



MEMORANDUM

Pima County Department of Environmental Quality

TO: Alex Gallego
Assistant Superintendent Operations & Facilities Planning

DATE: 6/4/2013
FROM: Beth Gorman
Senior Program Manager

RE: Pima County DEQ Beryllium Monitoring Report 1st Quarter 2013

Attached is the Pima County Department of Environmental Quality's (PDEQ) Air Monitoring Division Beryllium Monitoring Network Summary for the 1st Quarter of 2013.

Highlights:

- 106 samples collected resulting in 100 valid and 6 invalid samples (94.3% 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) 724-7400.

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 2013



*Pima County Department of Environmental Quality
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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 2013 there was a total of 106 PM₁₀ samples collected resulting in 100 valid and 6 invalid samples; for a data recovery of 94.3 %. 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 101 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 2013.

PM₁₀ /Beryllium Concentrations

Monthly Summary of PM₁₀/Beryllium Data

January 2013

Date	Location	Standard Concentration PM ₁₀ (µg/m ³)	24-hour NAAQS PM ₁₀ (µg/m ³)	Beryllium (ng/m ³)
01/01/13	Chaparral M.S.	10.0	150	<0.225
01/02/13	Transportation Bldg	10.1	150	<0.225
01/03/13	Sunnyside H.S.	15.7	150	<0.225
01/04/13	Ocotillo #1	9.4	150	<0.225
01/04/13	Ocotillo #2	9.8	150	<0.225
01/05/13	Los Amigos	12.9	150	<0.225
01/06/13	Los Niños	10.8	150	<0.225
01/07/13	Chaparral M.S.	18.6	150	<0.225
01/08/13	Transportation Bldg	21.1	150	<0.225
01/09/13	Sunnyside H.S.	20.5	150	<0.225
01/10/13	Ocotillo #1	19.1	150	<0.225
01/10/13	Ocotillo #2	23.5	150	<0.225
01/11/13	Los Amigos	20.3	150	<0.225
01/12/13	Los Niños	11.1	150	<0.225
01/13/13	Chaparral M.S.	11.0	150	<0.225
01/14/13	Transportation Bldg	11.5	150	<0.225
01/15/13	Sunnyside H.S.	30.3	150	<0.225
01/16/13	Ocotillo #1	22.3	150	<0.225
01/16/13	Ocotillo #2	23.2	150	<0.225
01/17/13	Los Amigos	14.9	150	<0.225
01/18/13	Los Niños	INVALID	150	INVALID
01/19/13	Chaparral M.S.	18.0	150	<0.225
01/20/13	Transportation Bldg.	14.6	150	<0.225
01/21/13	Sunnyside H.S.	24.4	150	<0.225
01/22/13	Ocotillo #1	INVALID	150	INVALID
01/22/13	Ocotillo #2	22.5	150	<0.225
01/23/13	Los Amigos	INVALID	150	INVALID
01/24/13	Los Niños	INVALID	150	INVALID
01/25/13	Chaparral M.S.	6.5	150	<0.225
01/26/13	Transportation Bldg.	5.9	150	<0.225
01/27/13	Sunnyside H.S.	7.5	150	<0.225
01/28/13	Ocotillo #1	5.4	150	<0.225
01/28/13	Ocotillo #2	5.7	150	<0.225
01/29/13	Los Amigos	INVALID	150	INVALID
01/30/13	Los Ninos	50.3	150	<0.225
01/31/13	Chaparral M.S.	17.6	150	<0.225

Samples running on 01/18/13, 01/23/13, 01/24/13 and 01/29/13 are all invalid due to the filters not being changed out resulting in double exposures.

Sample running on 01/22/13 invalid due to no ending flow rate being annotated resulting in not being able to calculate the concentration.

NAAQS = National Ambient Air Quality Standard for PM₁₀

PM₁₀ /Beryllium Concentrations (continued)

