APPENDIX C

PM2.5 Continuous Monitor Comparability Assessment and Request for Waiver

Introduction

The SCAQMD monitoring program has historically operated PM2.5 continuous monitors primarily to support forecasting and reporting of the Air Quality Index (AQI). These monitors supply data every hour to update the AQI on our web site as well as national web sites such as AIRNow (www.airnow.gov). SCAQMD has been using these monitors since the early part of the last decade as we implemented the PM2.5 monitoring program. Over the last few years, a number of PM2.5 continuous monitors have been approved as Federal Equivalent Methods (FEMs). By utilizing an approved FEM, any subsequent data produced from the method may be eligible for comparison to EPA's health based standard known as the NAAQS. The primary advantage of operating a PM2.5 continuous FEM is that it can support the AQI, while also supplying data that are eligible for comparison to the NAAQS. Thus, a network utilizing PM2.5 continuous FEMs can potentially lower the number of filter-based FRMs operated in the network, which are primarily used for comparison to the NAAQS. These filter-based FRMs are resource intensive in that they require field operations as well as pre- and post-sampling laboratory analysis which results in data not being available for approximately 2-4 weeks after sample collection.

The SCAQMD monitoring program has been evaluating PM2.5 continuous FEMs over the past several years. Although the PM2.5 continuous FEMs are automated methods, these methods still require careful attention in their set-up, operation, and validation of data. Once enough data was collected, we began to evaluate the performance of these methods compared to collocated FRMs. That evaluation is explained further below and includes our request regarding the use of the data from these methods.

Request for Exclusion of PM2.5 Continuous FEM data from Comparison to the NAAQS

The network technical requirements for requesting exclusion of data from comparison to the NAAQS are identified in 40 CFR §58.11(e). These requirements refer to the performance criteria

described in Table C-4 to subpart C of part 53. To accommodate the differences in how routine monitoring agencies operate their networks, several additional provisions are described in §58.11(e). When a topic is not addressed in §58.11(e), then the test specifications from table C-4 applies.

As shown in the Table below, the slope of the regression between collocated FRM and FEM measurements at the Anaheim, Central Los Angeles, North Long Beach, South Long Beach, and Rubidoux stations is higher than 1.1, which is outside the test specification indicated in §53 Table C-4 (i.e. slope = 1 ± 0.1). Although the slope criteria was met, the intercept of the regression relationship between FRM and FEM data at the Burbank and Mira Loma monitoring sites does not meet the test specifications of between 15.05 - (17.32 × slope), but not less than -2.0; and 15.05 - (13.20 × slope), but not more than +2.0 (also indicated in §53 Table C-4).

Thus, in accordance with the PM NAAQS rule published on January 15th, 2013 (78 FR 3086) an

d specific to the provisions detailed in §58.10 (b)(13) and §58.11 (e), SCAQMD is requesting that data from the all of the SCAQMD FEM PM2.5 monitors be set aside for comparison to the NAAQS. While SCAQMD is working to optimize the monitoring instrumentation to meet all of our monitoring objectives, the performance is not yet at a point where the comparability of the PM2.5 continuous FEMs operated in our network compared to collocated FRMs is acceptable. After assessing the comparability of the PM2.5 FEMs to the collocated FRMs for our network, the sites listed below do not meet the comparability requirements. Detailed one-page assessments from which the information described below was obtained are included at the end of this section.

Table – Request for Exclusion of PM2.5 Continuous FEM Data

Site Name	City	Site ID	Cont POC	Cont Method Description	$PM_{2.5}$ Cont Begin Date	$PM_{2.5}$ Cont End Date	Continuous/ FRM Sampler Pairs Per Season	Slope (m)	Intercept (y)	Meets Bias Requirement	Correlation (r)
Sites with $PM_{2.5}$ continuous FEMs that are collocated with FRMs											
Anaheim	Anaheim	06-059-0007	3	Met-One BAM 1020 w/VSCC	01/01/2011	12/31/2013	Winter = 247 Spring = 254 Summer = 227 Fall = 260 Total = 988	1.16	2.62	No	0.94
Burbank	Burbank	06-037-1002	3	Met-One BAM 1020 w/VSCC	01/01/2011	12/31/2013	Winter = 259 Spring = 217 Summer = 262 Fall = 250 Total = 988	1.10	4.47	No	0.89
Central Los Angeles	Los Angeles	06-037-1103	3	Met-One BAM 1020 w/VSCC	01/01/2009	09/29/2011	Winter = 226 Spring = 161 Summer = 170 Fall = 182 Total = 739	1.21	1.77	No	0.93
			9	Met-One BAM 1020 w/VSCC	10/01/2011	12/31/2013	Winter = 176 Spring = 160 Summer = 156 Fall = 228 Total = 720	1.15	4.86	No	0.83
North Long Beach	Long Beach	06-037-4002	3	Met-One BAM 1020 w/VSCC	01/01/2011	12/31/2013	Winter = 214 Spring = 228 Summer = 255 Fall = 175 Total = 872	1.16	2.23	No	0.94
South Long Beach	Long Beach	06-037-4004	3	Met-One BAM 1020 w/VSCC	01/01/2012*	12/31/2013	Winter = 128 Spring = 169 Summer = 134 Fall = 121 Total = 552	1.27	0.35	No	0.93

