MEMORANDUM

Pima County Department of Environmental Quality

DATE: 8/15/2011

TO: Alex Gallego
Assistant Superintendent Operations & Facilities Planning

FROM: Beth Gorman
Program Manager

RE: Pima County DEQ Beryllium Monitoring Report 2nd Quarter 2011

Attached is the Pima County Department of Environmental Quality's (PDEQ) Air Monitoring Division Beryllium Monitoring Network Summary for the 2nd Quarter of 2011.

Highlights:

- 106 samples collected resulting in 101 valid and 5 invalid samples (95.3% 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) 740-3340.

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

2nd 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 2nd quarter of 2011 there was a total of 106 PM_{10} samples collected resulting in 101 valid and 5 invalid samples; for a data recovery of 95.39 %. 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 101 samples analyzed for beryllium. Beryllium concentrations are reported as <0.225 ng/m^3 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, PM_{10} concentrations (µg/m^3) calculated in standard conditions, PM_{10} 24-hour NAAQS standard, precision measurements, Beryllium analysis results, accompanying graphs and a brief explanation of all invalid samples for the 2nd quarter of 2011.

PM_{10} /Beryllium Concentrations

Monthly Summary of PM_{10}/Beryllium Data

April 2011

Date	Location	Standard Concentration PM_{10} (µg/m^3)	24-hour NAAQS PM_{10} (µg/m^3)	Beryllium (ng/m3)
04/01/11	Transportation Bldg	21.3	150	<0.225
04/02/11	Sunnyside H.S.	29.8	150	<0.225
04/03/11	Ocotillo #1	15.0	150	<0.225
04/03/11	Ocotillo #2	15.9	150	<0.225
04/04/11	Los Amigos	22.3	150	<0.225
04/05/11	Los Niños	28.1	150	<0.225
04/06/11	Chaparral M.S.	52.1	150	<0.225
04/07/11	Transportation Bldg	58.2	150	<0.225
04/08/11	Sunnyside H.S.	42.0	150	<0.225
04/09/11	Ocotillo #1	4.0	150	<0.225
04/09/11	Ocotillo #2	5.1	150	<0.225
04/10/11	Los Amigos	4.7	150	<0.225
04/11/11	Los Niños	9.9	150	<0.225
04/12/11	Chaparral M.S.	14.2	150	<0.225
04/13/11	Transportation Bldg	16.2	150	<0.225
04/14/11	Sunnyside H.S.	50.1	150	<0.225
04/15/11	Ocotillo #1	44.5	150	<0.225
04/15/11	Ocotillo #2	46.5	150	<0.225
04/16/11	Los Amigos	28.7	150	<0.225
04/17/11	Los Niños	21.3	150	<0.225
04/18/11	Chaparral M.S.	37.6	150	<0.225
04/19/11	Transportation Bldg	19.3	150	<0.225
04/20/11	Sunnyside H.S.	21.5	150	<0.225
04/21/11	Ocotillo #1	18.4	150	<0.225
04/21/11	Ocotillo #2	17.7	150	<0.225
04/22/11	Los Amigos	13.4	150	<0.225
04/23/11	Los Niños	22.7	150	<0.225
04/24/11	Chaparral M.S.	20.5	150	<0.225
04/25/11	Transportation Bldg.	20.5	150	<0.225
04/26/11	Sunnyside H.S.	38.3	150	<0.225
04/27/11	Ocotillo #1	21.0	150	<0.225
04/27/11	Ocotillo #2	25.1	150	<0.225
04/28/11	Los Amigos	26.5	150	<0.225
04/29/11	Los Niños	42.7	150	<0.225
04/30/11	Chaparral M.S.	31.4	150	<0.225

NAAQS = National Ambient Air Quality Standard for PM_{10}

PM_{10} /Beryllium Concentrations (continued)