Monthly Summary of PM₁₀/Beryllium Data

February 2013

Date	Location	Standard Concentration PM₁₀ (µg/m³)	24-hour NAAQS PM₁₀ (µg/m³)	Beryllium (ng/m³)
02/01/13	Transportation Bldg	13.8	150	<0.225
02/02/13	Sunnyside H.S.	18.6	150	<0.225
02/03/13	Ocotillo #1	14.3	150	<0.225
02/03/13	Ocotillo #2	19.4	150	<0.225
02/04/13	Los Amigos	17.4	150	<0.225
02/05/13	Los Ninos	14.2	150	<0.225
02/06/13	Chaparral M.S.	12.8	150	<0.225
02/07/13	Transportation Bldg	14.7	150	<0.225
02/08/13	Sunnyside H.S.	6.3	150	<0.225
02/09/13	Ocotillo #1	5.8	150	<0.225
02/09/13	Ocotillo #2	6.1	150	<0.225
02/10/13	Los Amigos	5.1	150	<0.225
02/11/13	Los Niños	6.1	150	<0.225
02/12/13	Chaparral M.S.	7.2	150	<0.225
02/13/13	Transportation Bldg	10.1	150	<0.225
02/14/13	Sunnyside H.S.	21.2	150	<0.225
02/15/13	Ocotillo #1	21.4	150	<0.225
02/15/13	Ocotillo #2	11.1	150	<0.225
02/16/13	Los Amigos	10.3	150	<0.225
02/17/13	Los Niños	1.9	150	<0.225
02/18/13	Chaparral M.S.	14.7	150	<0.225
02/19/13	Transportation Bldg	12.1	150	<0.225
02/20/13	Sunnyside H.S.	4.3	150	<0.225
02/21/13	Ocotillo #1	9.6	150	<0.225
02/21/13	Ocotillo #2	13.3	150	<0.225
02/22/13	Los Amigos	12.8	150	<0.225
02/23/13	Los Niños	13.4	150	<0.225
02/24/13	Chaparral M.S.	23.2	150	<0.225
02/25/13	Transportation Bldg	11.8	150	<0.225
02/26/13	Sunnyside H.S.	16.8	150	<0.225
02/27/13	Ocotillo #1	17.5	150	<0.225
02/27/13	Ocotillo #2	20.8	150	<0.225
02/28/13	Los Amigos	14.0	150	<0.225

NAAQS = National Ambient Air Quality Standard for PM₁₀

PM₁₀ /Beryllium Concentrations (continued)

Monthly Summary of PM₁₀/Beryllium Data

March 2013

Date	Location	Standard Concentration PM₁₀ (µg/m³)	24-hour NAAQS PM₁₀ (µg/m³)	Beryllium (ng/m³)
03/01/13	Los Niños	24.6	150	<0.225
03/02/13	Chaparral M.S.	21.2	150	<0.225
03/03/13	Transportation Bldg	12.5	150	<0.225
03/04/13	Sunnyside H.S.	25.4	150	<0.225
03/05/13	Ocotillo #1	20.2	150	<0.225
03/05/13	Ocotillo #2	18.2	150	<0.225
03/06/13	Los Amigos	20.8	150	<0.225
03/07/13	Los Niños	24.4	150	<0.225
03/08/13	Chaparral M.S.	33.1	150	<0.225
03/09/13	Transportation Bldg	6.9	150	<0.225
03/10/13	Sunnyside H.S.	9.4	150	<0.225
03/11/13	Ocotillo #1	15.4	150	<0.225
03/11/13	Ocotillo #2	16.4	150	<0.225
03/12/13	Los Amigos	16.7	150	<0.225
03/13/13	Los Niños	23.4	150	<0.225
03/14/13	Chaparral M.S.	22.5	150	<0.225
03/15/13	Transportation Bldg	21.4	150	<0.225
03/16/13	Sunnyside H.S.	19.0	150	<0.225
03/17/13	Ocotillo #1	17.4	150	<0.225
03/17/13	Ocotillo #2	19.1	150	<0.225
03/18/13	Los Amigos	24.1	150	<0.225
03/19/13	Los Ninos	30.3	150	<0.225
03/20/13	Chaparral M.S.	25.3	150	<0.225
03/21/13	Transportation Bldg	21.3	150	<0.225
03/22/13	Sunnyside H.S.	28.7	150	<0.225
03/23/13	Ocotillo #1	32.5	150	<0.225
03/23/13	Ocotillo #2	34.2	150	<0.225
03/24/13	Los Amigos	34.7	150	<0.225
03/25/13	Los Ninos	27.1	150	<0.225
03/26/13	Chaparral M.S.	22.2	150	<0.225
03/27/13	Transportation Bldg	20.4	150	<0.225
03/28/13	Sunnyside H.S.	19.6	150	<0.225
03/29/13	Ocotillo #1	INVALID	150	<0.225
03/29/13	Ocotillo #2	20.2	150	<0.225
03/30/13	Los Amigos	17.9	150	<0.225
03/31/13	Los Ninos	17.5	150	<0.225