Riverside/ Rubidoux	Rubidoux	06-065-8001	3	Met-One BAM 1020 w/PM2.5 SCC	01/01/ 2010	01/31/ 2013	Winter = 177 Spring = 139 Summer = 231 Fall = 265 Total = 812	1.15	0.48	No	0.89
			9	Met-One BAM 1020 w/VSCC	08/02/ 2011	12/31/ 2013	Winter = 170 Spring = 152 Summer = 212 Fall = 265 Total = 799	1.12	2.26	No	0.89
Mira Loma	Mira Loma	06-065-8005	3	Met-One BAM 1020 w/VSCC	01/01/ 2010	12/31/ 2013	Winter = 255 Spring = 244 Summer = 257 Fall = 265 Total = 1021	1.10	4.12	No	0.90

*2011 data have not been submitted to AQS

Period of Exclusion of Data from the PM2.5 Continuous FEMs

The above table details the period of available data by monitor on which the request to exclude PM2.5 continuous FEM data is based. Per EPA Regional Office approval, these data will be entered into EPA's AQS database in a manner where the data are only used for the appropriate monitoring objective(s) (i.e., use data for just the AQI). Additionally, SCAQMD will continue to load any new data generated for the next 18 months (intended to represent the period until December 31 of 2015) in the same manner or until such time we request and receive approval from the EPA Regional Office to change the status of these monitors.

PM2.5 Continuous FEM data for Reporting the AQI

While the analysis supports the request for the monitors above not be used for comparison to the NAAQS, the data are of sufficient comparability to collocated FRMs that they be used for public AQI reporting. Therefore, with EPA Regional Office approval we will report these data on our web site and to AIRNow (www.airnow.gov). As such, data submitted to EPA's AQS database will be under "acceptable AQI" reporting (i.e., parameter code 88101) so that data users will know that these data are appropriate for use in AQI calculations, but not NAAQS comparison.

Assessments

The following one-page assessments are locations where our agency has collocated PM2.5 FRM and continuous FEM monitors. Each of these assessments is represented in the "**Table – Request for Exclusion of PM2.5 Continuous FEM Data"** above.

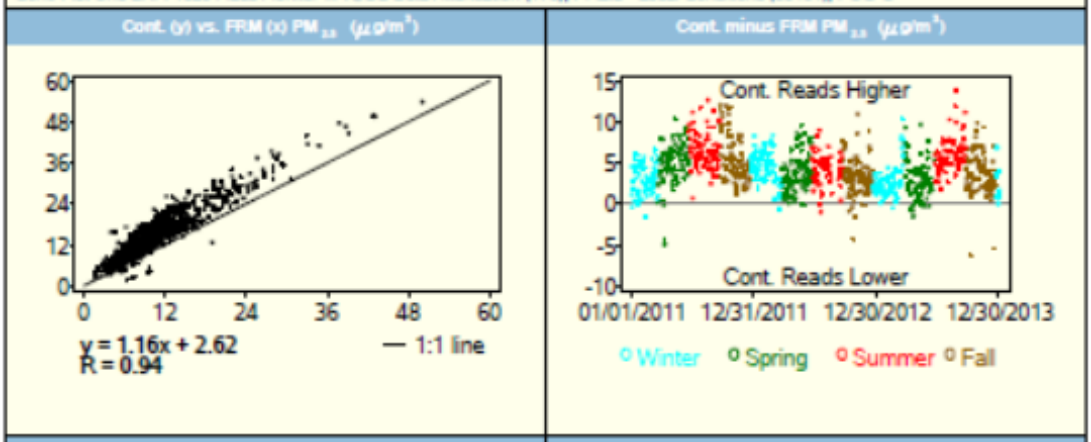
Anaheim

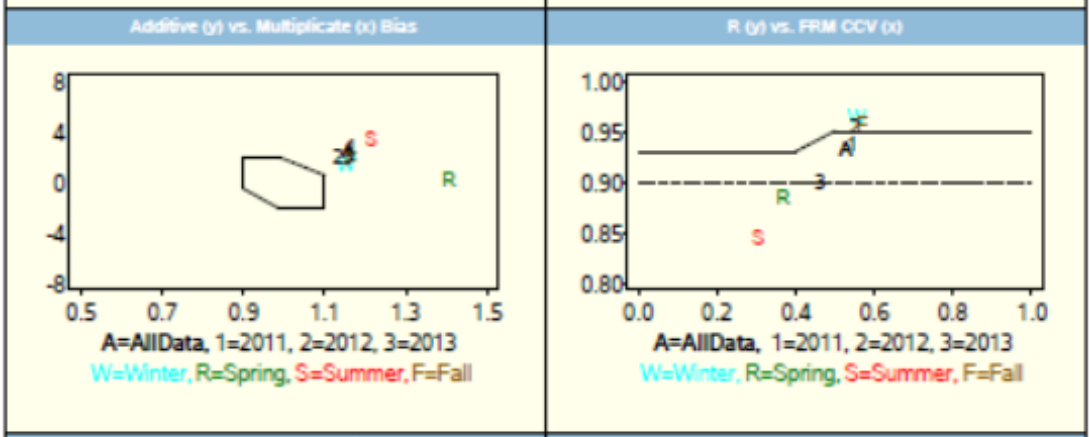
(FRM POC: 1; FEM POC: 3)

PM 2.5 Continuous Monitor Comparability Assessment

Site 06-059-0007: Anaheim, CA

FRM: Andersen RAAS2.5-300 PM2.5 SEQ w/WINS-GRAVIMETRIC (120), PM2.5 - Local Conditions (88101), POC=1
Cont: Met One BAM-1020 Mass Monitor w/VSCC-Beta Attenuation (170), PM2.5 - Local Conditions (88101), POC=3





Mean PM 2.5 (µg/m³)