Monthly Summary of PM_{10}/Beryllium Data

May 2011

Date	Location	Standard Concentration PM_{10} ($\mu g/m^3$)	24-hour NAAQS PM_{10} ($\mu g/m^3$)	Beryllium (ng/m3)
05/01/11	Transportation Bldg	12.3	150	<0.225
05/02/11	Sunnyside H.S.	24.0	150	<0.225
05/03/11	Ocotillo #1	28.7	150	<0.225
05/03/11	Ocotillo #2	32.9	150	<0.225
05/04/11	Los Amigos	31.6	150	<0.225
05/05/11	Los Ninos	43.0	150	<0.225
05/06/11	Chaparral M.S.	33.4	150	<0.225
05/07/11	Transportation Bldg	23.5	150	<0.225
05/08/11	Sunnyside H.S.	34.6	150	<0.225
05/09/11	Ocotillo #1	34.5	150	<0.225
05/09/11	Ocotillo #2	33.1	150	<0.225
05/10/11	Los Amigos	37.8	150	<0.225
05/11/11	Los Ninos	INVALID	150	INVALID
05/12/11	Chaparral M.S.	31.9	150	<0.225
05/13/11	Transportation Bldg	24.0	150	<0.225
05/14/11	Sunnyside H.S.	28.0	150	<0.225
05/15/11	Ocotillo #1	29.2	150	<0.225
05/15/11	Ocotillo #2	19.5	150	<0.225
05/16/11	Los Amigos	39.0	150	<0.225
05/17/11	Los Niños	INVALID	150	<0.225
05/18/11	Chaparral M.S.	36.5	150	<0.225
05/19/11	Transportation Bldg	20.6	150	<0.225
05/20/11	Sunnyside H.S.	32.4	150	<0.225
05/21/11	Ocotillo #1	28.5	150	<0.225
05/21/11	Ocotillo #2	20.6	150	<0.225
05/22/11	Los Amigos	31.0	150	<0.225
05/23/11	Los Niños	48.4	150	<0.225
05/24/11	Chaparral M.S.	28.4	150	<0.225
05/25/11	Transportation Bldg	27.1	150	<0.225
05/26/11	Sunnyside H.S.	33.3	150	<0.225
05/27/11	Ocotillo #1	25.6	150	<0.225
05/27/11	Ocotillo #2	24.4	150	<0.225
05/28/11	Los Amigos	27.1	150	<0.225
05/29/11	Los Niños	87.8	150	<0.225
05/30/11	Chaparral M.S.	47.2	150	<0.225
05/31/11	Transportation Bldg	30.8	150	<0.225

Sample running on 05/11/11 invalid do to equipment malfunction.

Sample running on 05/17/11 invalid for PM10 due to run time being less than 1380 minutes.

NAAQS = National Ambient Air Quality Standard for PM_{10}

PM_{10} /Beryllium Concentrations (continued)

Monthly Summary of PM_{10}/Beryllium Data

June 2011

Date	Location	Standard Concentration PM_{10} ($\mu g/m^3$)	24-hour NAAQS PM_{10} ($\mu g/m^3$)	Beryllium (ng/m3)
06/01/11	Sunnyside H.S.	43.3	150	<0.225
06/02/11	Ocotillo #1	30.9	150	<0.265
06/02/11	Ocotillo #2	32.7	150	<0.265
06/03/11	Los Amigos	45.2	150	<0.265
06/04/11	Los Niños	32.8	150	<0.265
06/05/11	Chaparral M.S.	29.5	150	<0.265
06/06/11	Transportation Bldg	28.0	150	<0.265
06/07/11	Sunnyside H.S.	36.6	150	<0.265
06/08/11	Ocotillo #1	27.5	150	<0.265
06/08/11	Ocotillo #2	28.1	150	<0.265
06/09/11	Los Amigos	25.1	150	<0.265
06/10/11	Los Niños	25.4	150	<0.265
06/11/11	Chaparral M.S.	33.6	150	<0.265
06/12/11	Transportation Bldg	31.0	150	<0.265
06/13/11	Sunnyside H.S.	36.8	150	<0.265
06/14/11	Ocotillo #1	INVALID	150	INVALID
06/14/11	Ocotillo #2	INVALID	150	INVALID
06/15/11	Los Amigos	26.4	150	<0.265
06/16/11	Los Niños	29.4	150	<0.265
06/17/11	Chaparral M.S.	46.6	150	<0.265
06/18/11	Transportation Bldg	32.8	150	<0.265
06/19/11	Sunnyside H.S.	94.1	150	<0.265
06/20/11	Ocotillo #1	INVALID	150	INVALID
06/20/11	Ocotillo #2	INVALID	150	INVALID
06/21/11	Los Amigos	25.5	150	<0.265
06/22/11	Los Ninos	34.7	150	<0.265
06/23/11	Chaparral M.S.	37.8	150	<0.265
06/24/11	Transportation Bldg	34.3	150	<0.265
06/25/11	Sunnyside H.S.	31.7	150	<0.265
06/26/11	Ocotillo #1	28.8	150	<0.225
06/26/11	Ocotillo #2	29.8	150	<0.265
06/27/11	Los Amigos	33.2	150	<0.265
06/28/11	Los Ninos	53.8	150	<0.265
06/29/11	Chaparral M.S.	45.3	150	<0.265
06/30/11	Transportation Bldg	35.5	150	<0.265

Samples running on 06/14/11 and 06/20/11 invalid due to SUSD not changing the filters resulting in double exposures.

