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# MEMORANDUM

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Date: February 14, 2008

To: The Honorable Chairman and Members  
Pima County Board of Supervisors

From: C.H. Huckelberry  
County Administrator

A handwritten signature in black ink, appearing to read "CHH", is written over the printed name "C.H. Huckelberry".

Re: **Beryllium Monitoring**

Attached please find a memorandum from the Pima County Environmental Quality Director regarding beryllium monitoring of samples collected from July of 2007. Beryllium was detected in these samples; however, controlled samples that were clean also detected beryllium.

An investigation by the Department indicated that the glass monitoring filters were manufactured with beryllium, resulting in contamination of the samples. The Department switched to quartz filters for all monitoring on and after December 15, 2007. The sampling submitted on quartz filters indicated beryllium detection well below the detection level of the equipment. Beryllium monitoring will continue, using quartz filters. In any event, the monitoring, even with contaminated filters, indicates the beryllium level detected is significantly below any levels that could pose a threat to public health.

There is no ambient air standard for beryllium, so the Pima County Department of Environmental Quality will work with the Pima County Health Department, the Arizona Department of Health Services, and the United States Environmental Protection Agency as further data is obtained to evaluate any health impacts.

CHH/jj

Attachment

c: Dennis Douglas, Deputy County Administrator for Medical and Health Services  
John Bernal, Deputy County Administrator - Public Works  
Ursula Kramer, Environmental Quality Director



# MEMORANDUM

Pima County Department of Environmental Quality

**DATE:** February 7, 2008

**TO:** C. H. Huckelberry  
County Administrator

**FROM:** Ursula Kramer *UK*  
Director

**RE:** Beryllium Monitoring

In July 2007, the Pima County Department of Environmental Quality (PDEQ) began monitoring for beryllium in the ambient air near the Brush Ceramics facility. This project is being undertaken in partnership with the Sunnyside School District (SUSD), through a contract with Brush Ceramics Products (BCP) and with technical advice from Eric Betterton, Ph.D., University of Arizona Atmospheric Sciences Department.

Attached, please find a copy of Pima County Department of Environmental Quality's (PDEQ) status report regarding ambient air monitoring for beryllium around the Brush Ceramics facility. Results analyzed to date have not found beryllium levels above the method reporting limit.

PDEQ began collecting samples from the monitoring network in July 2007. The samples were stored at PDEQ while the Department was seeking a contracted laboratory. In November 2007, Schneider Laboratories in Virginia was awarded the contract for analytical services for this project. PDEQ sent the samples collected through October 2007 to Schneider laboratory for beryllium analysis. In December 2007, Schneider Laboratory reported that field blanks as well as the monitoring samples all detected beryllium. The presence of beryllium in what should have been clean field blanks indicated a problem somewhere in the process. Upon an investigation with the laboratory and the filter manufacturer, it was determined that the glass monitoring filters were manufactured with beryllium. Unfortunately, this resulted in disqualification of all samples collected using glass filters.

Glass filters were the EPA recommended filter media. However, PDEQ was using a modified laboratory method in order to ensure the most accurate beryllium test results. This method was selected in consultation with our partners in this project and other experts in beryllium analysis. After researching this issue with the laboratory and manufacturer of the sample filters, PDEQ switched to quartz filters at all of the monitors on December 15, 2007. The quartz filters also contained trace levels of beryllium from the manufacturing but at levels below the detection limit for the analytical test method.

PDEQ submitted the monitoring samples collected on the quartz filters from December 15 through December 31, 2007 to Schneider Laboratories for Beryllium analysis in early January, 2008. The laboratory reported that total beryllium for all the samples was below the method

Memorandum to C. H. Huckelberry  
RE: Beryllium Monitoring  
February 7, 2008  
Page Two

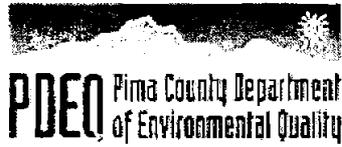
reporting limit of 0.20 µg. In accordance with our agreement with SUSD and BCP, PDEQ has posted this report on our website and transmitted it to the SUSD. Currently, PDEQ is working with the EPA, Dr. Betterton, and the Pima County Health Department to evaluate these results.

If you have any questions or would like to discuss this matter, I am available to meet at your convenience.

UK/RG/vlb

Attachment: Beryllium Report

cc: John Bernal, Deputy County Administrator for PW  
Richard Grimaldi, Deputy Director for EQ Division, PDEQ



**Pima County**  
**Department of Environmental Quality**  
**Air Monitoring Division**

**Beryllium Monitoring Network Summary**  
**4th Quarter 2007**



*Pima County Department of Environmental Quality*  
*150 West Congress St., 1st Floor*  
*Tucson, Arizona 85701*