Dataset	N	FRM	Cont	Ratio (Cont/FRM)
AllData	**988**	**10.7**	**15.0**	**1.40**
Winter	247	11.4	14.8	1.30
Spring	254	8.6	12.6	1.46
Summer	227	9.7	15.4	1.59
Fall	260	13.0	17.2	1.32
2011	348	11.0	16.1	1.46
2012	325	11.0	14.8	1.35
2013	315	10.2	14.1	1.38

Appendix A Statistics

Dataset	N (all observations)	Bias	N (only >= 3 µg/m³)	Bias
AllData	**988**	**44.3**	**977**	**44.3**
Winter	247	34.3	242	32.8
Spring	254	46.2	249	47.6
Summer	227	62.2	227	62.2
Fall	260	36.4	259	36.3
2011	348	51.7	344	52.8
2012	325	38.6	323	38.3
2013	315	42.0	310	41.2

Data Source: EPA AQS Data Mart

Generated on: May 20, 2014

Burbank

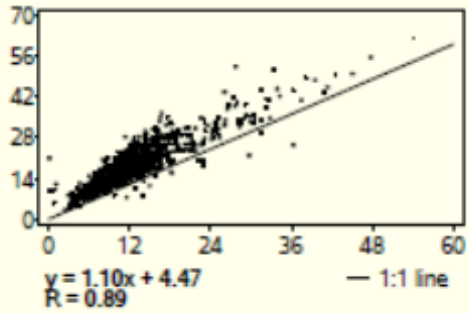
(FRM POC: 1; FEM POC: 3)

PM 2.5 Continuous Monitor Comparability Assessment

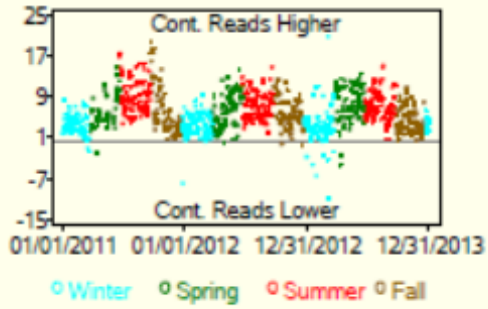
Site 06-037-1002: Burbank, CA

FRM: Andersen RAAS2.5-300 PM2.5 SEQ w/WINS-GRAVIMETRIC (120), PM2.5 - Local Conditions (88101), POC=1
Cont: Met One BAM-1020 Mass Monitor w/VSCC-Beta Attenuation (170), PM2.5 - Local Conditions (88101), POC=3

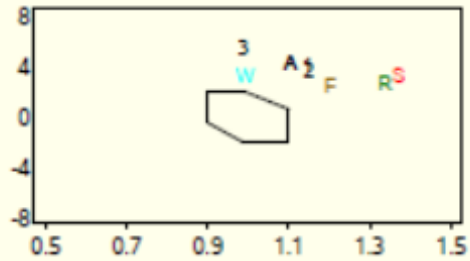
Cont. (y) vs. FRM (x) PM 2.5 (µg/m³)



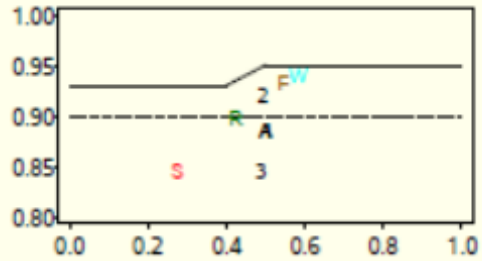
Cont. minus FRM PM 2.5 (µg/m³)



Additive (y) vs. Multiplicate (x) Bias



R (y) vs. FRM CCV (x)



Mean PM 2.5 (µg/m³)

Dataset	N	FRM	Cont	Ratio (Cont/FRM)
AllData	**988**	**12.5**	**18.3**	**1.46**
Winter	259	13.4	16.7	1.25
Spring	217	11.0	17.6	1.60
Summer	262	11.6	19.3	1.66
Fall	250	13.8	19.4	1.40
2011	302	13.4	19.6	1.47
2012	349	12.1	17.8	1.47
2013	337	12.1	17.6	1.45

Appendix A Statistics

Dataset	N (all observations)	Bias	N (only >= 3 µg/m³)	Bias
AllData	**988**	**79.5**	**981**	**50.9**
Winter	259	138	252	28.4
Spring	217	63.2	217	63.2
Summer	262	68.0	262	68.0
Fall	250	45.1	250	45.1
2011	302	52.1	302	52.1
2012	349	51.6	349	51.6
2013	337	133	330	49.2

Data Source: EPA AQS Data Mart

Generated on: May 20, 2014

Central Los Angeles

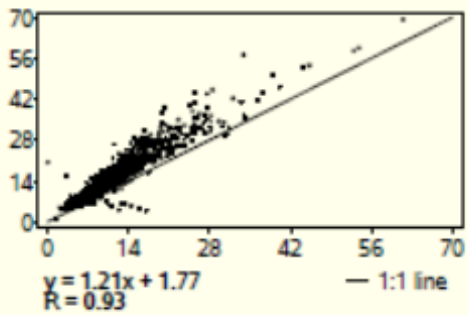
(FRM POC: 1; FEM POC: 3)

PM 2.5 Continuous Monitor Comparability Assessment

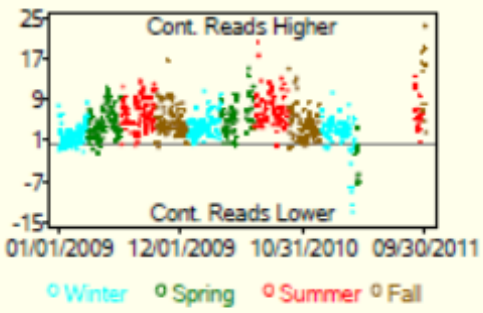
Site 06-037-1103: Los Angeles, CA

FRM: Andersen RAAS2.5-300 PM2.5 SEQ w/WINS-GRAVIMETRIC (120), PM2.5 - Local Conditions (88101), POC=1
Cont: Met One BAM-1020 Mass Monitor w/VSCC-Beta Attenuation (170), PM2.5 - Local Conditions (88101), POC=3

