NSR

Alton Coal Development, LLC
463 North 100 West, Suite 1
Cedar City, Utah 84720
Phone (435) 867-5331 • Fax (435) 867-1192

UTAH DEPARTMENT OF
ENVIRONMENTAL QUALITY
AUG - 9 2013
DIVISION OF AIR QUALITY

August 8, 2013

Jon Black
Engineer
Major New Source Review Section
Utah Division of Air Quality
195 North 1950 West
Salt Lake City, UT 84114

RE: 2nd QT 2013 Report - Coal Hollow Mine
Project ID: N14047-0002

Dear Mr. Black,

Please find enclosed the Summary of PM_{10} Data Collected at the Coal Hollow Mine, Utah during the Second Quarter, 2013 prepare by Alton Coal Development, LLC.

Please do not hesitate to contact me if you have any questions. I can be reached at (435) 867-5331 or (435) 691-1551.

Sincerely,

B. Kirk Nicholes
Environmental Specialist
Alton Coal Development, LLC

Alton Coal Development, LLC.

Summary of PM_{10} Data
Collected at Coal Hollow Mine, Utah
During the Second Quarter, 2013

Submitted to:
Utah Division of Environmental Quality
Division of Air Quality
195 North 1950 West
Salt Lake City, Utah
Contact: Jon Black

Prepared by:
Alton Coal Development, LLC.
463 N 100W, Suite1
Cedar City, Utah 84721
Contact: Kirk Nicholes
435.867.5331

Alton Coal Development
Coal Hollow
Project

Contents

1.0 Introduction **2**

2.0 Site Location **2**

3.0 AIR QUALITY DATA SUMMARIES **4**

4.0 DATA RECOVERY AND QUALITY ASSURANCE **6**

4.1 Data Recovery 6

4.2 Quality Assurance 7

4.2.1 Precision of PM_{10} Measurements 7

4.2.2 Audit Results 8

4.2.3 Zero and Single Point Flow Rate Checks 8

List of Tables

Table I - Summary of Measured PM_{10} Concentrations ($\mu g/m^3$) 5

Table II - Summary of Measured PM_{10} Concentrations ($\mu g/m^3$) 5

Table III - Summary of Measured PM_{10} Concentrations ($\mu g/m^3$) 6

Table IV – Mean Quarterly and Monthly Wind Speed 6

Table V - Summary of Data Recovery 7

Table VI - Audit Summary 8

List of Figures

Figure 1 - Site Location Map 3

Figure 2 - Satellite View of Monitoring Locations 4

List of Appendices

APPENDIX A

Windrose

APPENDIX B

Listing of PM_{10} Concentrations (Data sheets for monitor's on DVD)

APPENDIX C

Precision and Single-Point Flow Rate Checks

APPENDIX D

Field Data Sheets

APPENDIX E

Independent PM_{10} Sampler Performance Audit Report

1.0 INTRODUCTION

This report summarizes measurements of Particulate Matter less than 10 microns nominal aerodynamic diameter (PM_{10}) collected and processed by Alton Coal Development, LLC, (ACD) from the three monitoring stations located at the Coal Hollow Mine Facility in Alton, Utah. Monitoring for PM_{10} is a condition of the mines operating permit.

PM_{10} monitoring at the site consists of three BGI PQ200 PM_{10} monitors run by solar power. Figure 2 of this report shows the approximate locations of the monitoring locations. The BGI PQ200 monitors are EPA Reference Method monitors and are operated on the National Particulate 1-in-6 Monitoring Schedule. The data summarized herein covers the data collected during the fourth quarter of 2012.

2.0 SITE LOCATION

The Coal Hollow Mine is located in Kane County, Utah, approximately three miles southeast of the town of Alton, Utah. Figure I on the following page gives an overview of the site location. Specifically the Coal Hollow Mine is located in Sections 19, 20, 29, and 30 of Township 39S, Range 5W; with an approximate facility location of:

Northing: 41401699 meters

Easting: 371534 meters

Universal Transverse Mercator (UTM) Datum NAD27, Zone 12

The two monitoring locations as depicted in Figure 2, are located in positions to collect both background and maximum PM10 concentrations. The background monitor has a manufactures serial #962, therefore this monitor will be referred as monitor 962A. The compliance monitor has a manufactures serial #963, therefore this monitor will be referred as monitor 963B. The co-located monitor has a manufactures serial #964, therefore this monitor will be referred as monitor 964C. The compliance monitor and the co-located monitor coordinates are 37° 24' 5.04" North Latitude, 112° 27' 20.91" West Longitude, WGS84 Datum. The background monitor coordinates are 37° 24' 21.96" North Latitude, 112° 25' 59.97" West Longitude, WGS84 Datum.

