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# MEMORANDUM

Pima County Department of Environmental Quality

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**DATE:** 3/10/2011

**TO:** Richard Oros  
Director of Plant Operations

**FROM:** Beth Gorman  
Program Manager

**RE: Pima County DEQ Beryllium Monitoring Report 4<sup>th</sup> Quarter 2010**

Attached is the Pima County Department of Environmental Quality's (PDEQ) Air Monitoring Division Beryllium Monitoring Network Summary for the 4<sup>th</sup> Quarter of 2010.

**Highlights:**

- 107 samples collected resulting in 104 valid and 3 invalid samples (97.2 % 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**  
**4<sup>th</sup> Quarter 2010**



*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 4<sup>th</sup> quarter of 2010 there was a total of 107 PM<sub>10</sub> samples collected resulting in 104 valid and 3 invalid samples; for a data recovery of 97.2 %. 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 106 samples analyzed for beryllium. Beryllium concentrations are reported as <0.225 ng/m<sup>3</sup> 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<sub>10</sub> concentrations (µg/m<sup>3</sup>) calculated in standard conditions, PM<sub>10</sub> 24-hour NAAQS standard, precision measurements, Beryllium analysis results, accompanying graphs and a brief explanation of all invalid samples for the 4<sup>th</sup> quarter of 2010.

# PM<sub>10</sub> /Beryllium Concentrations

## Monthly Summary of PM<sub>10</sub>/Beryllium Data

October - 2010

Date	Location	Standard Concentration PM <sub>10</sub> (µg/m <sup>3</sup> )	24-hour NAAQS PM <sub>10</sub> (µg/m <sup>3</sup> )	Beryllium (ng/m <sup>3</sup> )
10/01/10	Los Niños	23.5	150	<0.225
10/02/10	Chaparral M.S.	35.5	150	<0.225
10/03/10	Transportation Bldg	INVALID	150	INVALID
10/04/10	Sunnyside H.S.	20.2	150	<0.225
10/05/10	Ocotillo #1	10.4	150	<0.225
10/05/10	Ocotillo #2	11.9	150	<0.225
10/06/10	Los Amigos	14.0	150	<0.225
10/07/10	Los Niños	18.4	150	<0.225
10/08/10	Chaparral M.S.	18.9	150	<0.225
10/09/10	Transportation Bldg	16.1	150	<0.225
10/10/10	Sunnyside H.S.	16.9	150	<0.225
10/11/10	Ocotillo #1	15.7	150	<0.225
10/11/10	Ocotillo #2	17.4	150	<0.225
10/12/10	Los Amigos	19.3	150	<0.225
10/13/10	Los Niños	23.5	150	<0.225
10/14/10	Chaparral M.S.	19.4	150	<0.225
10/15/10	Transportation Bldg	15.9	150	<0.225
10/16/10	Sunnyside H.S.	10.8	150	<0.225
10/17/10	Ocotillo #1	7.8	150	<0.225
10/17/10	Ocotillo #2	10.6	150	<0.225
10/18/10	Los Amigos	11.2	150	<0.225
10/19/10	Los Niños	14.7	150	<0.225
10/20/10	Chaparral M.S.	14.8	150	<0.225
10/21/10	Transportation Bldg	7.3	150	<0.225
10/22/10	Sunnyside H.S.	13.0	150	<0.225
10/23/10	Ocotillo #1	12.9	150	<0.225
10/23/10	Ocotillo #2	15.1	150	<0.225
10/24/10	Los Amigos	9.4	150	<0.225
10/25/10	Los Niños	15.6	150	<0.225
10/26/10	Chaparral M.S.	19.0	150	<0.225
10/27/10	Transportation Bldg	21.2	150	<0.225
10/28/10	Sunnyside H.S.	24.2	150	<0.225
10/29/10	Ocotillo #1	20.9	150	<0.225
10/29/10	Ocotillo #2	22.4	150	<0.225
10/30/10	Los Amigos	15.1	150	<0.225
10/31/10	Los Niños	17.6	150	<0.225

Sample running on 10/03/10 invalid due to SUSD not changing the filter resulting in a double exposure.