## Summary

PDEQ finalized a contract with Schneider Laboratories, Inc., located in Richmond Virginia, on October 24<sup>th</sup> 2007, to perform beryllium analysis using the NIOSH Method 7102 specified HF acid full digestion. All samples for the 4<sup>th</sup> quarter were sent to Schneider Laboratories for analysis. Beryllium analysis was not able to be completed on all samples due to the laboratory discovering that the glass base filters being used were manufactured with approximately 1 µg of beryllium. This discovery was based on beryllium analysis of blank filters provided by PDEQ. The low level presence of beryllium in the glass based filters is a product of the manufacturing process. Notification of contamination was received by PDEQ on December 13<sup>th</sup> 2007. On December 14<sup>th</sup> all glass based filters were removed from the field and the PDEQ weigh lab and replaced with quartz based filters, which contain very low levels of Beryllium. These levels will be below the detection limit of the lab when using the NIOSH Method 7102 specified HF acid full digestion analysis. Sampling using the quartz based filters started on December 15<sup>th</sup>. There were a total of 20 samples (including one field blank) analyzed for beryllium. All beryllium concentrations are reported as <0.001 µg/m<sup>3</sup>, which is the Minimum Reporting limit (MRL) for the graphite furnace atomic absorption spectroscopy (GFAAS) type of analysis being used.

For the 4<sup>th</sup> quarter of 2007 there was a total of 108 samples collected resulting in 94 valid and 13 invalid samples; for a data recovery of 87.9%. There were 88 glass based samples and 20 quartz based samples collected. 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*.

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 each month of the 4<sup>th</sup> quarter.

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

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

October - 2007

Date	Location	PM <sub>10</sub> (µg/m <sup>3</sup> )	24-hour NAAQS PM <sub>10</sub> (µg/m <sup>3</sup> )	Beryllium (µg/m <sup>3</sup> )
10/01/07	Transportation Bldg	6.7	150	N/A
10/02/07	Sunnyside H.S.	18.0	150	N/A
10/03/07	Ocotillo #1	15.0	150	N/A
10/03/07	Ocotillo #2	15.6	150	N/A
10/04/07	Los Amigos	19.3	150	N/A
10/05/07	Los Niños	17.3	150	N/A
10/06/07	Chaparral M.S.	27.5	150	N/A
10/07/07	Transportation Bldg	22.6	150	N/A
10/08/07	Sunnyside H.S.	53.0	150	N/A
10/09/07	Ocotillo #1	30.8	150	N/A
10/09/07	Ocotillo #2	31.6	150	N/A
10/10/07	Los Amigos	31.5	150	N/A
10/11/07	Los Niños	35.8	150	N/A
10/12/07	Chaparral M.S.	INVALID	150	N/A
10/13/07	Transportation Bldg	18.9	150	N/A
10/14/07	Sunnyside H.S.	INVALID	150	N/A
10/15/07	Ocotillo #1	INVALID	150	N/A
10/15/07	Ocotillo #2	INVALID	150	N/A
10/16/07	Los Amigos	INVALID	150	N/A
10/17/07	Los Niños	24.6	150	N/A
10/18/07	Chaparral M.S.	INVALID	150	N/A
10/19/07	Transportation Bldg	30.0	150	N/A
10/20/07	Sunnyside H.S.	INVALID	150	N/A
10/21/07	Ocotillo #1	INVALID	150	N/A
10/21/07	Ocotillo #2	INVALID	150	N/A
10/22/07	Los Amigos	INVALID	150	N/A
10/23/07	Los Niños	32.0	150	N/A
10/24/07	Chaparral M.S.	24.6	150	N/A
10/25/07	Transportation Bldg	21.2	150	N/A
10/26/07	Sunnyside H.S.	32.4	150	N/A
10/27/07	Ocotillo #1	24.5	150	N/A
10/27/07	Ocotillo #2	18.2	150	N/A
10/28/07	Los Amigos	26.3	150	N/A
10/29/07	Los Niños	22.5	150	N/A
10/30/07	Chaparral M.S.	24.0	150	N/A
10/31/07	Transportation Bldg	31.5	150	N/A

Samples running on 10/12/07, 10/14/07, 10/15/07, 10/16/07, 10/18/07, 10/20/07, 10/21/07 and 10/22/07 were invalid due to double exposure.

**Note:** All invalid samples due to double exposure are the result of filters not being changed by SUSD.

**Note:** All beryllium concentrations shown as N/A are due to the glass based filters being contaminated with approximately 1 µg per filter of beryllium as a result of the manufacturing process.