Sample running on 03/29/13 invalid for PM10 due to the flow being >44 CFM (cubic feet per minute)

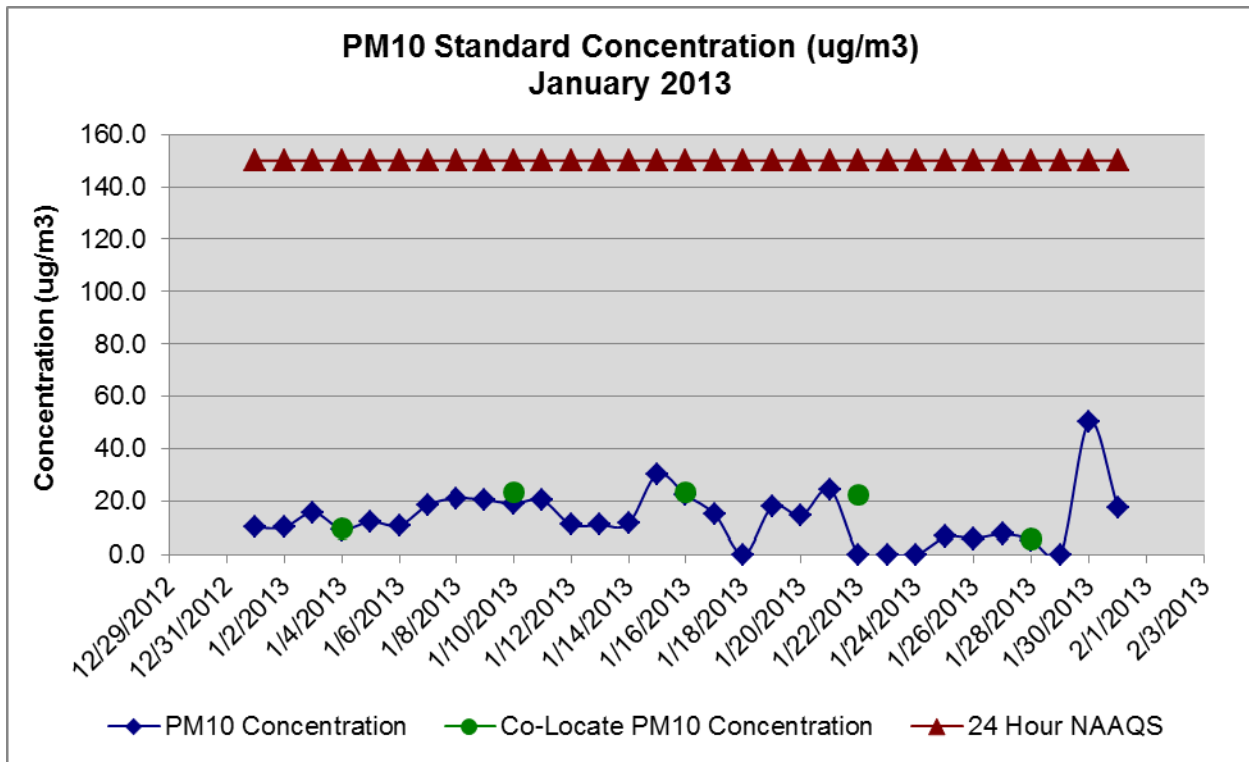
NAAQS = National Ambient Air Quality Standard for PM₁₀