NAAQS = National Ambient Air Quality Standard for PM<sub>10</sub>

**PM<sub>10</sub> /Beryllium Concentrations (continued)**

**Monthly Summary of PM<sub>10</sub>/Beryllium Data**

**November - 2010**

<b>Date</b>	<b>Location</b>	<b>Standard Concentration PM<sub>10</sub> (µg/m<sup>3</sup>)</b>	<b>24-hour NAAQS PM<sub>10</sub> (µg/m<sup>3</sup>)</b>	<b>Beryllium (ng/m<sup>3</sup>)</b>
11/01/10	Chaparral M.S.	27.8	150	<0.225
11/02/10	Transportation Bldg	22.5	150	<0.225
11/03/10	Sunnyside H.S.	18.8	150	<0.225
11/04/10	Ocotillo #1	30.1	150	<0.225
11/04/10	Ocotillo #2	29.6	150	<0.225
11/05/10	Los Amigos	27.3	150	<0.225
11/06/10	Los Niños	24.2	150	<0.225
11/07/10	Chaparral M.S.	INVALID	150	<0.225
11/08/10	Transportation Bldg	31.7	150	<0.225
11/09/10	Sunnyside H.S.	30.5	150	<0.225
11/10/10	Ocotillo #1	18.1	150	<0.225
11/10/10	Ocotillo #2	18.6	150	<0.225
11/11/10	Los Amigos	24.0	150	<0.225
11/12/10	Los Niños	30.5	150	<0.225
11/13/10	Chaparral M.S.	25.7	150	<0.225
11/14/10	Transportation Bldg	21.0	150	<0.225
11/15/10	Sunnyside H.S.	26.6	150	<0.225
11/16/10	Ocotillo #1	18.8	150	<0.225
11/16/10	Ocotillo #2	21.6	150	<0.225
11/17/10	Los Amigos	27.8	150	<0.225
11/18/10	Los Niños	33.2	150	<0.225
11/19/10	Chaparral M.S.	28.3	150	<0.225
11/20/10	Transportation Bldg	18.6	150	<0.225
11/21/10	Sunnyside H.S.	11.7	150	<0.225
11/22/10	Ocotillo #1	17.1	150	<0.225
11/22/10	Ocotillo #2	20.4	150	<0.225
11/23/10	Los Amigos	25.5	150	<0.225
11/24/10	Los Niños	26.5	150	<0.225
11/25/10	Chaparral M.S.	INVALID	150	<0.225
11/26/10	Transportation Bldg	29.9	150	<0.225
11/27/10	Sunnyside H.S.	20.6	150	<0.225
11/28/10	Ocotillo #1	19.4	150	<0.225
11/28/10	Ocotillo #2	20.5	150	<0.225
11/29/10	Los Amigos	28.6	150	<0.225
11/30/10	Los Niños	32.0	150	<0.225

Sample running on 11/07/10 invalid for PM<sub>10</sub> due to the average flow rate not being between 36 and 44 CFM

Sample running on 11/25/10 invalid for PM<sub>10</sub> due to the average flow rate not being between 36 and 44 CFM