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 - 2007

Date	Location	PM <sub>10</sub> (µg/m <sup>3</sup> )	24-hour NAAQS PM <sub>10</sub> (µg/m <sup>3</sup> )	Beryllium (µg/m <sup>3</sup> )
11/01/07	Sunnyside H.S.	37.3	150	N/A
11/02/07	Ocotillo #1	30.2	150	N/A
11/02/07	Ocotillo #2	34.0	150	N/A
11/03/07	Los Amigos	32.1	150	N/A
11/04/07	Los Niños	36.0	150	N/A
11/05/07	Chaparral M.S.	31.5	150	N/A
11/06/07	Transportation Bldg	40.8	150	N/A
11/07/07	Sunnyside H.S.	59.9	150	N/A
11/08/07	Ocotillo #1	35.5	150	N/A
11/08/07	Ocotillo #2	38.8	150	N/A
11/09/07	Los Amigos	INVALID	150	N/A
11/10/07	Los Niños	38.0	150	N/A
11/11/07	Chaparral M.S.	INVALID	150	N/A
11/12/07	Transportation Bldg	41.4	150	N/A
11/13/07	Sunnyside H.S.	43.3	150	N/A
11/14/07	Ocotillo #1	37.3	150	N/A
11/14/07	Ocotillo #2	38.9	150	N/A
11/15/07	Los Amigos	128.9	150	N/A
11/16/07	Los Niños	48.2	150	N/A
11/17/07	Chaparral M.S.	39.2	150	N/A
11/18/07	Transportation Bldg	34.4	150	N/A
11/19/07	Sunnyside H.S.	38.2	150	N/A
11/20/07	Ocotillo #1	29.3	150	N/A
11/20/07	Ocotillo #2	31.4	150	N/A
11/21/07	Los Amigos	35.9	150	N/A
11/22/07	Los Niños	26.7	150	N/A
11/23/07	Chaparral M.S.	23.6	150	N/A
11/24/07	Transportation Bldg	16.8	150	N/A
11/25/07	Sunnyside H.S.	16.8	150	N/A
11/26/07	Ocotillo #1	36.8	150	N/A
11/26/07	Ocotillo #2	38.9	150	N/A
11/27/07	Los Amigos	35.1	150	N/A
11/28/07	Los Niños	47.2	150	N/A
11/29/07	Chaparral M.S.	1.7	150	N/A
11/30/07	Transportation Bldg	7.1	150	N/A

Sample running on 11/09/07 was invalid due to operator error (sampler hood left open)

Sample running on 11/11/07 was invalid due to operator error (sampler ran on wrong day and started at 10:00)

**Note:** All beryllium concentrations shown as N/A are due to the glass based filters being contaminated with of approximately 1 µg per filter beryllium as a result of the manufacturing process.

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 - 2007

Date	Location	PM <sub>10</sub> (µg/m <sup>3</sup> )	24-hour NAAQS PM <sub>10</sub> (µg/m <sup>3</sup> )	Beryllium (µg/m <sup>3</sup> )
12/01/07	Sunnyside H.S.	2.8	150	N/A
12/02/07	Ocotillo #1	16.4	150	N/A
12/02/07	Ocotillo #2	15.8	150	N/A
12/03/07	Los Amigos	19.6	150	N/A
12/04/07	Los Niños	26.8	150	N/A
12/05/07	Chaparral M.S.	INVALID	150	N/A
12/06/07	Transportation Bldg	20.9	150	N/A
12/07/07	Sunnyside H.S.	15.2	150	N/A
12/08/07	Ocotillo #1	6.0	150	N/A
12/08/07	Ocotillo #2	6.3	150	N/A
12/09/07	Los Amigos	8.5	150	N/A
12/10/07	Los Niños	9.7	150	N/A
12/11/07	Chaparral M.S.	5.1	150	N/A
12/12/07	Transportation Bldg	13.3	150	N/A
12/13/07	Sunnyside H.S.	13.8	150	N/A
12/14/07	Ocotillo #1	11.0	150	N/A
12/14/07	Ocotillo #2	11.9	150	N/A
12/15/07	Los Amigos	17.7	150	<0.001
12/16/07	Los Niños	5.9	150	<0.001
12/17/07	Chaparral M.S.	18.9	150	<0.001
12/18/07	Transportation Bldg	20.2	150	<0.001
12/19/07	Sunnyside H.S.	25.1	150	<0.001
12/20/07	Ocotillo #1	22.1	150	<0.001
12/20/07	Ocotillo #2	23.7	150	<0.001
12/21/07	Los Amigos	25.5	150	<0.001
12/22/07	Los Niños	23.1	150	<0.001
12/23/07	Chaparral M.S.	16.5	150	<0.001
12/24/07	Transportation Bldg	18.3	150	<0.001
12/25/07	Sunnyside H.S.	33.3	150	<0.001
12/26/07	Ocotillo #1	19.4	150	<0.001
12/26/07	Ocotillo #2	21.0	150	<0.001
12/27/07	Los Amigos	20.5	150	<0.001
12/28/07	Los Niños	17.5	150	<0.001
12/29/07	Chaparral M.S.	18.0	150	<0.001
12/30/07	Transportation Bldg	13.8	150	<0.001
12/31/07	Sunnyside H.S.	26.9	150	<0.001

Sample running on 12/05/07 was invalid due to several tears in sampling area

**Note:** All beryllium concentrations shown as N/A are due to the glass based filters being contaminated with approximately 1 µg per filter of beryllium as a result of the manufacturing process.

**Note:** All Beryllium concentrations are reported as <0.001 µg/m<sup>3</sup>, which is the Minimum Reporting Limit (MRL) for the type of analysis.