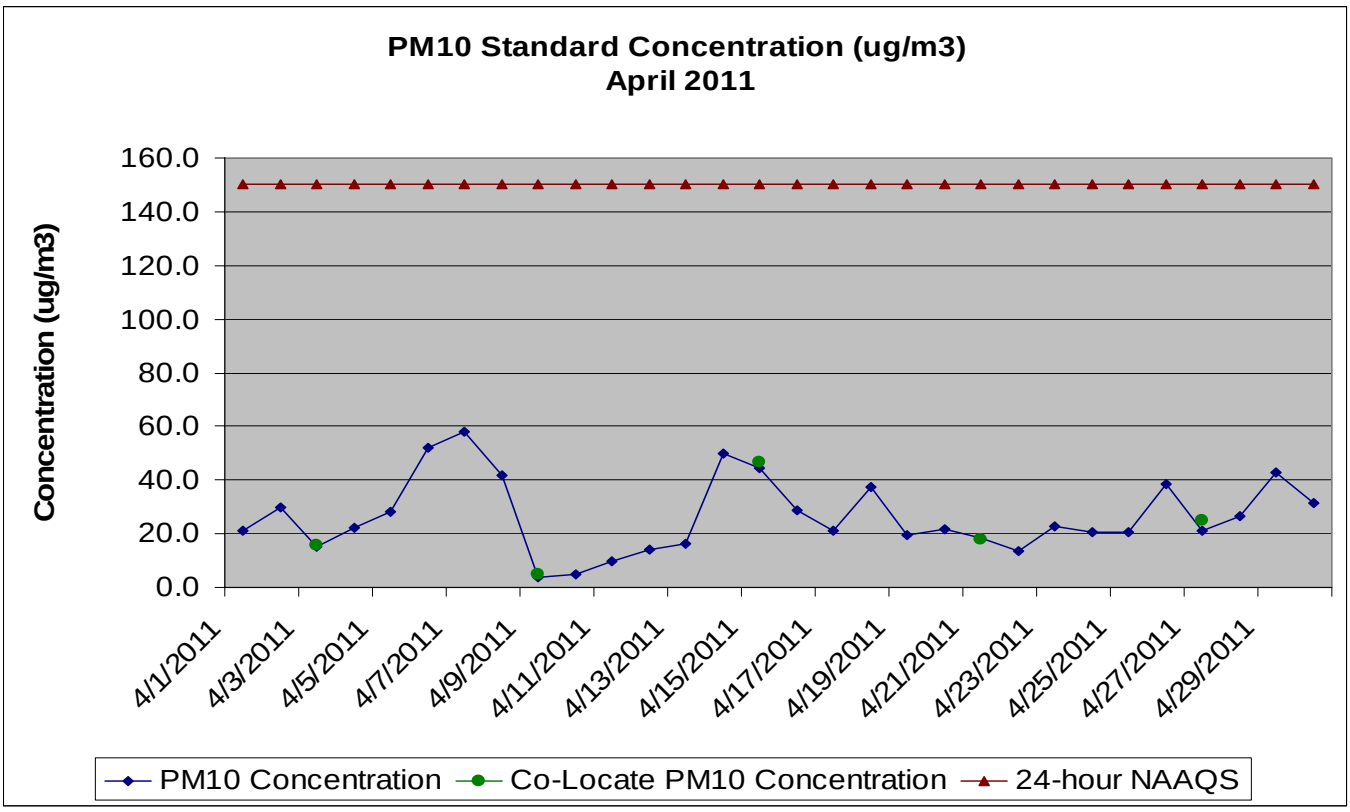
NAAQS = National Ambient Air Quality Standard for PM_{10}