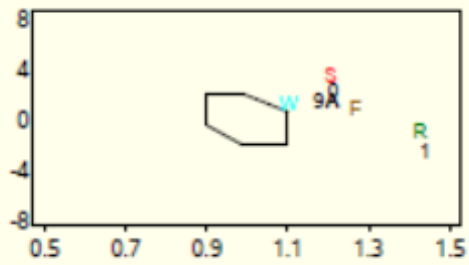
Cont. (y) vs. FRM (x) PM 2.5 (µg/m³)



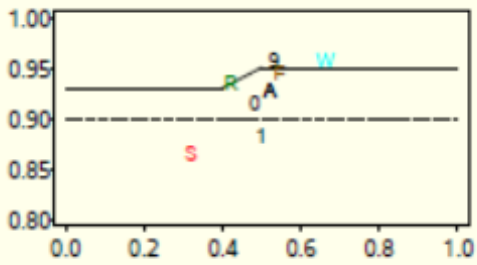
Cont. minus FRM PM 2.5 (µg/m³)



Additive (y) vs. Multiplicate (x) Bias



R (y) vs. FRM CCV (x)



Mean PM 2.5 (µg/m³)

Dataset	N	FRM	Cont	Ratio (Cont/FRM)
AllData	739	13.2	17.8	1.34
Winter	226	13.1	15.8	1.21
Spring	161	12.1	16.6	1.37
Summer	170	14.0	20.6	1.48
Fall	182	13.8	18.6	1.35
2009	340	14.4	18.7	1.30
2010	298	12.1	17.2	1.42
2011	101	12.8	16.3	1.27

Appendix A Statistics

Dataset	N (all observations)	Bias	N (only >= 3 µg/m³)	Bias
AllData	739	36.1	734	36.0
Winter	226	24.8	224	24.8
Spring	161	35.9	161	35.9
Summer	170	48.0	169	48.0
Fall	182	39.5	180	38.9
2009	340	32.0	340	32.0
2010	298	44.5	294	44.4
2011	101	25.6	100	25.1

Data Source: EPA AQS Data Mart

Generated on: May 20, 2014

Central Los Angeles

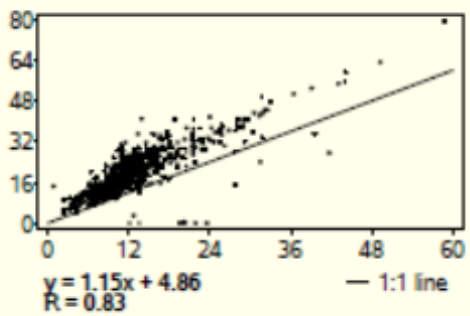
(FRM POC: 1; FEM POC: 9)

PM 2.5 Continuous Monitor Comparability Assessment

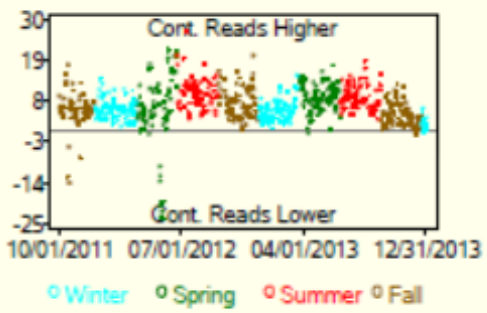
Site 06-037-1103: Los Angeles, CA

FRM: Andersen RAAS2.5-300 PM2.5 SEQ w/WINS-GRAVIMETRIC (120), PM2.5 - Local Conditions (88101), POC=1
Cont: Met One BAM-1020 Mass Monitor w/VSCC-Beta Attenuation (170), PM2.5 - Local Conditions (88101), POC=9

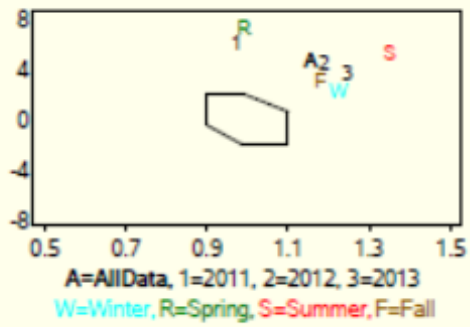
Cont. (y) vs. FRM (x) PM 2.5 (µg/m³)



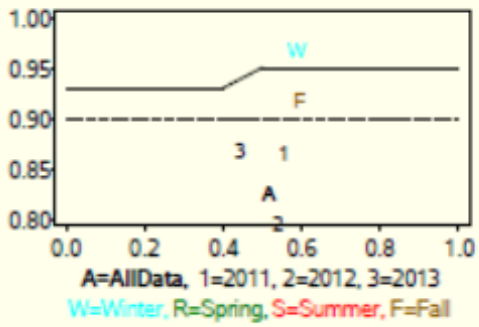
Cont. minus FRM PM 2.5 (µg/m³)



Additive (y) vs. Multiplicate (x) Bias



R (y) vs. FRM CCV (x)



Mean PM 2.5 (µg/m³)

Dataset	N	FRM	Cont	Ratio (Cont/FRM)
AllData	**720**	**12.8**	**19.6**	**1.53**
Winter	176	12.9	18.2	1.42
Spring	160	12.5	19.8	1.59
Summer	156	11.8	21.4	1.81
Fall	228	13.7	19.5	1.42
2011	73	16.2	22.1	1.36
2012	311	12.8	19.9	1.55
2013	336	12.1	18.9	1.56