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

# SCHNEIDER LABORATORIES

INCORPORATED

2512 W. Cary Street • Richmond, Virginia • 23220-5117  
804-353-6778 • 800-785-LABS (5227) • (FAX) 804-359-1475

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AIHA/ELLAP 100527, NVLAP 101150-0, NYELAP/NELAC 11413, CAELAP 2078, NC 593, SC 93003

## LABORATORY ANALYSIS REPORT

High-Volume Filter Beryllium Analysis by NIOSH 7102M

ACCOUNT #: 3690-08-2  
CLIENT: Pima County Procurement Department  
ADDRESS: 150 West Congress, 1st Floor  
Tucson, AZ 85701

DATE COLLECTED: 12/15/2007  
DATE RECEIVED: 1/8/2008  
DATE ANALYZED: 1/9/2008  
DATE REPORTED: 1/11/2008

PROJECT NAME: PDEQ Beryllium Study

JOB LOCATION: Tucson, Arizona

PROJECT NO.:

PO NO.: B504685 Rev. No: 000

Sample Type: PM10

SLI Sample No.	Client Sample No.	Filter Type	Filter Sample Date	Sample Location	Flow Rate (L/min)	Sample Volume (m <sup>3</sup> )	Total Beryllium (µg)*	Beryllium Conc (µg/m <sup>3</sup> )	24 Hour TWA (µg/m <sup>3</sup> )
29589326	Q4113555	PM10	12/15/07	Los Amigos Elementary	1105.40	1,511.28	< 0.20	< 0.001	< 0.001
29589327	Q4113554	PM10	12/16/07	Los Niños Elementary	1149.00	1,570.78	< 0.20	< 0.001	< 0.001
29589328	Q4113553	PM10	12/17/07	Chaparral Middle School	1205.70	1,648.29	< 0.20	< 0.001	< 0.001
29589329	Q4113552	PM10	12/18/07	Transportation Building	1230.10	1,681.73	< 0.20	< 0.001	< 0.001
29589330	Q4113551	PM10	12/19/07	Sunnyside High School	1222.40	1,671.17	< 0.20	< 0.001	< 0.001
29589331	Q4113550	PM10	12/20/07	Ocotillo Elementary #1	1239.90	1,695.10	< 0.20	< 0.001	< 0.001
29589332	Q4113549	PM10	12/20/07	Ocotillo Elementary #2	1186.30	1,621.81	< 0.20	< 0.001	< 0.001
29589333	Q4113548	PM10	12/21/07	Los Amigos Elementary	1202.80	1,644.41	< 0.20	< 0.001	< 0.001
29589334	Q4113547	PM10	12/22/07	Los Niños Elementary	1217.70	1,664.70	< 0.20	< 0.001	< 0.001
29589335	Q4113541	PM10	12/23/07	Chaparral Middle School	1196.00	1,635.15	< 0.20	< 0.001	< 0.001
29589336	Q4113540	PM10	12/24/07	Transportation Building	1216.10	1,662.58	< 0.20	< 0.001	< 0.001
29589337	Q4113539	PM10	12/25/07	Sunnyside High School	1171.30	1,601.34	< 0.20	< 0.001	< 0.001
29589338	Q4113538	PM10	12/26/07	Ocotillo Elementary #1	1232.90	1,685.57	< 0.20	< 0.001	< 0.001
29589339	Q4113537	PM10	12/26/07	Ocotillo Elementary #2	1209.70	1,653.86	< 0.20	< 0.001	< 0.001
29589340	Q4113535	PM10	12/27/07	Los Amigos Elementary	1147.90	1,569.32	< 0.20	< 0.001	< 0.001
29589341	Q4113534	PM10	12/28/07	Los Niños Elementary	1189.90	1,626.59	< 0.20	< 0.001	< 0.001
29589342	Q4113533	PM10	12/29/07	Chaparral Middle School	1200.90	1,641.74	< 0.20	< 0.001	< 0.001
29589343	Q4113532	PM10	12/30/07	Transportation Building	1175.40	1,606.97	< 0.20	< 0.001	< 0.001
29589344	Q4113531	PM10	12/31/07	Sunnyside High School	1121.50	1,533.18	< 0.20	< 0.001	< 0.001

**Total Number of Pages in Report: 2**

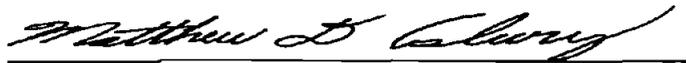
. Results relate only to samples as received by the laboratory