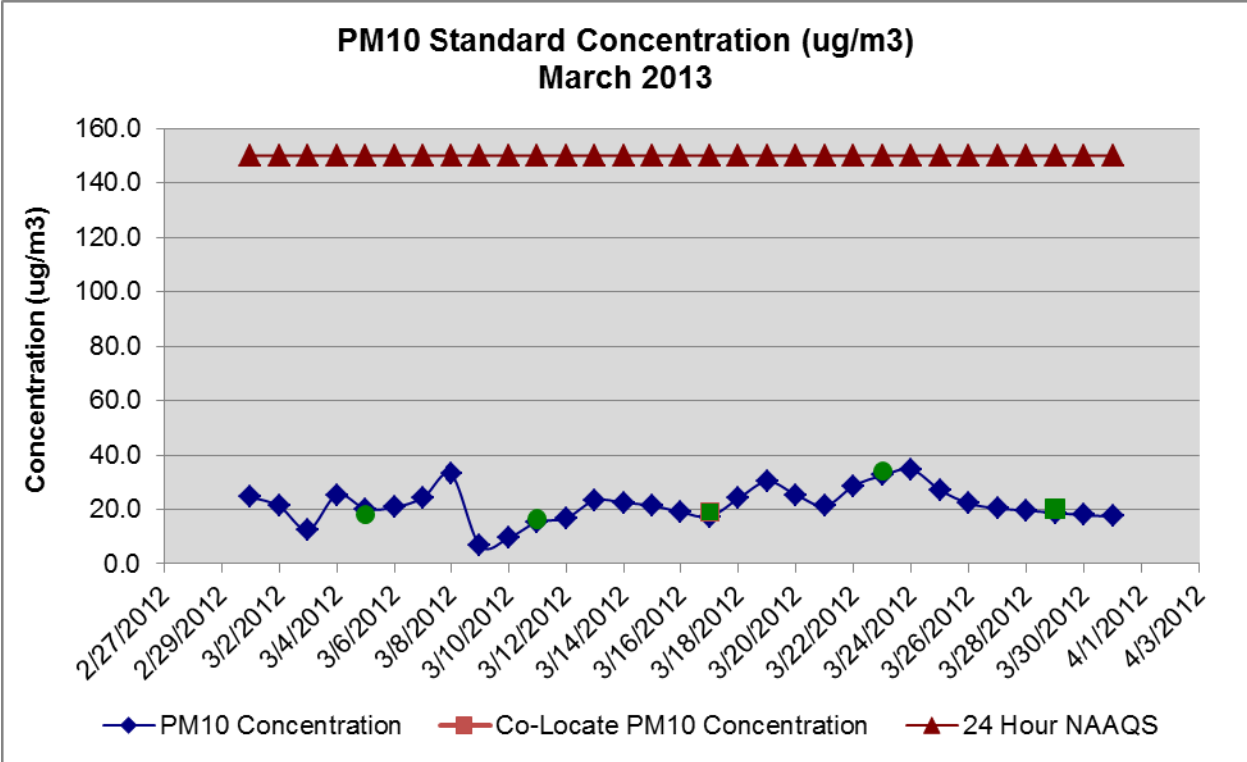
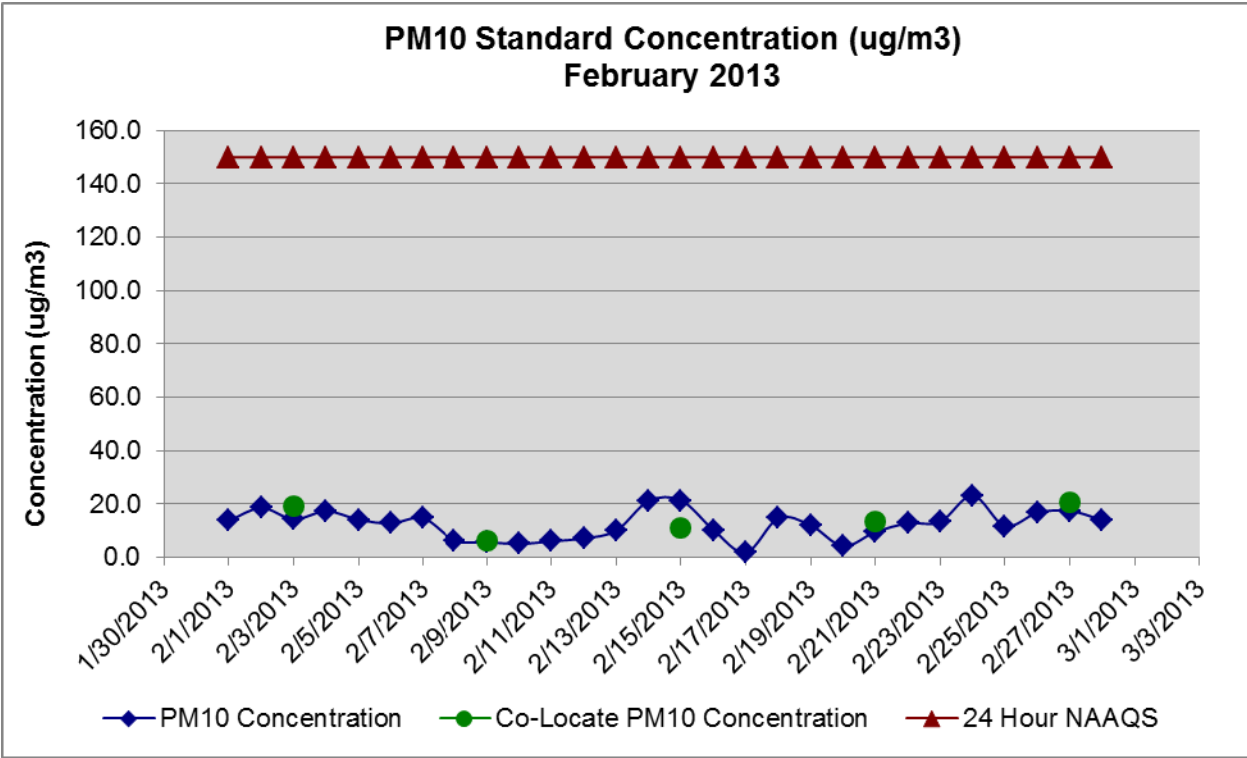
Precision of Duplicate Pairs – PM10