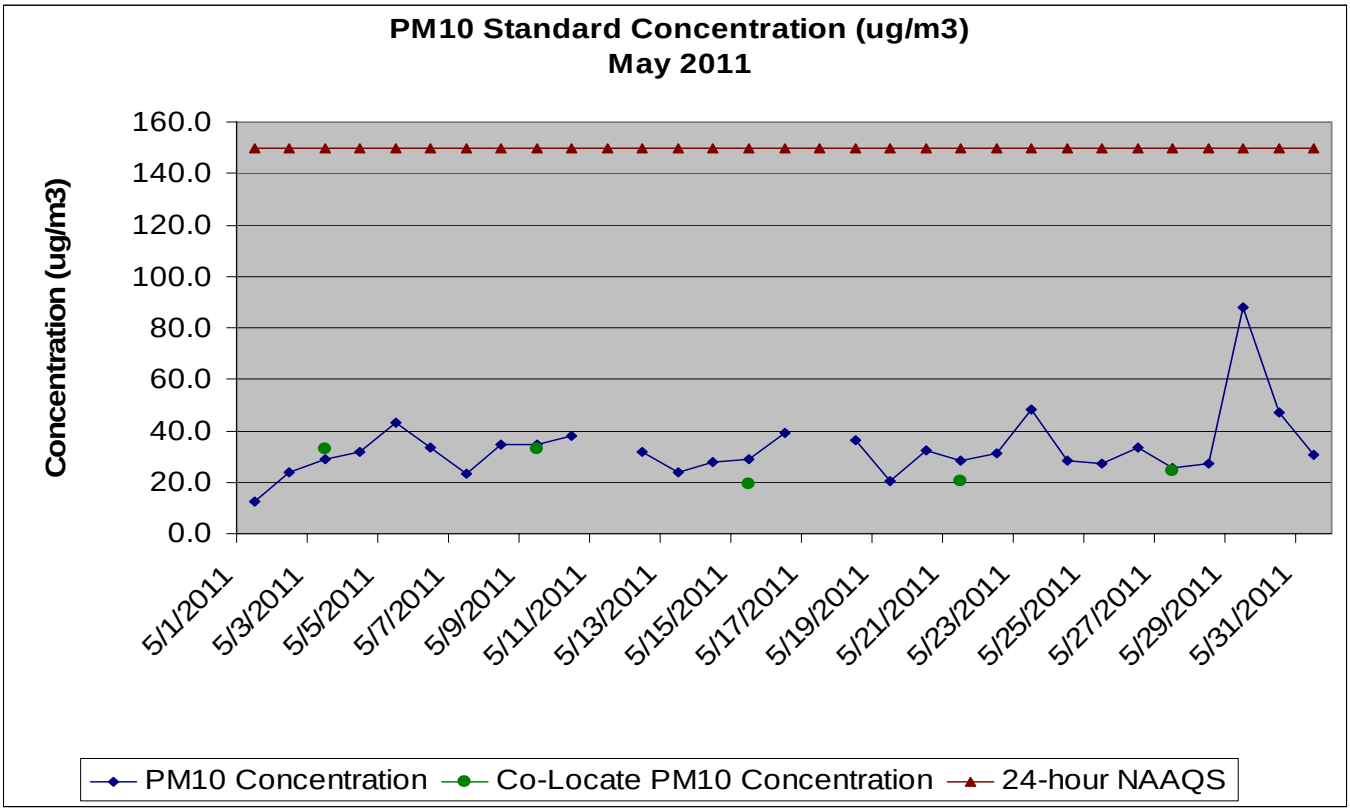
Precision of Duplicate Pairs – PM10

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/m^3 (40CFR58, Appendix A, Section 4c).