### Amended Report

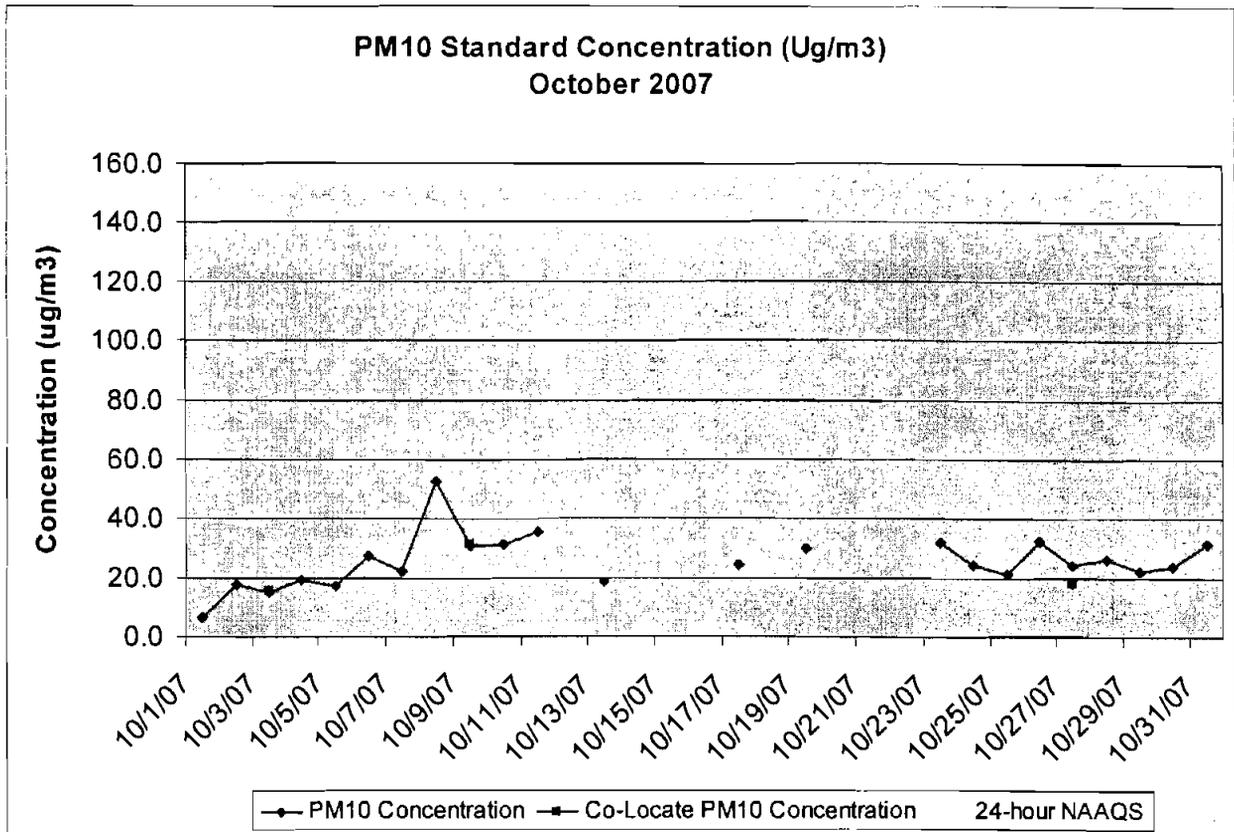
*Minimum Reporting Limit: 0.2 µg Total Beryllium. Volume is based on client-supplied information. 24h TWA assumes zero concentration for time not sampled. Results are not blank-corrected unless noted by analyst. Quality control data is available from the laboratory upon request. \*Data precision justifies 2 significant figures. Unusual sample conditions, if any, are described.*

SLI Sample No.	Client Sample No.	Filter Type	Filter Sample Date	Sample Location	Flow Rate (m <sup>3</sup> /min)	Sample Volume (m <sup>3</sup> )	Total Beryllium (µg)*	Beryllium Conc (µg/m <sup>3</sup> )	24 Hour TWA (µg/m <sup>3</sup> )
29589345	Q4113536	PM10	12/21/07	FIELD BLANK			< 0.20		

Analysis Run ID: 41033

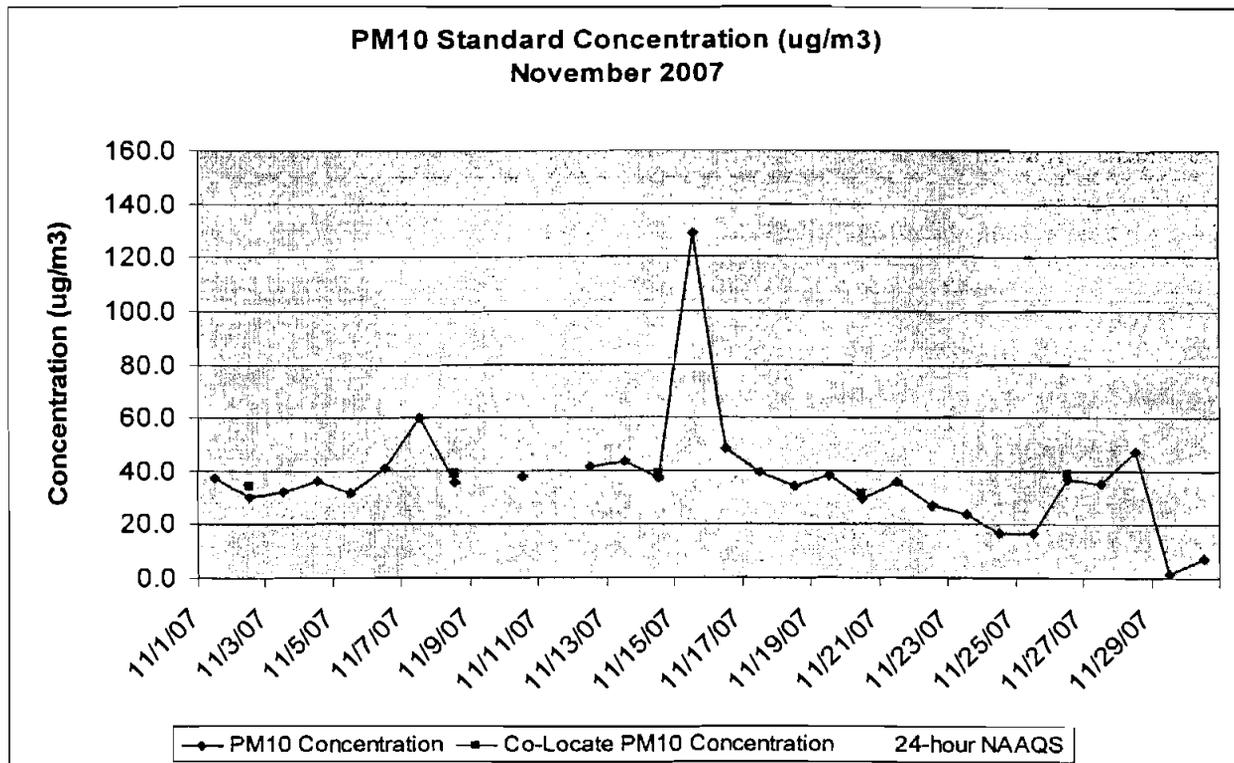
**Analyst: DEREK L. JACKSON Total Number of Pages in Report: 2 Reviewed By**