NAAQS = National Ambient Air Quality Standard for PM<sub>10</sub>

**PM<sub>10</sub> /Beryllium Concentrations (continued)**

**Monthly Summary of PM<sub>10</sub>/Beryllium Data**

**December - 2010**

<b>Date</b>	<b>Location</b>	<b>Standard Concentration PM<sub>10</sub> (µg/m<sup>3</sup>)</b>	<b>24-hour NAAQS PM<sub>10</sub> (µg/m<sup>3</sup>)</b>	<b>Beryllium (ng/m<sup>3</sup>)</b>
12/01/10	Chaparral M.S.	31.7	150	<0.225
12/02/10	Transportation Bldg	27.9	150	<0.225
12/03/10	Sunnyside H.S.	39.9	150	<0.225
12/04/10	Ocotillo #1	29.4	150	<0.225
12/04/10	Ocotillo #2	30.9	150	<0.225
12/05/10	Los Amigos	25.9	150	<0.225
12/06/10	Los Niños	39.7	150	<0.225
12/07/10	Chaparral M.S.	54.7	150	<0.225
12/08/10	Transportation Bldg	31.8	150	<0.225
12/09/10	Sunnyside H.S.	37.4	150	<0.225
12/10/10	Ocotillo #1	32.3	150	<0.225
12/10/10	Ocotillo #2	35.1	150	<0.225
12/11/10	Los Amigos	21.0	150	<0.225
12/12/10	Los Niños	30.6	150	<0.225
12/13/10	Chaparral M.S.	30.6	150	<0.225
12/14/10	Transportation Bldg	25.0	150	<0.225
12/15/10	Sunnyside H.S.	35.3	150	<0.225
12/16/10	Ocotillo #1	26.0	150	<0.225
12/16/10	Ocotillo #2	26.2	150	<0.225
12/17/10	Los Amigos	16.5	150	<0.225
12/18/10	Los Niños	17.3	150	<0.225
12/19/10	Chaparral M.S.	13.3	150	<0.225
12/20/10	Transportation Bldg	11.9	150	<0.225
12/21/10	Sunnyside H.S.	21.0	150	<0.225
12/22/10	Ocotillo #1	22.7	150	<0.225
12/22/10	Ocotillo #2	26.4	150	<0.225
12/23/10	Los Amigos	10.8	150	<0.225
12/24/10	Los Niños	15.9	150	<0.225
12/25/10	Chaparral M.S.	11.7	150	<0.225
12/26/10	Transportation Bldg	14.5	150	<0.225
12/27/10	Sunnyside H.S.	25.8	150	<0.225
12/28/10	Ocotillo #1	23.3	150	<0.225
12/28/10	Ocotillo #2	27.3	150	<0.225
12/29/10	Los Amigos	17.0	150	<0.225
12/30/10	Los Niños	9.7	150	<0.225
12/31/10	Chaparral M.S.	23.1	150	<0.225

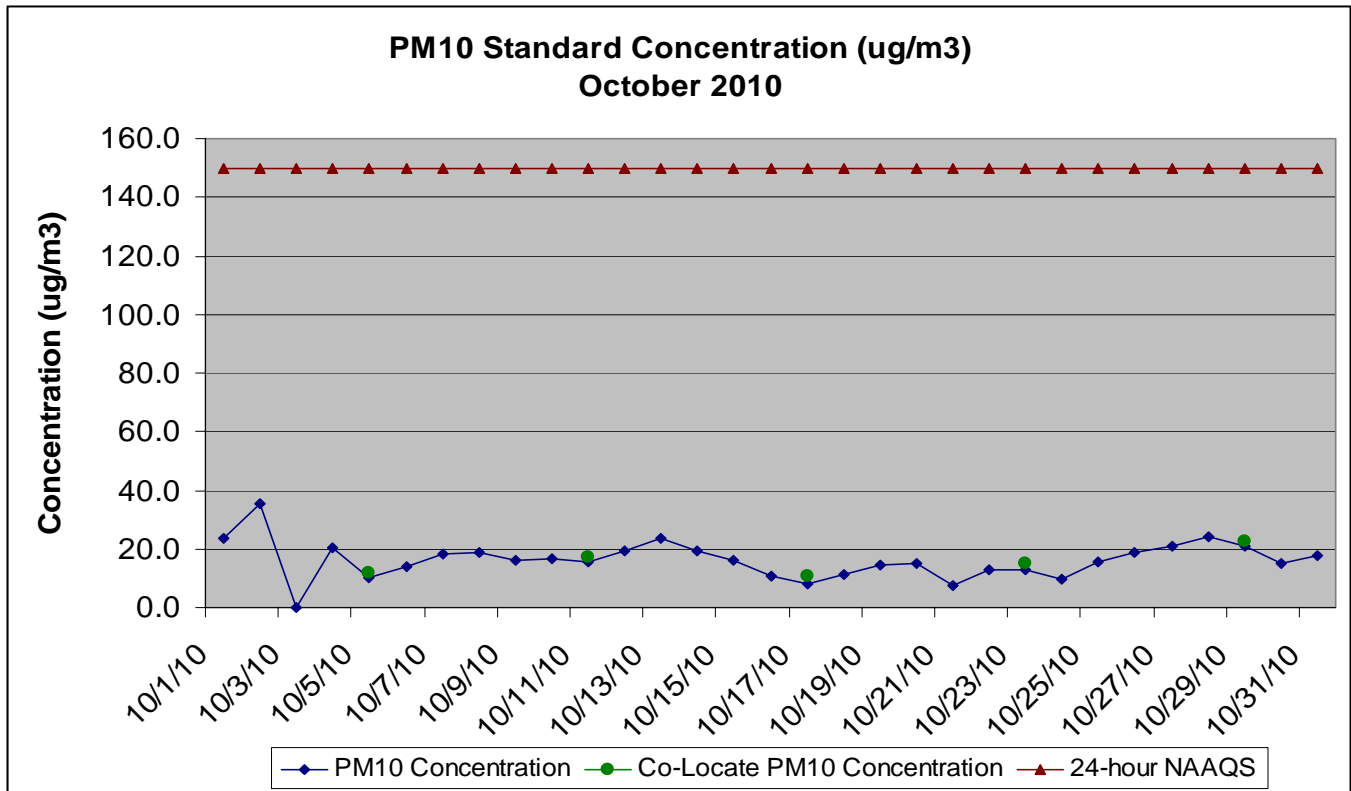
NAAQS = National Ambient Air Quality Standard for PM<sub>10</sub>