Appendix A Statistics

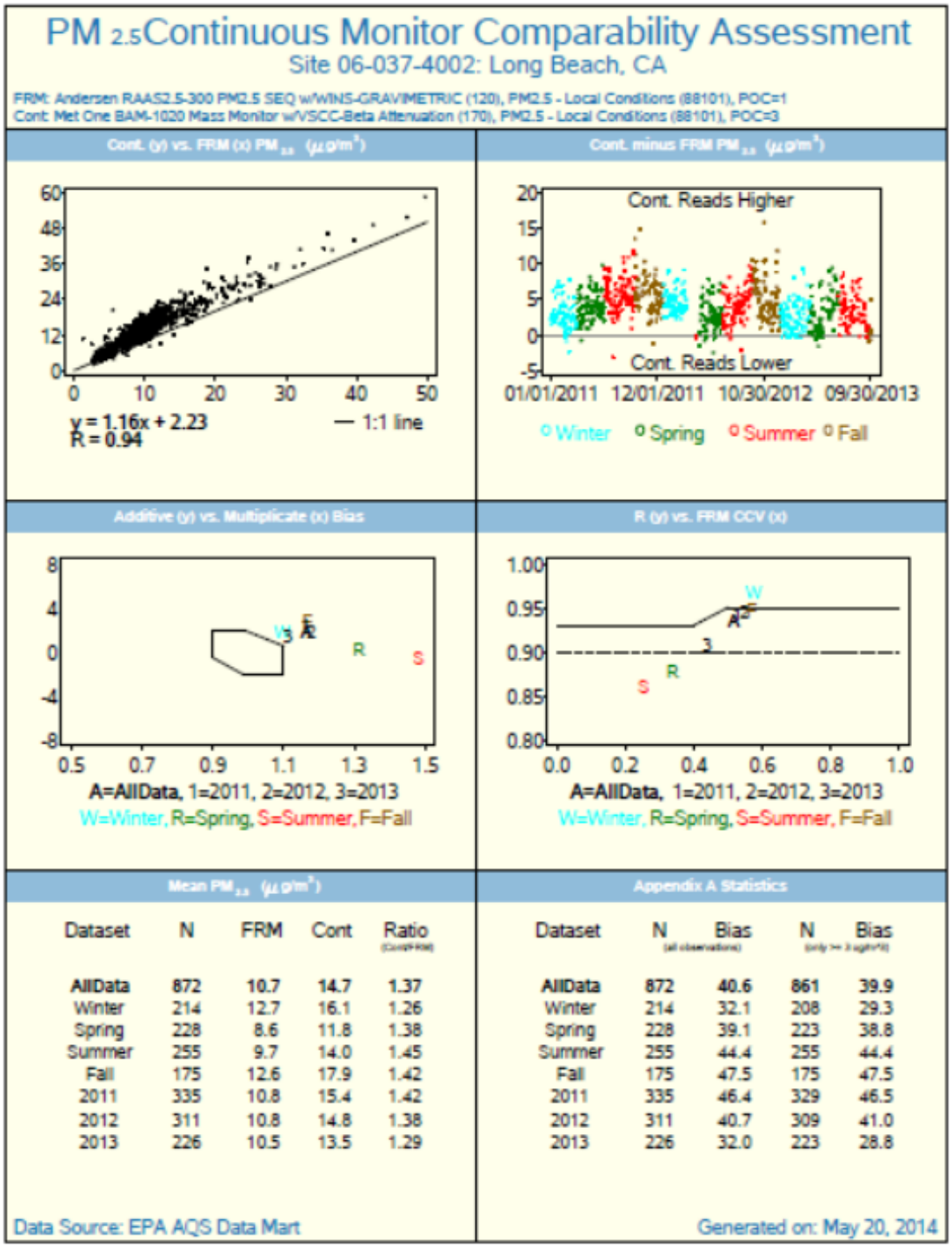
Dataset	N (all observations)	Bias	N (only >= 3 µg/m³)	Bias
AllData	**720**	**62.3**	**706**	**61.3**
Winter	176	49.4	171	46.8
Spring	160	66.1	152	74.8
Summer	156	93.5	155	83.1
Fall	228	48.3	228	48.3
2011	73	44.3	73	44.3
2012	311	63.3	301	66.9
2013	336	65.3	332	60.0

Data Source: EPA AQS Data Mart

Generated on: May 20, 2014

North Long Beach

(FRM POC: 1; FEM POC: 3)