Reviewed By **Matthew D. Asbury, Lab Director**Results relate only to samples as received by the laboratory. Visit [www.slabin.com](http://www.slabin.com) for current certifications.**Amended Report**

*Minimum Reporting Limit: 0.2 µg Total Beryllium. Volume is based on client-supplied information. 24h TWA assumes zero concentration for time not sampled. Results are not blank-corrected unless noted by analyst. Quality control data is available from the laboratory upon request. \*Data precision justifies 2 significant figures. Unusual sample conditions, if any, are described.*



Samples running on 10/12/07, 10/14/07, 10/15/07, 10/16/07, 10/18/07, 10/20/07, 10/21/07 and 10/22/07 were invalidated due to double exposure.

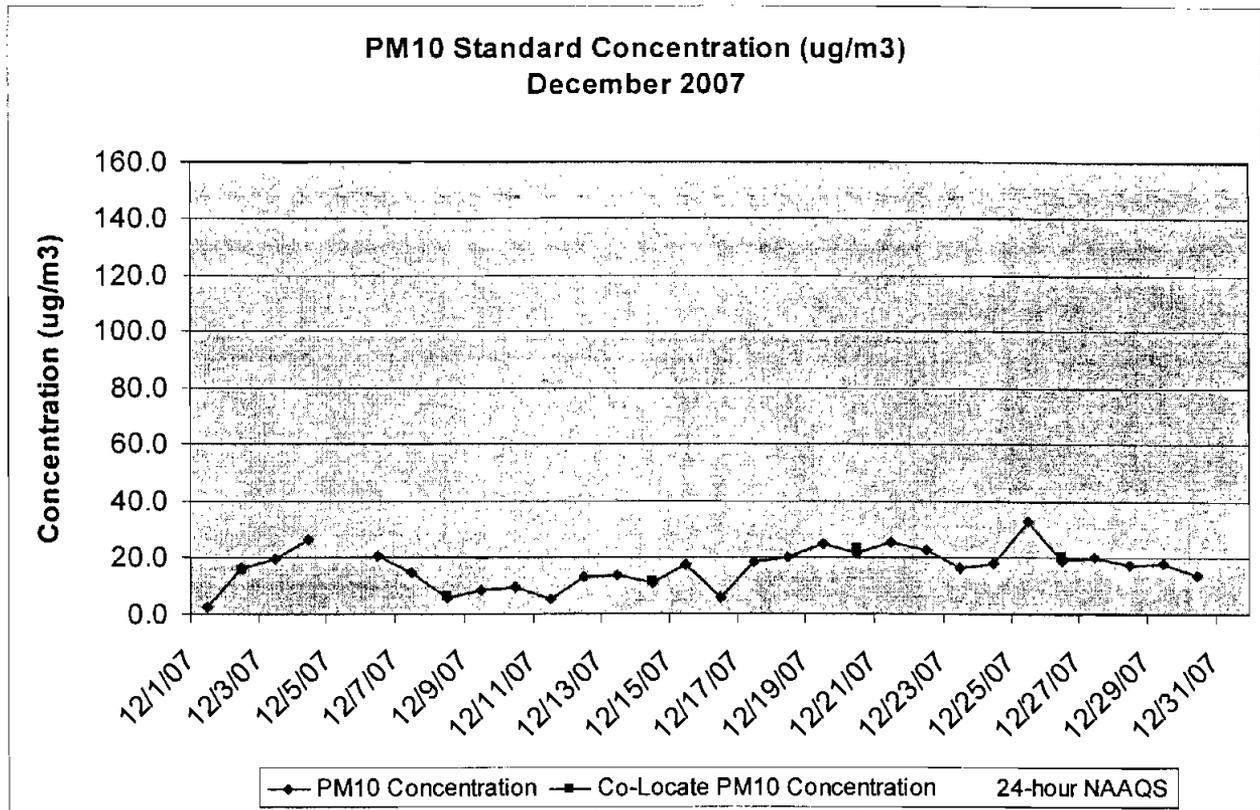
NAAQS = National Ambient Air Quality Standards for PM<sub>10</sub>



Sample running on 11/9/2007 was invalidated due to sampler hood left open.