## 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<sup>3</sup> (40CFR58, Appendix A, Section 4c).

Sample Date	Primary Sampler Number	Measured PM <sub>10</sub> (µg/m <sup>3</sup> )	Duplicate Sampler Number	Measured PM <sub>10</sub> (µg/m <sup>3</sup> )	Difference (µg/m <sup>3</sup> )	Percent Difference %
10/11/2010	1	15.7	2	17.4	1.7	10.27
10/29/2010	1	20.9	2	22.4	1.5	6.93
11/04/2010	1	30.1	2	29.6	-0.5	-1.68
11/10/2010	1	18.1	2	18.6	0.5	2.72
11/16/2010	1	18.8	2	21.6	2.8	13.86
11/22/2010	1	17.1	2	20.4	3.3	17.60
11/28/2010	1	19.4	2	20.5	1.1	5.51
12/04/2010	1	29.4	2	30.9	1.5	4.98
12/10/2010	1	32.3	2	35.1	2.8	8.31
12/16/2010	1	26.0	2	26.2	0.2	0.77
12/22/2010	1	22.7	2	26.4	3.7	15.07
12/28/2010	1	23.3	2	27.3	4.0	15.81

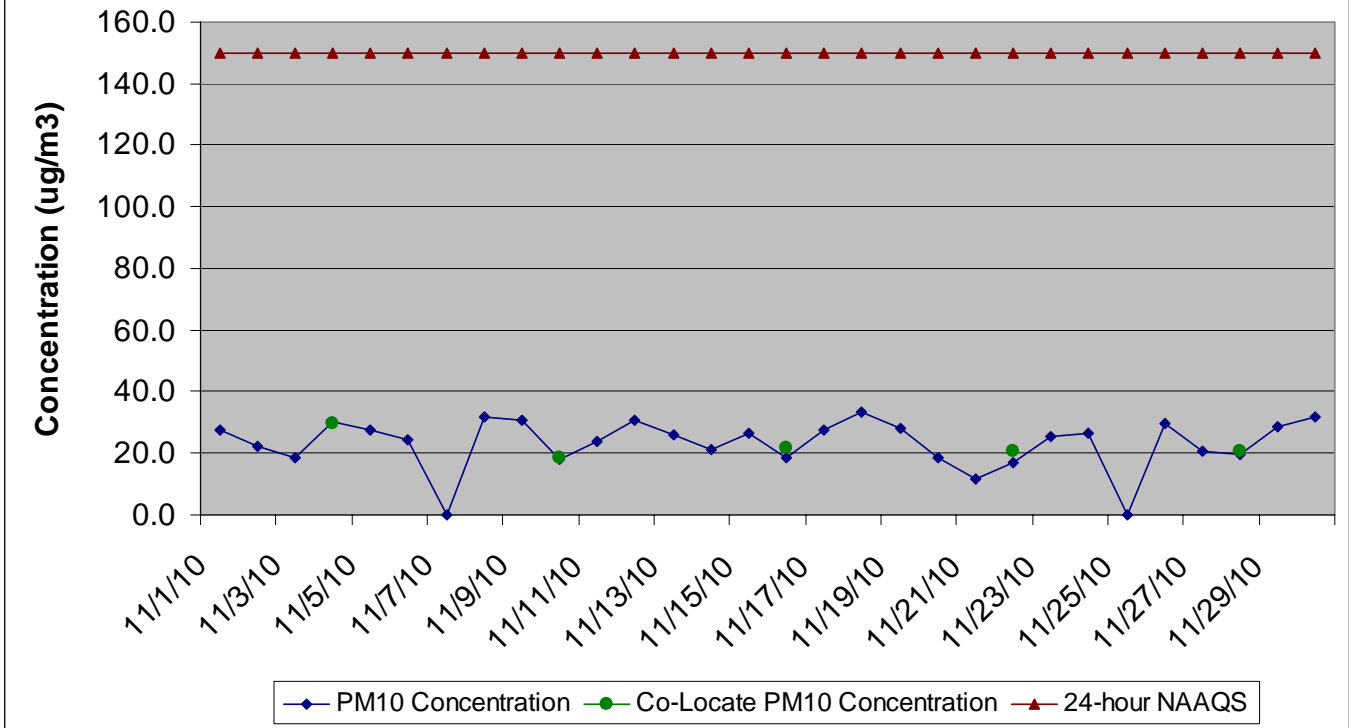
## PM<sub>10</sub> Concentration Charts



Sample running on 10/03/10 invalid due to SUSD not changing the filter resulting in a double exposure.

NAAQS = National Ambient Air Quality Standards for PM<sub>10</sub>

**PM10 Standard Concentration (ug/m3)  
November 2010**

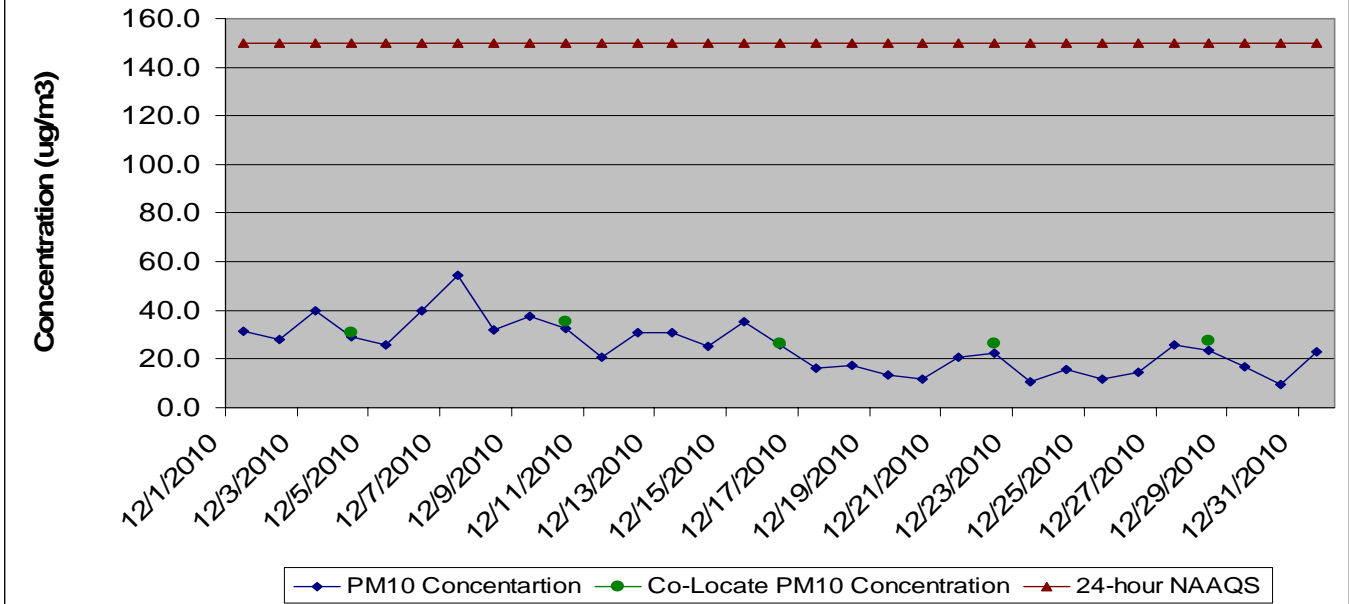


Sample running on 11/07/10 invalid for PM10 due to the average flow rate not being between 36 and 44 CFM.

Sample running on 11/25/10 invalid for PM10 due to the average flow rate not being between 36 and 44 CFM.