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 %
01/10/13	1	19.1	2	23.5	4.4	20.66
01/16/13	1	22.3	2	23.2	1.0	3.96
02/27/13	1	17.5	2	20.8	3.3	17.23
03/05/13	1	20.2	2	18.2	-2.0	-10.42
03/11/13	1	15.4	2	16.4	1.0	6.29
03/17/13	1	17.4	2	19.1	1.7	9.32
03/23/13	1	32.5	2	34.2	1.5	5.10

PM₁₀ Concentration Charts





Audit Results

Audits were performed on all of the samplers for the 1st quarter of 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
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: 03/25/13 **Ps =** 692.8
Motor: 1424 **Temp c =** 24.30
 Ta = 297.3
 Pa = 692.0

Orifice Calibration Relationship
m= 1.30069 b= -0.12083

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	3.42	36.2	2.48	1.03
13	2.87	33.4	2.20	0.97
10	2.36	30.6	1.72	0.86
7	1.92	27.9	1.30	0.75
5	1.31	23.6	0.80	0.59

Orifice dH2O 2.376
 Sample dPex 1.7
 Orifice Qa(m3/m) 0.86967
 Sample Qa dPex 30.7734

Audit flow rate % diff: 3.95 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.376	30.70	0.87

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
1.70	31.92	0.90

Sampler Audit Relationship		
m =	0.037	
b =	-0.273	
r =	0.992	
	pm10	tsp
Set Point (cfm)	40.2	50.3
Set Point (H20)	3.4	5.7

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: 03/25/13 **Ps =** 692.8
Motor: 1418 **Temp c =** 24.70
 Ta = 297.7
 Pa = 694.0

Orifice Calibration Relationship
m= 1.30069 b= -0.12083

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	4.49	41.0	2.51	1.04
13	3.74	37.7	2.26	0.98
10	3.11	34.6	1.83	0.89
7	2.01	28.5	1.32	0.75
5	1.21	22.8	0.93	0.63

Orifice dH2O 2.912
 Sample dPex 1.8
 Orifice Qa(m3/m) 0.95217
 Sample Qa dPex 33.4789

Audit flow rate % diff: 5.14 %

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.912	33.61	0.95

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
1.77	35.35	1.00

Sampler Audit Relationship		
m =	0.023	
b =	0.104	
r =	0.995	
	pm10	tsp
Set Point (cfm)	40.2	50.2
Set Point (H20)	2.4	3.7

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: 03/26/13 **Ps =** 692.8
Motor: 1419 **Temp c =** 29.30

Ta = 302.3
Pa = 692.0

Orifice Calibration Relationship
m= 1.30069 b= -0.12083

Plate No.	Orifice dH20	Qa Orifice	Sampler dPex	Sampler dPext
18	3.78	38.2	1.65	0.85
13	3.31	35.9	1.33	0.76
10	2.71	32.8	1.02	0.67
7	1.86	27.8	0.69	0.55
5	1.24	23.3	0.36	0.40

Orifice dH2O 2.58
 Sample dPex 1.0
 Orifice Qa(m3/m) 0.90911
 Sample Qa dPex 32.2465

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.58	32.09	0.91

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
1.01	33.35	0.94

Sampler Audit Relationship		
m =	0.029	
b =	-0.278	
r =	0.995	
	pm10	tsp
Set Point (cfm)	40.9	51.1
Set Point (H2O)	1.9	3.4

Audit flow rate % diff: 3.88 %

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: 03/26/13 **Ps =** 692.8
Motor: 1421 **Temp c =** 30.20