Sample running on 11/11/2007 was invalidated due to sampler running on wrong day.

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



Sample running on 12/5/2007 was invalidated due to tear in filter.

NAAQS = National Ambient Air Quality Standards for PM

### Precision of Duplicate Pairs – PM10

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
10/9/07	1	30.8	2	31.6	0.8	0.64%
11/2/07	1	30.2	2	34.0	3.8	2.96%
11/8/07	1	35.5	2	38.8	3.3	2.22%
11/14/07	1	37.3	2	38.9	1.6	1.05%
11/22/07	1	29.3	2	31.4	2.1	1.73%
11/26/07	1	36.8	2	38.9	2.1	1.39%
12/20/07	1	22.1	2	23.7	1.6	1.75%

### Audit Results

Audits were performed on all of the samplers with the audit flow rate percent difference being below 6% for all samplers. 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:** 12/26/07      **Ps =** 694.7  
**Motor:** 1416      **Temp c =** 10.90  
**Temp f:** 51.62      **Ta =** 283.9  
**Press:** 27.282      **Pa =** 693.0  
**Altim:** 29.950      **Orifice Calibration Relationship**  
    **m= 1.31823      b= -0.05678**

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	2.73	29.8	0.94	0.62
13	2.35	27.8	0.73	0.55
10	1.99	25.7	0.56	0.48
7	1.36	21.5	0.30	0.35
5	0.92	18.0	0.11	0.21

Orifice dH2O                      1.87  
 Sample dPex                      0.5  
 Orifice Qa(m3/m)                0.707062  
 Sample Qa dPex                 25.25754

**Audit flow rate % diff: 4.01 %**

Orifice		
dH2O	Qa(CFM)	Qa(M3/m)
1.87	24.96	0.71

Sampler w/Orifice		
dPex	Qa(CFM)	Qa(M3/m)
0.53	25.97	0.74

Sampler Audit Relationship		
<b>m =</b>	0.034	
<b>b =</b>	-0.386	
<b>r =</b>	0.998	
	<b>pm10</b>	<b>tsp</b>
<b>Set Point (cfm)</b>	39.7	49.7
<b>Set Point (H2O)</b>	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:** Sunnyside H.S.      **Ts =** 286.5  
**Audit Date:** 12/26/07      **Ps =** 694.7  
**Motor:** 1418      **Temp c =** 8.90  
**Temp f:** 48.02      **Ta =** 281.9  
**Press:** 27.360      **Pa =** 695.0  
**Altim:** 30.035      **Orifice Calibration Relationship**  
    **m= 1.31823      b= -0.05678**

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	4.40	37.3	2.40	0.99
13	3.67	34.2	2.10	0.92
10	3.05	31.3	1.73	0.84
7	2.02	25.8	1.22	0.70
5	1.30	21.0	0.83	0.58

Orifice dH2O                      2.888  
 Sample dPex                      1.7  
 Orifice Qa(m3/m)                0.864137  
 Sample Qa dPex                 30.44538

**Audit flow rate % diff: 5.32 %**

Orifice		
dH2O	Qa(CFM)	Qa(M3/m)
2.888	30.50	0.86

Sampler w/Orifice		
dPex	Qa(CFM)	Qa(M3/m)
1.66	32.14	0.91

Sampler Audit Relationship		
<b>m =</b>	0.025	
<b>b =</b>	0.055	
<b>r =</b>	0.999	
	<b>pm10</b>	<b>tsp</b>
<b>Set Point (cfm)</b>	39.3	49.2
<b>Set Point (H2O)</b>	2.7	4.1

### 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:** Los Amigos      **Ts =** 286.5  
**Audit Date:** 12/26/07      **Ps =** 694.7  
**Motor:** 1419      **Temp c =** 9.90  
**Temp f:** 49.82      **Ta =** 282.9  
**Press:** 27.360      **Pa =** 695.0  
**Altim:** 30.035      **Orifice Calibration Relationship**  
    **m= 1.31823      b= -0.05678**

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	3.00	31.1	1.32	0.73
13	2.50	28.5	1.08	0.66
10	2.12	26.4	0.83	0.58
7	1.48	22.3	0.49	0.45
5	1.00	18.6	0.22	0.30

Orifice dH2O                      2.02  
 Sample dPex                              0.8  
 Orifice Qa(m3/m)              0.730969  
 Sample Qa dPex              26.02237

**Audit flow rate % diff: 4.08 %**

Orifice		
dH2O	Qa(CFM)	Qa(M3/m)
2.02	25.80	0.73

Sampler w/Orifice		
dPex	Qa(CFM)	Qa(M3/m)
0.79	26.86	0.76

Sampler Audit Relationship		
<b>m =</b>	0.035	
<b>b =</b>	-0.340	
<b>r =</b>	0.997	
	<b>pm10</b>	<b>tsp</b>
<b>Set Point (cfm)</b>	39.5	49.4
<b>Set Point (H2O)</b>	2.6	4.7

### 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 Niños      **Ts =** 286.5  
**Audit Date:** 12/26/07      **Ps =** 694.7  
**Motor:** 1421      **Temp c =** 11.10  
**Temp f:** 51.98      **Ta =** 284.1  
**Press:** 27.244      **Pa =** 692.0  
**Altim:** 29.910      **Orifice Calibration Relationship**  
    **m= 1.31823      b= -0.05678**