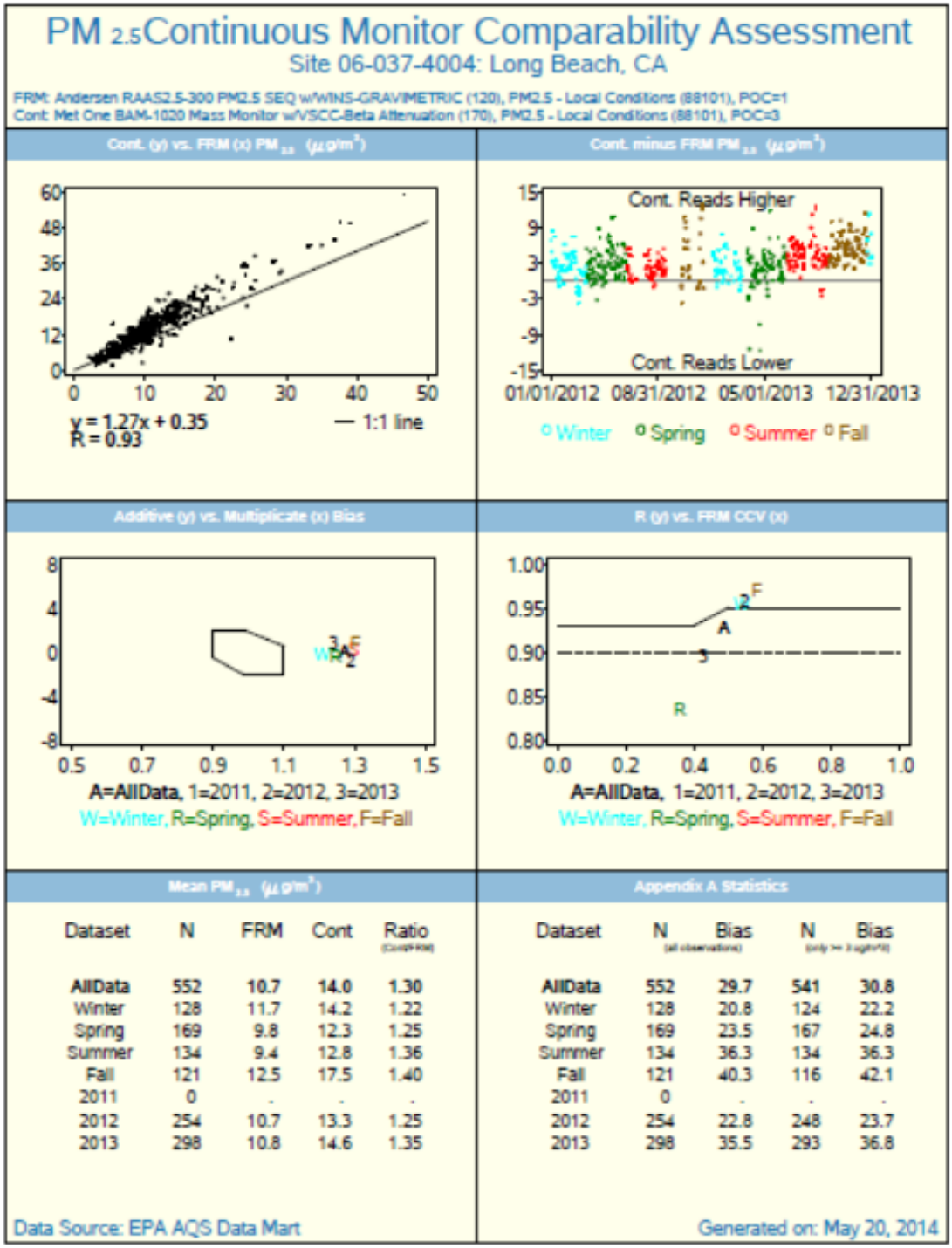


Dataset	N	FRM	Cont	Ratio (Cont/FRM)
AllData	**872**	**10.7**	**14.7**	**1.37**
Winter	214	12.7	16.1	1.26
Spring	228	8.6	11.8	1.38
Summer	255	9.7	14.0	1.45
Fall	175	12.6	17.9	1.42
2011	335	10.8	15.4	1.42
2012	311	10.8	14.8	1.38
2013	226	10.5	13.5	1.29

Dataset	N (all observations)	Bias	N (only >= 3 ug/m³)	Bias
AllData	**872**	**40.6**	**861**	**39.9**
Winter	214	32.1	208	29.3
Spring	228	39.1	223	38.8
Summer	255	44.4	255	44.4
Fall	175	47.5	175	47.5
2011	335	46.4	329	46.5
2012	311	40.7	309	41.0
2013	226	32.0	223	28.8

South Long Beach

(FRM POC: 1; FEM POC: 3)



Dataset	N	FRM	Cont	Ratio (Cont/FRM)
AllData	552	10.7	14.0	1.30
Winter	128	11.7	14.2	1.22
Spring	169	9.8	12.3	1.25
Summer	134	9.4	12.8	1.36
Fall	121	12.5	17.5	1.40
2011	0	.	.	.
2012	254	10.7	13.3	1.25
2013	298	10.8	14.6	1.35

Dataset	N (all observations)	Bias	N (only >= 3 ug/m^3)	Bias
AllData	552	29.7	541	30.8
Winter	128	20.8	124	22.2
Spring	169	23.5	167	24.8
Summer	134	36.3	134	36.3
Fall	121	40.3	116	42.1
2011	0	.	.	.
2012	254	22.8	248	23.7
2013	298	35.5	293	36.8

Rubidoux

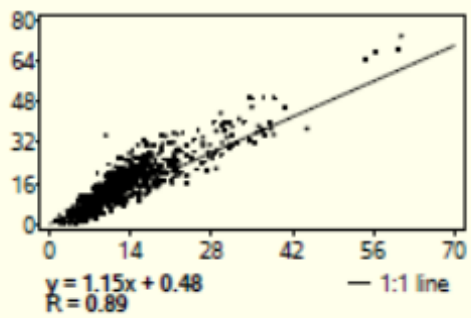
(FRM POC: 1; FEM POC: 3)

