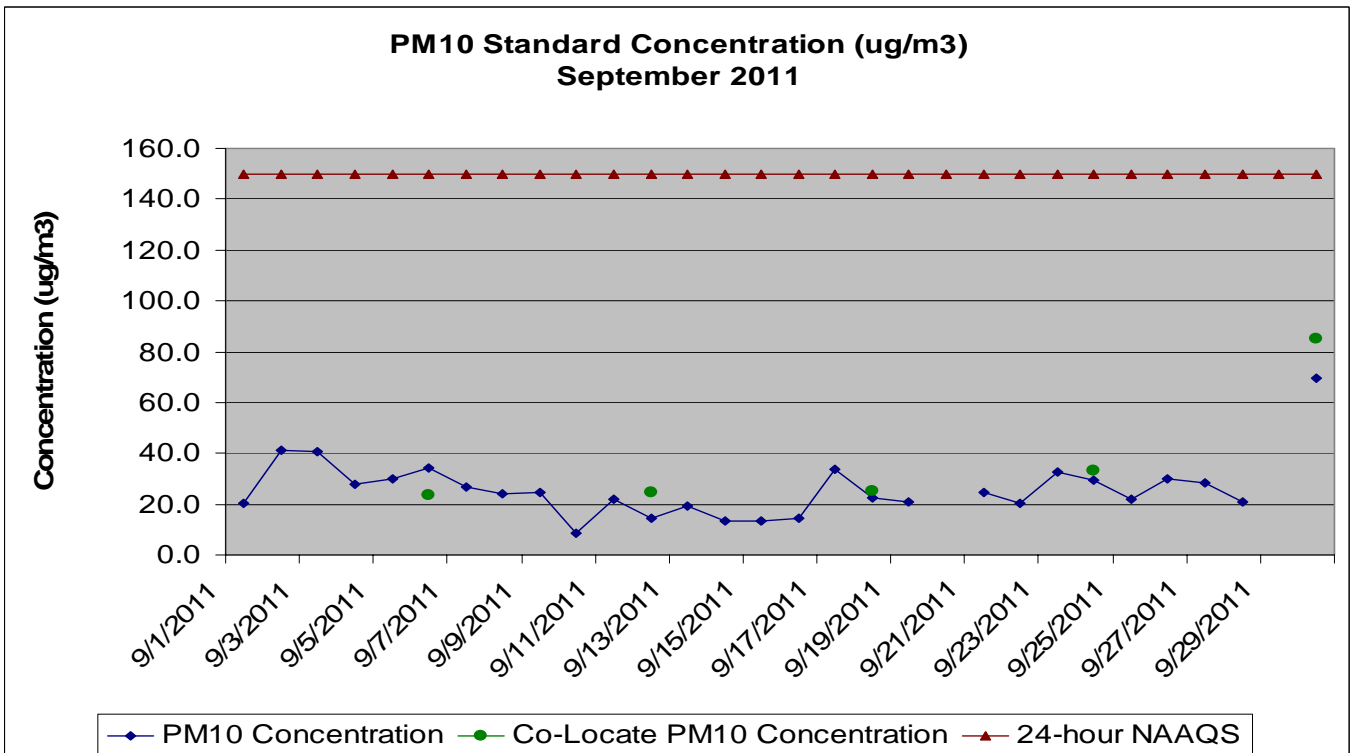
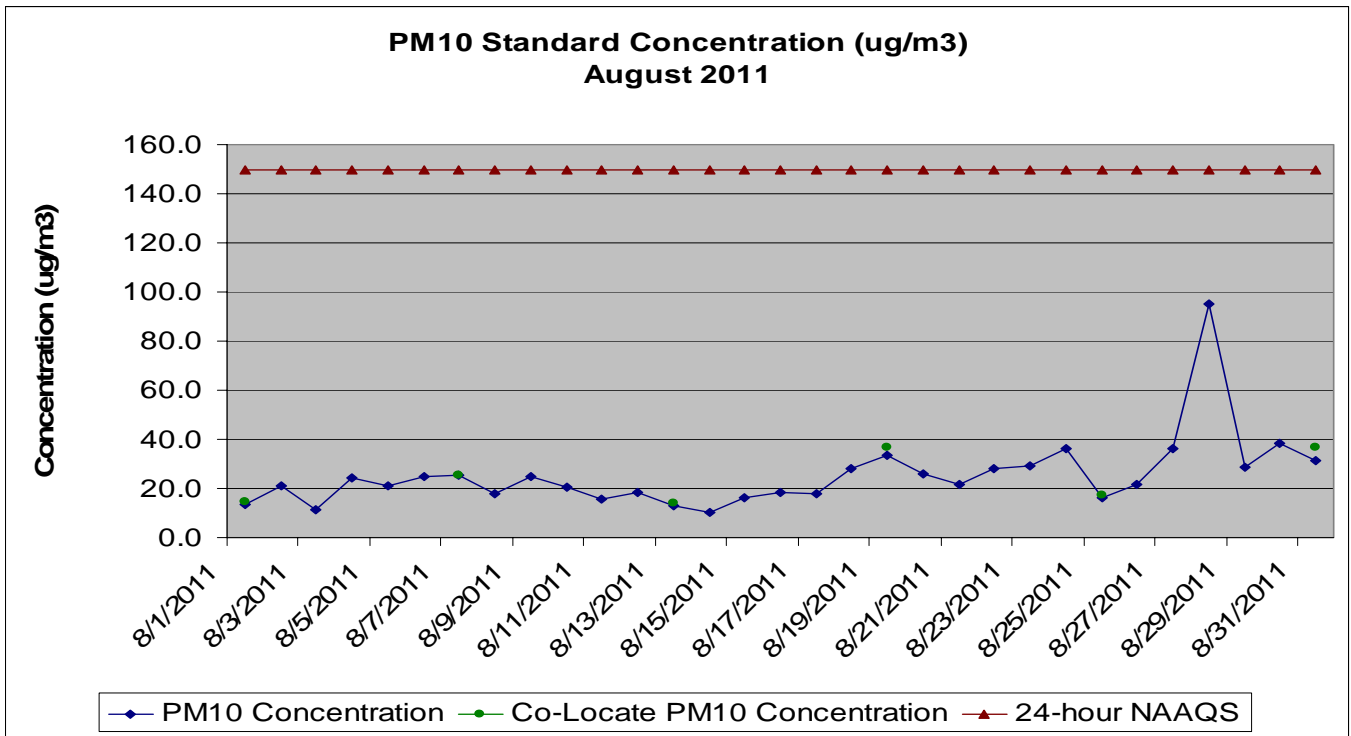
PM₁₀ Concentration Charts