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	3.27	32.6	1.32	0.74
13	2.77	30.1	1.08	0.67
10	2.35	27.8	0.87	0.60
7	1.61	23.3	0.52	0.46
5	1.03	18.9	0.24	0.31

Orifice dH2O                      2.206  
 Sample dPex                              0.8  
 Orifice Qa(m3/m)              0.764996  
 Sample Qa dPex              27.19236

**Audit flow rate % diff: 4.21 %**

Orifice		
dH2O	Qa(CFM)	Qa(M3/m)
2.206	27.00	0.76

Sampler w/Orifice		
dPex	Qa(CFM)	Qa(M3/m)
0.81	28.15	0.80

Sampler Audit Relationship		
<b>m =</b>	0.031	
<b>b =</b>	-0.266	
<b>r =</b>	0.999	
	<b>pm10</b>	<b>tsp</b>
<b>Set Point (cfm)</b>	39.8	49.8
<b>Set Point (H2O)</b>	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 =** 286.5  
**Audit Date:** 12/27/07      **Ps =** 694.7  
**Motor:** 1420      **Temp c =** 6.80  
**Temp f:** 44.24      **Ta =** 279.8  
**Press:** 27.244      **Pa =** 692.0  
**Altim:** 29.910      **Orifice Calibration Relationship**  
    **m = 1.31823      b = -0.05678**

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	3.09	31.5	1.40	0.75
13	2.62	29.1	1.13	0.68
10	2.17	26.6	0.91	0.61
7	1.49	22.3	0.59	0.49
5	1.04	18.9	0.23	0.35

Orifice dH2O                      2.082  
 Sample dPex                        0.9  
 Orifice Qa(m3/m)                0.739085  
 Sample Qa dPex                 26.2302

**Audit flow rate % diff: 4.30 %**

Orifice		
dH2O	Qa(CFM)	Qa(M3/m)
2.082	26.09	0.74

Sampler w/Orifice		
dPex	Qa(CFM)	Qa(M3/m)
0.87	27.22	0.77

Sampler Audit Relationship		
<b>m =</b>	0.031	
<b>b =</b>	-0.228	
<b>r =</b>	0.994	
<b>Set Point (cfm)</b>	39.2	tsp 49.0
<b>Set Point (H2O)</b>	2.5	4.2

**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:** 12/27/07      **Ps =** 694.7  
**Motor:** 1417      **Temp c =** 6.60  
**Temp f:** 43.88      **Ta =** 279.6  
**Press:** 27.244      **Pa =** 692.0  
**Altim:** 29.910      **Orifice Calibration Relationship**  
    **m = 1.31823      b = -0.05678**

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	3.44	33.1	1.58	0.80
13	2.87	30.4	1.36	0.74
10	2.36	27.7	1.08	0.66
7	1.61	23.1	0.72	0.54
5	1.02	18.7	0.37	0.39

Orifice dH2O                      2.260  
 Sample dPex                        1.0  
 Orifice Qa(m3/m)                0.767968  
 Sample Qa dPex                 27.19678

**Audit flow rate % diff: 4.61 %**

Orifice		
dH2O	Qa(CFM)	Qa(M3/m)
2.260	27.11	0.77

Sampler w/Orifice		
dPex	Qa(CFM)	Qa(M3/m)
1.02	28.37	0.80

Sampler Audit Relationship		
<b>m =</b>	0.029	
<b>b =</b>	-0.138	
<b>r =</b>	0.995	
<b>Set Point (cfm)</b>	39.2	tsp 49.0
<b>Set Point (H2O)</b>	2.4	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:** Transportation      **Ts =** 286.5  
**Audit Date:** 12/26/07      **Ps =** 694.7  
**Motor:** 1422      **Temp c =** 6.90  
**Temp f:** 44.42      **Ta =** 279.9  
**Press:** 27.360      **Pa =** 695.0  
**Altim:** 30.035      **Orifice Calibration Relationship**  
    **m = 1.31823      b = -0.05678**

Plate No.	Orifice dH2O	Qa Orifice	Sampler dPex	Sampler dPext
18	3.70	34.2	1.65	0.82
13	3.12	31.5	1.31	0.73
10	2.57	28.8	1.04	0.65
7	1.65	23.4	0.65	0.51
5	1.06	19.0	0.36	0.38

Orifice dH2O                      2.420  
 Sample dPex                      1.0  
 Orifice Qa(m3/m)                0.792001  
 Sample Qa dPex                 28.06464

**Audit flow rate % diff: 4.60 %**

dH2O	Orifice	
	Qa(CFM)	Qa(M3/m)
2.420	27.96	0.79

dPex	Sampler w/Orifice	
	Qa(CFM)	Qa(M3/m)
1.00	29.25	0.83

Sampler Audit Relationship		
<b>m =</b>	0.028	
<b>b =</b>	-0.149	
<b>r =</b>	0.998	

	pm10	tsp
<b>Set Point (cfm)</b>	39.1	48.8
<b>Set Point (H2O)</b>	2.2	3.7