PM 2.5 Continuous Monitor Comparability Assessment

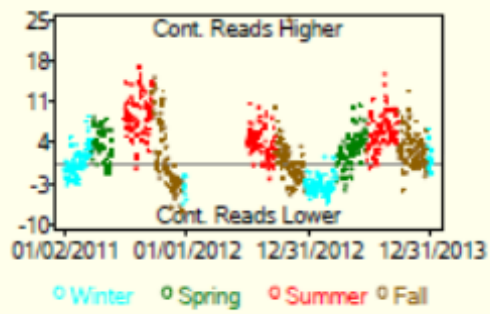
Site 06-065-8001: Rubidoux, CA

FRM: Andersen RAAS2.5-300 PM2.5 SEQ w/WINS-GRAVIMETRIC (120), PM2.5 - Local Conditions (88101), POC=1
Cont: Met-One BAM-1020 W/PM2.5 SCC-Beta Attenuation (731), Acceptable PM2.5 AQI & Speciation Mass (88502), POC=3

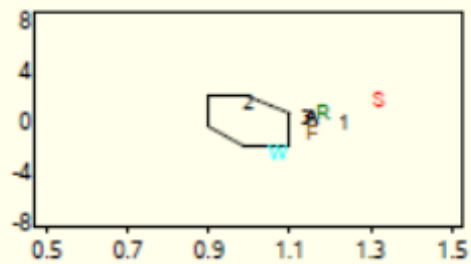
Cont. (y) vs. FRM (x) PM 2.5 (µg/m³)



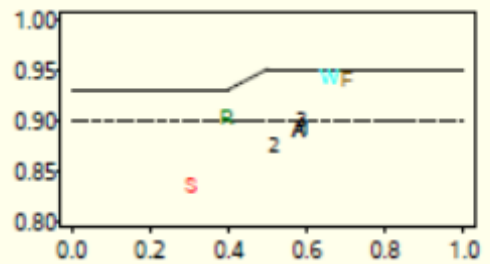
Cont. minus FRM PM 2.5 (µg/m³)



Additive (y) vs. Multiplicate (x) Bias



R (y) vs. FRM CCV (x)



Mean PM 2.5 (µg/m³)

Dataset	N	FRM	Cont	Ratio (Cont/FRM)
AllData	**812**	**13.2**	**15.7**	**1.19**
Winter	177	11.9	10.6	0.89
Spring	139	12.0	15.2	1.26
Summer	231	13.1	19.2	1.47
Fall	265	14.8	16.3	1.11
2011	299	13.5	16.8	1.24
2012	174	13.9	15.7	1.12
2013	339	12.5	14.8	1.18

Appendix A Statistics

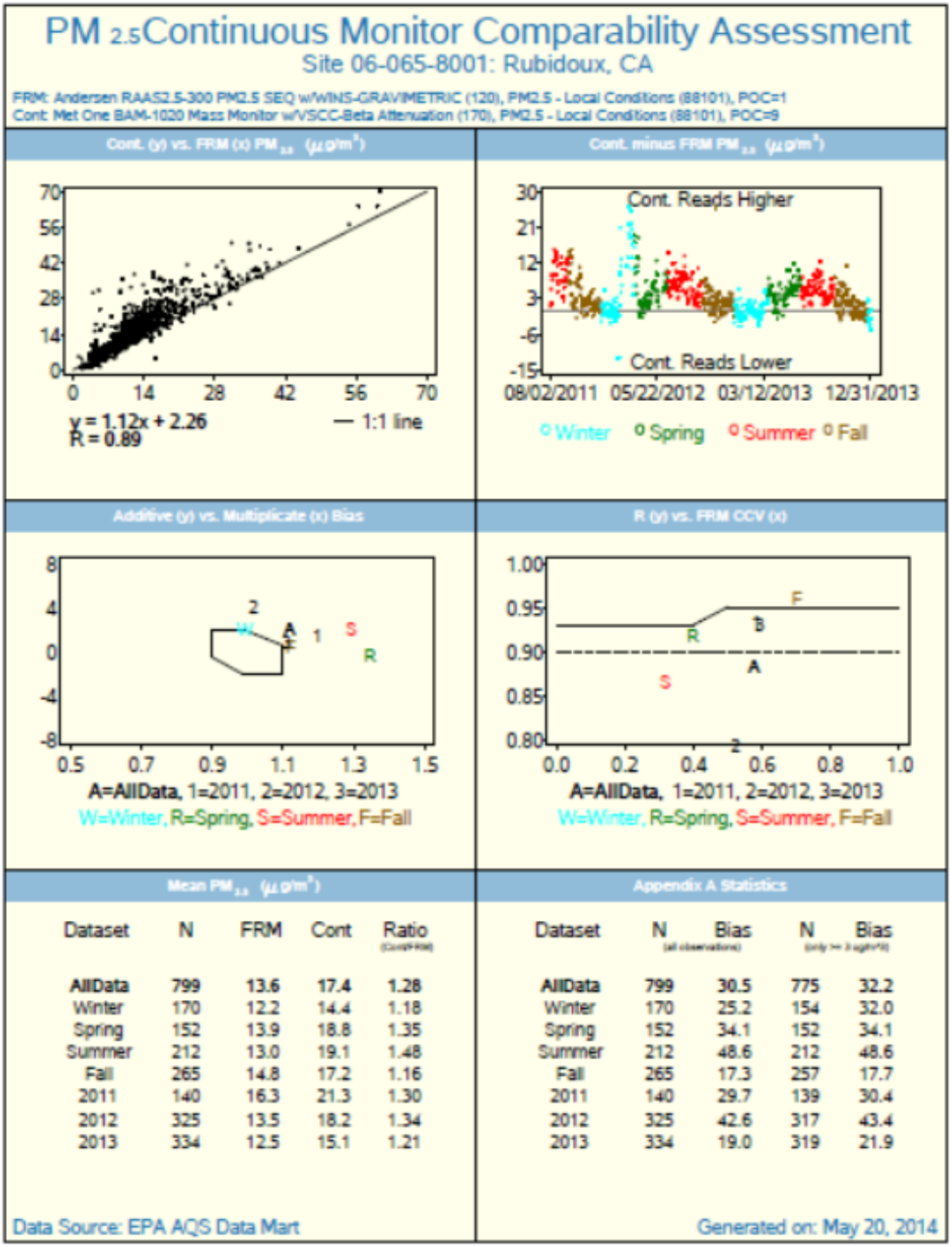
Dataset	N (all observations)	Bias	N (only >= 3 µg/m³)	Bias
AllData	**812**	**15.2**	**755**	**21.7**
Winter	177	-23	141	-8.1
Spring	139	25.5	136	27.3
Summer	231	47.8	231	47.8
Fall	265	6.9	247	11.2
2011	299	17.9	277	25.2
2012	174	12.2	167	15.4
2013	339	14.3	311	22.0