Sample running on 7/4/11 invalid due to the sampler being damaged during a storm.

Sample running on 7/5/11 invalid due to a power failure caused from a storm.

Samples running on 7/19/11 thru 7/23/11 and 7/25/11 thru 7/29/11 are all invalid due to SUSD not changing the filters resulting in double exposures.



Sample running on 9/20/11 invalid due to a power failure.

Sample running on 9/29/11 invalid due to SUSD not changing filters resulting in a double exposure.

Audit Results

Audits were performed on all of the samplers for the 3rd 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 =** 290.1
Audit Date: 09/29/11 **Ps =** 694.9
Motor: 1424 **Temp c =** 31.20
Temp f: 88.16 **Ta =** 304.2
Press: 27.244 **Pa =** 692.0
Altim: 29.910 **Orifice Calibration Relationship**
 m= 1.31697 b= -0.05235

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	4.54	39.3	2.37	1.02
13	3.82	36.1	2.03	0.94
10	3.14	32.9	1.75	0.88
7	2.13	27.3	1.23	0.74
5	1.36	22.1	0.87	0.62

Orifice dH2O 2.998
 Sample dPex 1.7
 Orifice Qa(m3/m) 0.911443
 Sample Qa dPex 32.08984

Audit flow rate % diff: 5.12 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.0998	32.17	0.91

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
1.65	33.83	0.96

Sampler Audit Relationship

m = 0.024
b = 0.096
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 =** 290.1
Audit Date: 09/30/11 **Ps =** 694.9
Motor: 1418 **Temp c =** 30.70
Temp f: 87.26 **Ta =** 303.7
Press: 27.360 **Pa =** 695.0
Altim: 30.035 **Orifice Calibration Relationship**
 m= 1.31697 b= -0.05235

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	4.64	39.6	2.51	1.05
13	3.91	36.5	2.22	0.98
10	3.16	32.9	1.84	0.90
7	2.12	27.2	1.18	0.72
5	1.34	21.9	0.88	0.61

Orifice dH2O 3.034
 Sample dPex 1.7
 Orifice Qa(m3/m) 0.914082
 Sample Qa dPex 32.22359

Audit flow rate % diff: 4.87 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
3.034	32.27	0.91

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
1.72	33.85	0.96

Sampler Audit Relationship

m = 0.026
b = 0.037
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 Amigos **Ts =** 290.1
Audit Date: 09/29/11 **Ps =** 694.9
Motor: 1419 **Temp c =** 29.30
Temp f: 84.74 **Ta =** 302.3
Press: 27.323 **Pa =** 694.0
Altim: 29.995 **Orifice Calibration Relationship**
 m= 1.31697 b= -0.05235