NAAQS = National Ambient Air Quality Standards for PM<sub>10</sub>

**PM10 Standard Concentration (ug/m3)  
December 2010**



NAAQS = National Ambient Air Quality Standard for PM<sub>10</sub>



## Audit Results

Audits were performed on all of the samplers for the 4<sup>th</sup> quarter of 2010. 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 =** 286.5  
**Audit Date:** 12/17/10      **Ps =** 694.7  
**Motor:** 1424      **Temp c =** 19.50  
**Temp f:** 67.1      **Ta =** 292.5  
**Press:** 27.244      **Pa =** 692.0  
**Altim:** 29.910      **Orifice Calibration Relationship**  
    **m= 1.31620      b= -0.04542**

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	4.26	37.2	2.32	0.99
13	3.66	34.6	2.02	0.92
10	2.93	31.1	1.65	0.84
7	2.02	26.0	1.17	0.70
5	1.30	21.1	0.83	0.59

Orifice dH2O                      2.834  
 Sample dPex                      1.6  
 Orifice Qa(m3/m)                0.866052  
 Sample Qa dPex                 30.51484

Audit flow rate % diff: 5.19 %

Orifice		
dH2O	Qa(CFM)	Qa(M3/m)
2.834	30.57	0.87

Sampler w/Orifice		
dPex	Qa(CFM)	Qa(M3/m)
1.60	32.17	0.91

Sampler Audit Relationship	
<b>m =</b>	0.025
<b>b =</b>	0.063
<b>r =</b>	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 =** 286.5  
**Audit Date:** 12/17/10      **Ps =** 694.7  
**Motor:** 1418      **Temp c =** 17.00  
**Temp f:** 62.6      **Ta =** 290.0  
**Press:** 27.283      **Pa =** 693.0  
**Altim:** 29.952      **Orifice Calibration Relationship**  
    **m= 1.31620      b= -0.04542**

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	4.04	36.1	2.34	0.99
13	3.42	33.3	2.02	0.92
10	2.84	30.5	1.68	0.84
7	1.91	25.2	1.17	0.70
5	1.24	20.5	0.85	0.60

Orifice dH2O                      2.690  
 Sample dPex                      1.6  
 Orifice Qa(m3/m)                0.840605  
 Sample Qa dPex                 29.61800

Audit flow rate % diff: 5.24 %

Orifice		
dH2O	Qa(CFM)	Qa(M3/m)
2.690	29.67	0.84

Sampler w/Orifice		
dPex	Qa(CFM)	Qa(M3/m)
1.61	31.24	0.88

Sampler Audit Relationship	
<b>m =</b>	0.026
<b>b =</b>	0.064
<b>r =</b>	0.998

**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 =** 286.5  
**Audit Date:** 12/22/10      **Ps =** 694.7  
**Motor:** 1419      **Temp c =** 14.44  
**Temp f:** 58.0      **Ta =** 287.4  
**Press:** 27.393      **Pa =** 695.8  
**Altim:** 30.070      **Orifice Calibration Relationship**  
    **m= 1.31620      b= -0.04542**

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	3.60	33.9	1.56	0.80
13	30.3	31.2	1.27	0.72
10	2.52	28.6	1.00	0.64
7	1.70	23.7	0.60	0.50
5	1.11	19.4	0.31	0.36

Orifice dH2O      2.392  
 Sample dPex      0.90  
 Orifice Qa(m3/m)      0.789775  
 Sample Qa dPex      28.04730

Audit flow rate % diff: 4.32 %

Orifice		
dH2O	Qa(CFM)	Qa(M3/m)
2.392	27.88	0.79
Sampler w/Orifice		
dPex	Qa(CFM)	Qa(M3/m)
0.95	29.09	0.82

Sampler Audit Relationship	
<b>m =</b>	0.031
<b>b =</b>	-0.230
<b>r =</b>	1.000

**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 =** 286.5  
**Audit Date:** 12/17/10      **Ps =** 694.7  
**Motor:** 1421      **Temp c =** 18.40  
**Temp f:** 65.12      **Ta =** 291.4  
**Press:** 27.244      **Pa =** 692.0  
**Altim:** 29.910      **Orifice Calibration Relationship**  
    **m= 1.31620      b= -0.04542**