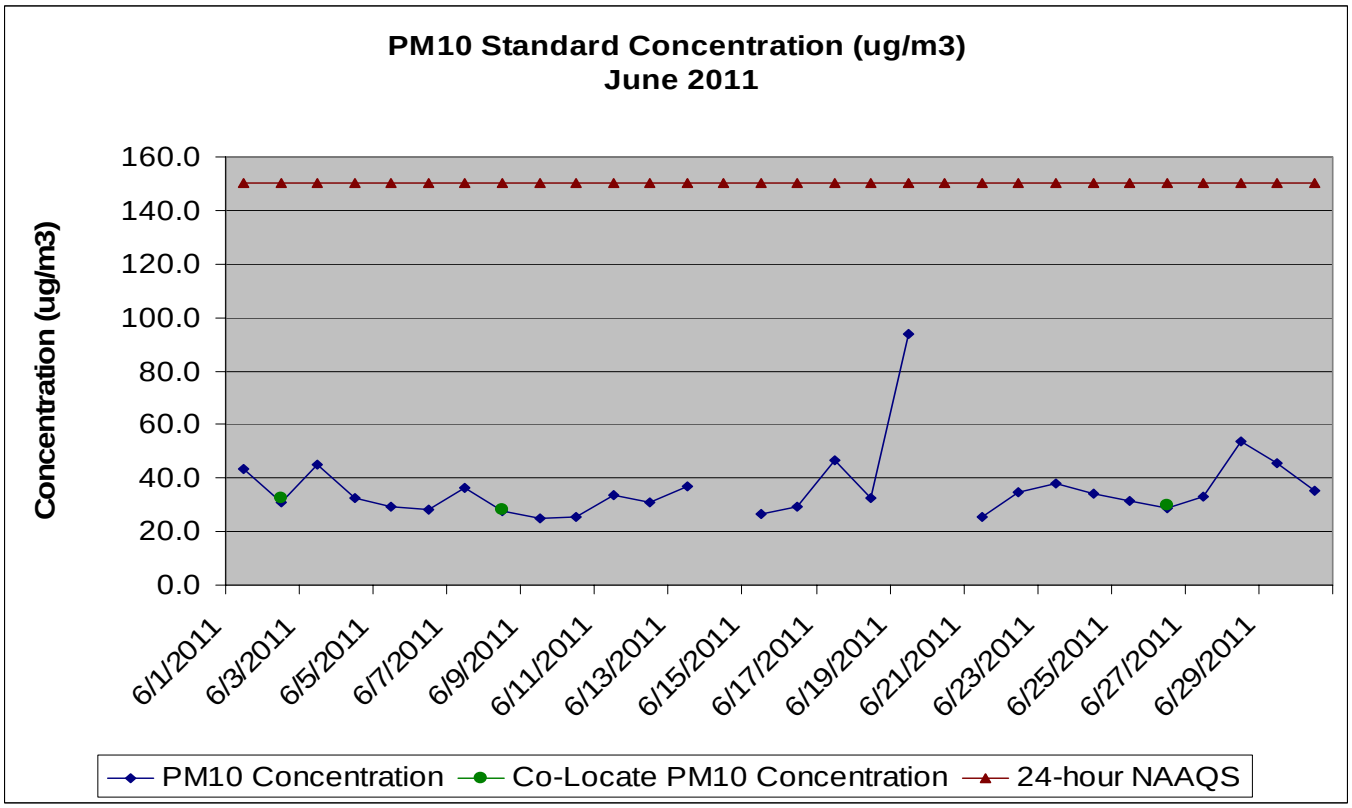
Sample Date	Primary Sampler Number	Measured PM_{10} (µg/m^3)	Duplicate Sampler Number	Measured PM_{10} (µg/m^3)	Difference (µg/m^3)	Percent Difference %
4/3/11	1	15.0	2	15.9	0.9	5.83
4/15/11	1	44.5	2	46.5	2.0	4.40
4/21/11	1	18.4	2	17.7	-0.7	-3.38
4/27/11	1	21.0	2	25.1	4.1	17.79
5/3/11	1	28.7	2	32.9	4.2	13.64
5/9/11	1	34.5	2	33.1	-1.4	-4.14
5/15/11	1	29.2	2	19.5	-9.7	-39.84
5/21/11	1	28.5	2	20.6	-7.9	-32.18
5/27/11	1	25.6	2	24.4	-1.2	-4.80
6/2/11	1	30.9	2	32.7	1.8	5.66
6/8/11	1	27.5	2	28.1	0.6	2.16
6/26/11	1	28.8	2	29.8	1.0	3.41

PM_{10} Concentration Charts





Sample running on 05/11/11 invalid do to equipment malfunction.
Sample running on 05/17/11 invalid for PM10 due to run time being less than 1380 minutes.



Samples running on 06/14/11 and 06/20/11 invalid due to SUSD not changing the filters resulting in double exposures.