Plate No.	Orifice dH20	Qa Orifice	Sampler dPex	Sampler dPext
18	3.81	35.9	1.68	0.86
13	3.23	33.2	1.31	0.76
10	2.73	30.6	1.08	0.69
7	1.84	25.4	0.63	0.52
5	1.21	20.9	0.29	0.36

Orifice dH2O 2.564
 Sample dPex 1.0
 Orifice Qa(m3/m) 0.842202
 Sample Qa dPex 29.9552

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.564	29.73	0.84

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
1.00	30.94	0.88

Sampler Audit Relationship	
m =	0.033
b =	-0.315
r =	0.998

Audit flow rate % diff: 4.03 %

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 =** 290.1
Audit Date: 09/29/11 **Ps =** 694.9
Motor: 1421 **Temp c =** 31.70
Temp f: 89.06 **Ta =** 304.7
Press: 27.244 **Pa =** 692.0
Altim: 29.910 **Orifice Calibration Relationship**
 m= 1.31697 b= -0.05235

Plate No.	Orifice dH20	Qa Orifice	Sampler dPex	Sampler dPext
18	3.84	36.3	1.62	0.84
13	3.30	33.7	1.28	0.75
10	2.73	30.8	1.02	0.67
7	1.86	25.7	0.58	0.51
5	1.24	21.2	0.32	0.38

Orifice dH2O 2.594
 Sample dPex 1.0
 Orifice Qa(m3/m) 0.851252
 Sample Qa dPex 30.2535

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.594	30.05	0.85

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
0.96	31.27	0.89

Sampler Audit Relationship	
m =	0.031
b =	-0.285
r =	0.999

Audit flow rate % diff: 4.02 %

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 =** 290.1
Audit Date: 09/29/11 **Ps =** 694.9
Motor: 1420 **Temp c =** 28.00
Temp f: 82.4 **Ta =** 301.0
Press: 27.323 **Pa =** 694.0
Altim: 29.995 **Orifice Calibration Relationship**
 m= 1.31697 b= -0.05235

Plate No.	Orifice dH20	Qa Orifice	Sampler dPex	Sampler dPext
18	3.44	34.2	1.39	0.78
13	2.89	31.4	1.09	0.69
10	2.40	28.8	0.85	0.61
7	1.63	23.9	0.52	0.47
5	1.06	19.6	0.22	0.31

Orifice dH2O 2.284
 Sample dPex 0.8
 Orifice Qa(m3/m) 0.795490
 Sample Qa dPex 28.31042

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.284	28.08	0.80
Sampler w/Orifice		
dPex	Qa(CFM)	Qa(M3/m)
0.81	29.23	0.83

Sampler Audit Relationship	
m =	0.031
b =	-0.295
r =	0.997

Audit flow rate % diff: 4.06 %

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 =** 290.1
Audit Date: 09/29/11 **Ps =** 694.9
Motor: 1417 **Temp c =** 28.00
Temp f: 82.40 **Ta =** 301.0
Press: 27.323 **Pa =** 694.0
Altim: 29.995 **Orifice Calibration Relationship**
 m= 1.31697 b= -0.05235

Plate No.	Orifice dH20	Qa Orifice	Sampler dPex	Sampler dPext
18	3.79	35.8	1.58	0.83
13	3.24	33.2	1.21	0.72
10	2.71	30.5	1.11	0.69
7	1.85	25.4	0.67	0.54
5	1.19	20.7	0.40	0.42

Orifice dH2O 2.556
 Sample dPex 1.0
 Orifice Qa(m3/m) 0.839224
 Sample Qa dPex 29.71606

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.556	29.62	0.84
Sampler w/Orifice		
dPex	Qa(CFM)	Qa(M3/m)
0.99	30.92	0.88

Sampler Audit Relationship	
m =	0.027
b =	-0.133
r =	0.990

Audit flow rate % diff: 4.33 %

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 =** 290.1
Audit Date: 09/30/11 **Ps =** 694.9
Motor: 1422 **Temp c =** 31.70
Temp f: 89.06 **Ta =** 304.7
Press: 27.323 **Pa =** 694.0
Altim: 29.995 **Orifice Calibration Relationship**
 m= 1.31697 b= -0.05235

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	3.06	32.5	1.31	0.76
13	2.58	29.9	1.10	0.69
10	2.13	27.3	0.88	0.62
7	1.49	23.1	0.56	0.50
5	0.98	19.0	0.31	0.37

Orifice dH2O 2.048
 Sample dPex 0.8
 Orifice Qa(m3/m) 0.759766
 Sample Qa dPex 26.93271

Audit flow rate % diff: 4.12 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.048	26.82	0.76
Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
0.83	27.93	0.79

Sampler Audit Relationship	
m =	0.029
b =	-0.178
r =	0.999