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	3.28	32.7	1.36	0.76
13	2.81	30.4	1.09	0.68
10	2.39	28.1	0.88	0.61
7	1.61	23.3	0.52	0.47
5	1.05	19.1	0.24	0.32

Orifice dH2O      2.228  
 Sample dPex      0.80  
 Orifice Qa(m3/m)      0.770418  
 Sample Qa dPex      27.39868

Audit flow rate % diff: 4.15 %

Orifice		
dH2O	Qa(CFM)	Qa(M3/m)
2.228	27.20	0.77
Sampler w/Orifice		
dPex	Qa(CFM)	Qa(M3/m)
0.82	28.33	0.80

Sampler Audit Relationship	
<b>m =</b>	0.032
<b>b =</b>	-0.277
<b>r =</b>	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 =** 286.5  
**Audit Date:** 12/17/10      **Ps =** 694.7  
**Motor:** 1420      **Temp c =** 19.20  
**Temp f:** 66.56      **Ta =** 292.2  
**Press:** 27.283      **Pa =** 693.0  
**Altim:** 29.952      **Orifice Calibration Relationship**  
    **m= 1.31620      b= -0.04542**

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	3.02	31.5	1.26	0.73
13	2.60	29.3	1.03	0.66
10	2.21	27.1	0.79	0.58
7	1.51	22.6	0.46	0.44
5	1.00	18.6	0.20	0.29

Orifice dH2O                      2.068  
 Sample dPex                      0.70  
 Orifice Qa(m3/m)                0.743967  
 Sample Qa dPex                 26.49863

Audit flow rate % diff: 4.04 %

Orifice		
dH2O	Qa(CFM)	Qa(M3/m)
2.068	26.26	0.74

Sampler w/Orifice		
dPex	Qa(CFM)	Qa(M3/m)
0.75	27.33	0.77

Sampler Audit Relationship	
<b>m =</b>	0.034
<b>b =</b>	-0.335
<b>r =</b>	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 #2      **Ts =** 286.5  
**Audit Date:** 12/17/10      **Ps =** 694.7  
**Motor:** 1417      **Temp c =** 19.20  
**Temp f:** 66.56      **Ta =** 292.2  
**Press:** 27.283      **Pa =** 693.0  
**Altim:** 29.952      **Orifice Calibration Relationship**  
    **m= 1.31620      b= -0.04542**

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	3.30	32.9	1.44	0.78
13	2.81	30.4	1.21	0.71
10	2.34	27.9	0.97	0.64
7	1.59	23.2	0.60	0.50
5	1.06	19.2	0.34	0.38

Orifice dH2O                      2.220  
 Sample dPex                      0.91  
 Orifice Qa(m3/m)                0.769578  
 Sample Qa dPex                 27.28440

Audit flow rate % diff: 4.31 %

Orifice		
dH2O	Qa(CFM)	Qa(M3/m)
2.220	27.17	0.77

Sampler w/Orifice		
dPex	Qa(CFM)	Qa(M3/m)
0.91	28.34	0.80

Sampler Audit Relationship	
<b>m =</b>	0.029
<b>b =</b>	-0.179
<b>r =</b>	1.000

**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 =** 286.5  
**Audit Date:** 12/17/10      **Ps =** 694.7  
**Motor:** 1422      **Temp c =** 17.10  
**Temp f:** 62.78      **Ta =** 290.1  
**Press:** 27.283      **Pa =** 693.0  
**Altim:** 29.952      **Orifice Calibration Relationship**  
                                  **m= 1.31620      b= -0.04542**

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	3.31	32.8	1.45	0.78
13	2.82	30.4	1.16	0.70
10	2.33	27.7	0.94	0.63
7	1.57	23.0	0.59	0.50
5	1.02	18.7	0.34	0.38

Orifice dH2O                      2.210  
 Sample dPex                      0.90  
 Orifice Qa(m3/m)                0.765280  
 Sample Qa dPex                 27.11960

Audit flow rate % diff: 4.41 %

Orifice		
dH2O	Qa(CFM)	Qa(M3/m)
2.210	27.01	0.77
Sampler w/Orifice		
dPex	Qa(CFM)	Qa(M3/m)
0.90	28.22	0.80

Sampler Audit Relationship	
<b>m =</b>	0.028
<b>b =</b>	-0.152
<b>r =</b>	0.999