Audit Results

Audits were performed on all of the samplers for the 2nd quarter of 2011. If the audit flow rate percent difference is ≤ ± 10%, the sampler calibration is accepted. Differences exceeding ± 10% require sampler recalibration. Differences exceeding ± 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 =**	300.3
Audit Date:	06/24/11	**Ps =**	693.4
Motor:	1424	**Temp c =**	40.10
Temp f:	104.18	**Ta =**	313.1
Press:	27.203	**Pa =**	691.0
Altim:	29.865	**Orifice Calibration Relationship**	
		m= 1.31697	**b=** -0.05235

Plate No.	Orifice dH20	Qa Orifice	Sampler dPex	Sampler dPext
18	3.00	32.7	1.61	0.85
13	2.55	30.2	1.42	0.80
10	2.17	28.0	1.24	0.75
7	1.52	23.7	0.94	0.65
5	1.02	19.6	0.63	0.53

Orifice dH2O	2.052
Sample dPex	1.2
Orifice Qa(m3/m)	0.771952
Sample Qa dPex	27.20081
Audit flow rate % diff:	4.93 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.052	27.25	0.77
Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
1.17	28.60	0.81

Sampler Audit Relationship		
m =	0.024	
b =	0.066	
r =	0.996	
	pm10	**tsp**
Set Point (cfm)	41.9	52.3
Set Point (H20)	2.6	4.0

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 =**	300.3
Audit Date:	06/24/11	**Ps =**	693.4
Motor:	1418	**Temp c =**	36.80
Temp f:	98.24	**Ta =**	309.8
Press:	27.203	**Pa =**	691.0
Altim:	29.865	**Orifice Calibration Relationship**	
		m= 1.31697	**b=** -0.05235

Plate No.	Orifice dH20	Qa Orifice	Sampler dPex	Sampler dPext
18	3.71	36.0	2.20	0.99
13	3.15	33.3	1.93	0.93
10	2.64	30.6	1.59	0.84
7	1.81	25.6	1.14	0.71
5	1.17	20.8	0.82	0.61

Orifice dH2O	2.496
Sample dPex	1.5
Orifice Qa(m3/m)	0.843024
Sample Qa dPex	29.70683
Audit flow rate % diff:	4.89 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.496	29.76	0.84
Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
1.54	31.22	0.88

Sampler Audit Relationship		
m =	0.026	
b =	0.061	
r =	0.998	
	pm10	**tsp**
Set Point (cfm)	41.4	51.8
Set Point (H20)	2.9	4.4

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
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
Audit Date: 06/24/11
Motor: 1419
Temp f: 99.68
Press: 27.203
Altim: 29.865

Ts = 300.6
Ps = 693.4
Temp c = 37.60
Ta = 310.6
Pa = 691.0

Orifice Calibration Relationship
m= 1.31697 **b=** -0.05235

Plate No.	Orifice dH20	Qa Orifice	Sampler dPex	Sampler dPext
18	3.15	33.3	1.36	0.78
13	2.70	30.9	1.12	0.71
10	2.27	28.5	0.90	0.64
7	1.55	23.8	0.49	0.47
5	1.04	19.7	0.24	0.33

Orifice dH2O 2.142
Sample dPex 0.8
Orifice Qa(m3/m) 0.784845
Sample Qa dPex 27.93024

Audit flow rate % diff: 3.86 %

Orifice

dH2O	Qa (CFM)	Qa (M3/m)
2.142	27.71	0.78

Sampler w/Orifice

dPex	Qa (CFM)	Qa (M3/m)
0.82	28.78	0.82

Sampler Audit Relationship
m = 0.034
b = -0.331
r = 0.999

	pm10	tsp
Set Point (cfm)	41.5	51.8
Set Point (H20)	2.5	4.4

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
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
Audit Date: 06/24/11
Motor: 1421
Temp f: 101.84
Press: 27.128
Altim: 29.784

Ts = 300.6
Ps = 693.4
Temp c = 38.80
Ta = 311.8
Pa = 689.0

Orifice Calibration Relationship
m= 1.31697 **b=** -0.05235

Plate No.	Orifice dH20	Qa Orifice	Sampler dPex	Sampler dPext
18	2.96	32.4	1.20	0.74
13	2.56	30.3	0.98	0.67
10	2.13	27.7	0.78	0.59
7	1.48	23.3	0.49	0.47
5	1.01	19.5	0.25	0.34

Orifice dH2O 2.028
Sample dPex 0.7
Orifice Qa(m3/m) 0.76715
Sample Qa dPex 27.24452