Data Source: EPA AQS Data Mart

Generated on: May 20, 2014

Rubidoux

(FRM POC: 1; FEM POC: 9)



Dataset	N	FRM	Cont	Ratio (Cont/FRM)
AllData	799	13.6	17.4	1.28
Winter	170	12.2	14.4	1.18
Spring	152	13.9	18.8	1.35
Summer	212	13.0	19.1	1.48
Fall	265	14.8	17.2	1.16
2011	140	16.3	21.3	1.30
2012	325	13.5	18.2	1.34
2013	334	12.5	15.1	1.21

Dataset	N (all observations)	Bias	N (only >= 3 µg/m³)	Bias
AllData	799	30.5	775	32.2
Winter	170	25.2	154	32.0
Spring	152	34.1	152	34.1
Summer	212	48.6	212	48.6
Fall	265	17.3	257	17.7
2011	140	29.7	139	30.4
2012	325	42.6	317	43.4
2013	334	19.0	319	21.9

Mira Loma

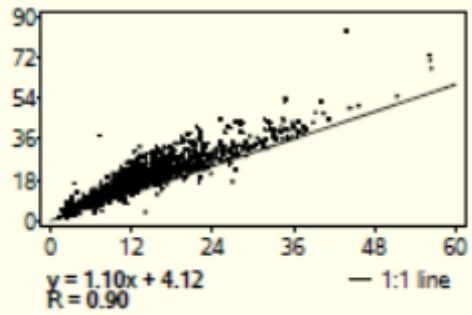
(FRM POC: 1; FEM POC: 3)

PM 2.5 Continuous Monitor Comparability Assessment

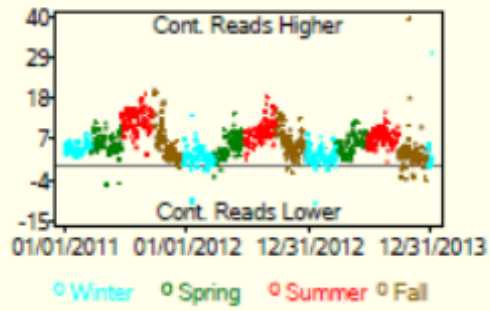
Site 06-065-8005: Mira Loma, CA

FRM: Andersen RAAS2.5-300 PM2.5 SEQ w/WINS-GRAVIMETRIC (120), PM2.5 - Local Conditions (88101), POC=1
Cont: Met One BAM-1020 Mass Monitor w/VSCC-Beta Attenuation (170), PM2.5 - Local Conditions (88101), POC=3

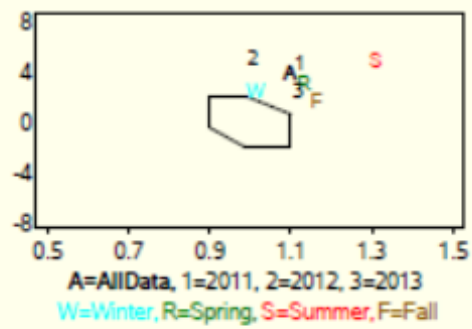
Cont. (y) vs. FRM (x) PM 2.5 (µg/m³)



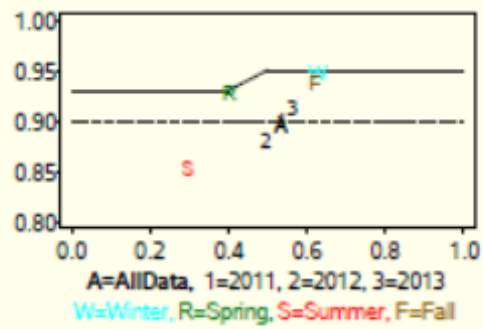
Cont. minus FRM PM 2.5 (µg/m³)



Additive (y) vs. Multiplicate (x) Bias



R (y) vs. FRM CCV (x)



Mean PM 2.5 (µg/m³)

Dataset	N	FRM	Cont	Ratio (Cont/FRM)
AllData	**1021**	**14.9**	**20.4**	**1.37**
Winter	255	14.4	17.3	1.20
Spring	244	14.3	19.4	1.36
Summer	257	13.7	23.1	1.69
Fall	265	17.0	21.8	1.28
2011	334	15.5	22.4	1.44
2012	340	15.0	20.4	1.36
2013	347	14.1	18.5	1.32

Appendix A Statistics

Dataset	N (all observations)	Bias	N (only >= 3 µg/m³)	Bias
AllData	**1021**	**44.1**	**999**	**43.3**
Winter	255	32.0	238	26.9
Spring	244	39.9	244	39.9
Summer	257	71.2	257	71.2
Fall	265	33.2	260	33.8
2011	334	52.8	328	51.0
2012	340	43.7	336	42.9
2013	347	36.1	335	36.1

Data Source: EPA AQS Data Mart

Generated on: May 20, 2014