Ta = 303.2
Pa = 691.0

Orifice Calibration Relationship
m= 1.30069 b= -0.12083

Plate No.	Orifice dH20	Qa Orifice	Sampler dPex	Sampler dPext
18	3.69	37.8	1.67	0.86
13	3.13	35.1	1.39	0.78
10	2.56	32.1	1.03	0.67
7	1.66	26.4	0.61	0.52
5	0.99	21.2	0.38	0.41

Orifice dH2O 2.406
 Sample dPex 1.0
 Orifice Qa(m3/m) 0.88285
 Sample Qa dPex 31.2752

Orifice		
dH2O	Qa (CFM)	Qa (M3/m)
2.406	31.16	0.88

Sampler w/Orifice		
dPex	Qa (CFM)	Qa (M3/m)
1.02	32.45	0.92

Sampler Audit Relationship		
m =	0.027	
b =	-0.187	
r =	0.992	
	pm10	tsp
Set Point (cfm)	41.1	51.3
Set Point (H2O)	2.0	3.4

Audit flow rate % diff: 4.11 %

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
Audit Date: 03/26/13 **Ps =** 692.8
Motor: 1420 **Temp c =** 28.10
 Ta = 301.1
 Pa = 693.0
Orifice Calibration Relationship
 m= 1.30069 b= -0.12083

Plate No.	Orifice dH20	Qa Orifice	Sampler dPex	Sampler dPext
18	3.66	37.5	1.44	0.79
13	3.03	34.4	1.10	0.69
10	2.53	31.7	0.89	0.62
7	1.63	26.1	0.56	0.49
5	1.01	21.3	0.23	0.32

Orifice dH2O 2.372
 Sample dPex 0.8
 Orifice Qa(m3/m) 0.8734
 Sample Qa dPex 31.027
 Audit flow rate % diff: 4.00 %

dH2O	Orifice	
	Qa (CFM)	Qa (M3/m)
2.372	30.83	0.87

dPex	Sampler w/Orifice	
	Qa(CFM)	Qa(M3/m)
0.84	32.07	0.91

Sampler Audit Relationship		
m =	0.028	
b =	-0.268	
r =	0.993	
	pm10	tsp
Set Point (cfm)	40.7	50.8
Set Point (H2O)	1.8	3.1

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
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: 03/26/13 **Ps =** 692.8
Motor: 1417 **Temp c =** 28.10
 Ta = 301.1
 Pa = 693.0
Orifice Calibration Relationship
 m= 1.30069 b= -0.12083

Plate No.	Orifice dH20	Qa Orifice	Sampler dPex	Sampler dPext
18	3.34	36.0	1.59	0.83
13	2.80	33.2	1.29	0.75
10	2.35	30.7	0.94	0.64
7	1.58	25.8	0.64	0.53
5	1.03	21.4	0.34	0.38

Orifice dH2O 2.218
 Sample dPex 1.0
 Orifice Qa(m3/m) 0.84763
 Sample Qa dPex 30.0642
 Audit flow rate % diff: 3.93 %

dH2O	Orifice	
	Qa (CFM)	Qa (M3/m)
2.218	29.92	0.85

dPex	Sampler w/Orifice	
	Qa (CFM)	Qa (M3/m)
0.96	31.11	0.88

Sampler Audit Relationship		
m =	0.030	
b =	-0.259	
r =	0.993	
	pm10	tsp
Set Point (cfm)	40.7	50.8
Set Point (H2O)	2.1	3.7

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: 03/25/13 **Ps =** 692.8
Motor: 1422 **Temp c =** 20.40
 Ta = 293.4
 Pa = 693.0
Orifice Calibration Relationship
 m= 1.30069 b= -0.12083

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	4.04	38.8	1.88	0.89
13	3.36	35.7	1.50	0.80
10	2.73	32.5	1.18	0.71
7	1.69	26.2	0.83	0.59
5	1.02	21.1	0.43	0.43

Orifice dH2O 2.568
 Sample dPex 1.2
 Orifice Qa(m3/m) 0.89455
 Sample Qa dPex 31.6058

Audit flow rate % diff: 4.46 %

dH2O	Orifice	
	Qa (CFM)	Qa (M3/m)
2.568	31.58	0.89

dPex	Sampler w/Orifice	
	Qa (CFM)	Qa (M3/m)
1.16	33.00	0.93

Sampler Audit Relationship		
m =	0.025	
b =	-0.094	
r =	0.991	
	pm10	tsp
Set Point (cfm)	39.6	49.5
Set Point (H2O)	1.9	3.1