Audit flow rate % diff: 3.87 %

Orifice

dH2O	Qa (CFM)	Qa (M3/m)
2.028	27.08	0.77

Sampler w/Orifice

dPex	Qa (CFM)	Qa (M3/m)
0.74	28.14	0.80

Sampler Audit Relationship
m = 0.030
b = -0.251
r = 0.998

	pm10	tsp
Set Point (cfm)	41.8	52.2
Set Point (H20)	2.3	4.0

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 =**	300.3
Audit Date:	06/24/11	**Ps =**	693.4
Motor:	1420	**Temp c =**	34.80
Temp f:	94.64	**Ta =**	307.8
Press:	27.203	**Pa =**	691.0
Altim:	29.865	**Orifice Calibration Relationship**	
		m= 1.31697	**b=** -0.05235

Plate No.	Orifice dH20	Qa Orifice	Sampler dPex	Sampler dPext
18	3.33	34.1	1.33	0.77
13	2.80	31.3	1.08	0.69
10	2.35	28.8	0.84	0.61
7	1.62	24.2	0.48	0.46
5	1.08	20.0	0.24	0.33

Orifice dH2O	2.236
Sample dPex	0.8
Orifice Qa(m3/m)	0.797579
Sample Qa dPex	28.37338
Audit flow rate % diff:	3.92 %

Orifice dH2O	Orifice Qa (CFM)	Orifice Qa (M3/m)
2.236	28.15	0.80

Sampler w/Orifice dPex	Sampler w/Orifice Qa(CFM)	Sampler w/Orifice Qa(M3/m)
0.79	29.27	0.83

Sampler Audit Relationship		
m =	0.032	
b =	-0.305	
r =	1.000	
	pm10	**tsp**
Set Point (cfm)	41.1	51.4
Set Point (H20)	2.2	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
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 =**	300.3
Audit Date:	06/24/11	**Ps =**	693.4
Motor:	1417	**Temp c =**	34.80
Temp f:	94.64	**Ta =**	307.8
Press:	27.203	**Pa =**	691.0
Altim:	29.865	**Orifice Calibration Relationship**	
		m= 1.31697	**b=** -0.05235

Plate No.	Orifice dH20	Qa Orifice	Sampler dPex	Sampler dPext
18	3.22	33.5	1.39	0.79
13	2.73	31.0	1.15	0.72
10	2.30	28.5	0.97	0.66
7	1.59	24.0	0.61	0.52
5	1.06	19.8	0.36	0.40

Orifice dH2O	2.18
Sample dPex	0.9
Orifice Qa(m3/m)	0.788029
Sample Qa dPex	27.91121
Audit flow rate % diff:	4.13 %

Orifice dH2O	Orifice Qa (CFM)	Orifice Qa (M3/m)
2.18	27.82	0.79

Sampler w/Orifice dPex	Sampler w/Orifice Qa (CFM)	Sampler w/Orifice Qa (M3/m)
0.90	28.98	0.82

Sampler Audit Relationship		
m =	0.028	
b =	-0.157	
r =	0.999	
	pm10	**tsp**
Set Point (cfm)	41.1	51.4
Set Point (H20)	2.3	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
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 =**	300.3
Audit Date:	06/27/11	**Ps =**	693.4
Motor:	1422	**Temp c =**	34.80
Temp f:	94.64	**Ta =**	307.8
Press:	27.126	**Pa =**	689.0
Altim:	29.782	**Orifice Calibration Relationship**	
		m= 1.31697	**b=** -0.05235

Plate No.	Orifice dH20	Qa Orifice	Sampler dPex	Sampler dPext
18	3.35	34.2	1.43	0.80
13	2.83	31.6	1.15	0.72
10	2.35	28.9	0.97	0.66
7	1.60	24.1	0.64	0.53
5	1.06	19.9	0.37	0.41

Orifice dH2O	2.238
Sample dPex	0.9
Orifice Qa(m3/m)	0.798992
Sample Qa dPex	28.27772
Audit flow rate % diff:	4.25 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.238	28.20	0.80

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
0.91	29.41	0.83

Sampler Audit Relationship		
m =	0.027	
b =	-0.119	
r =	0.998	
	pm10	**tsp**
Set Point (cfm)	41.3	51.6
Set Point (H20)	2.2	3.6