Figure 1 - Site Location Map

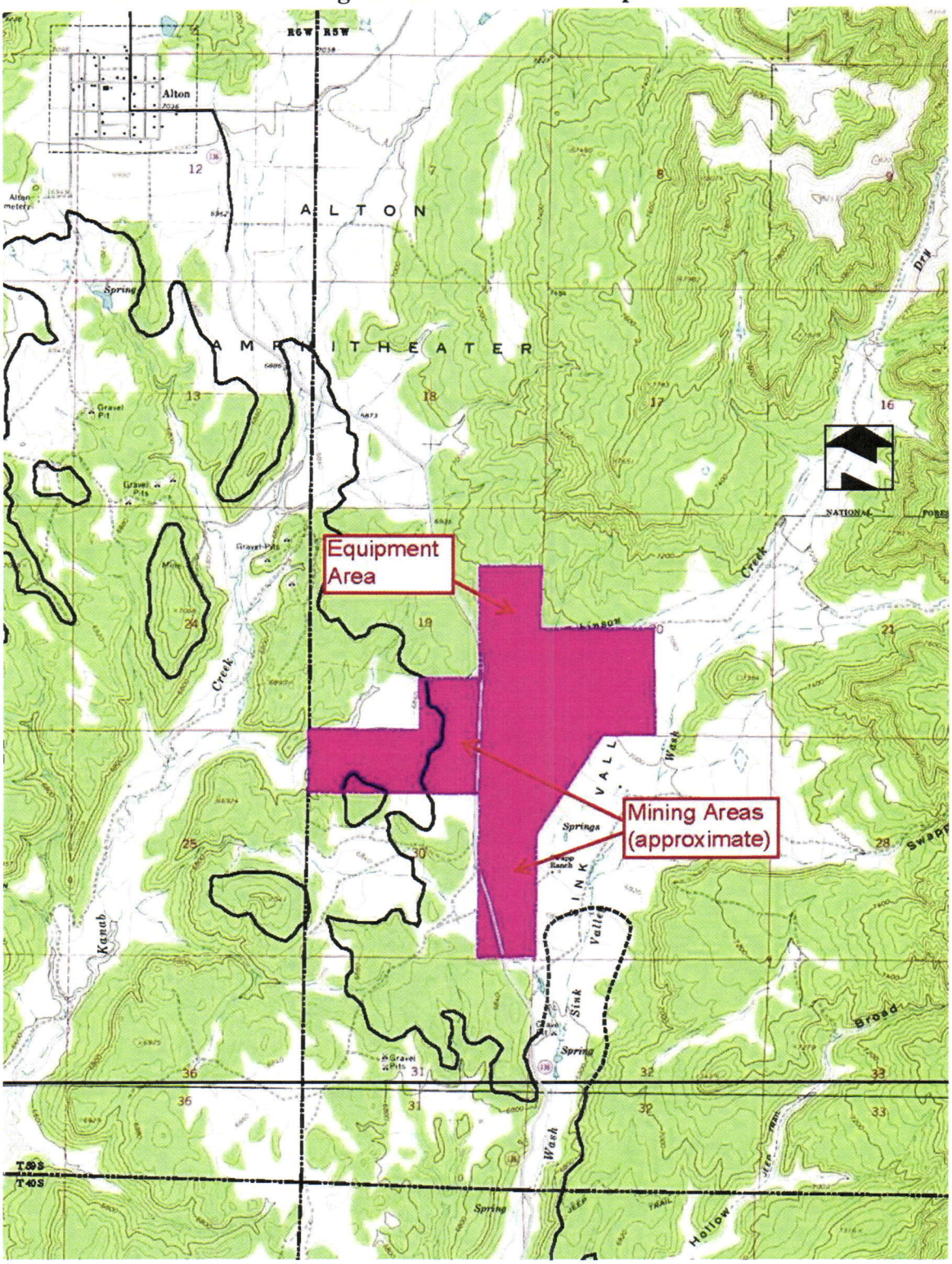
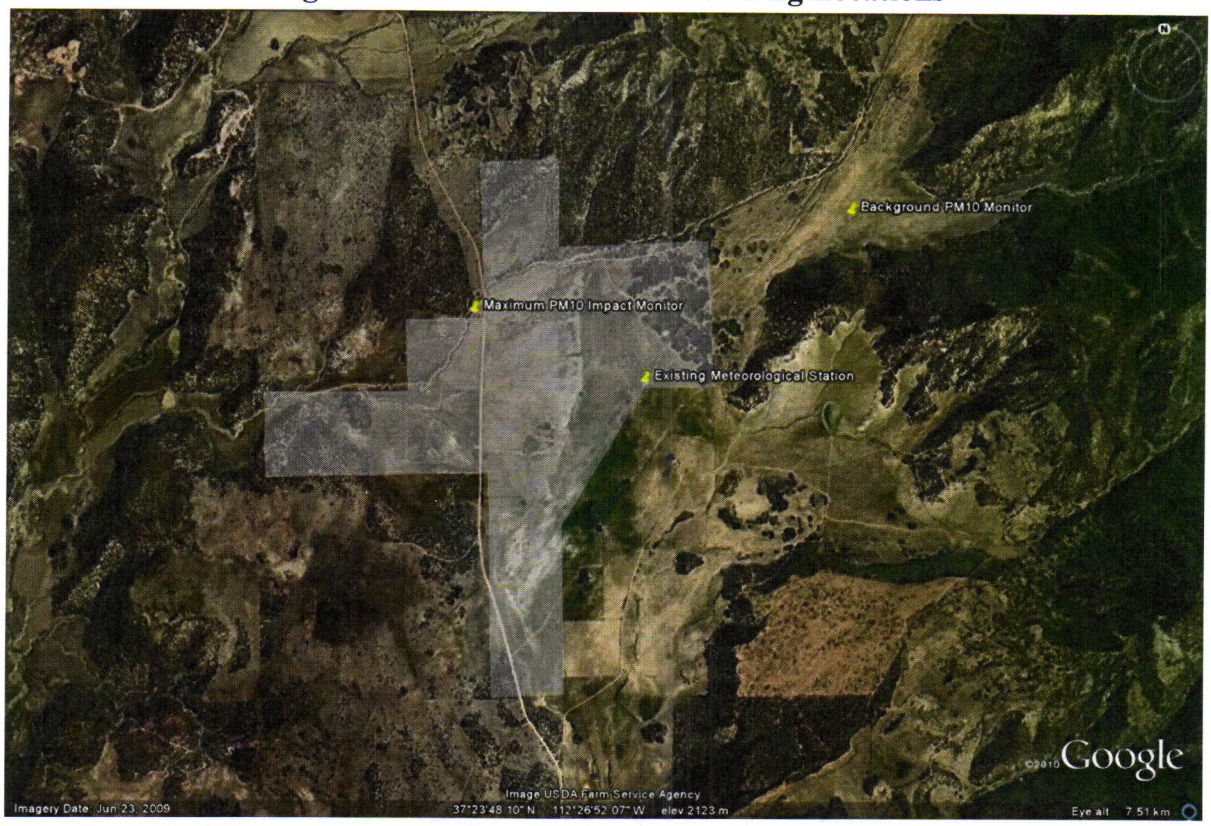


Figure 2 - Satellite View of Monitoring Locations



3.0 AIR QUALITY DATA SUMMARIES

A listing of the measured PM_{10} concentrations for the quarter are presented in Appendix B (individual data sheets are provided on the enclosed disk in the PDF version of Appendix B) and Field Data Sheets generated during the collection of each sample are presented in Appendix D. Measurements were collected during a 24-hour periods and represent the average PM_{10} concentration during the midnight to midnight data collection cycle. As required by the operating permit, duplicate measurements were made with Sampler #963B (designated as a compliance monitor) and Sampler #964C (designated as a co-located sampler) to the extent possible. The #964C monitor continues to have problems, ACD is in contact working with the manufacture (BGI) to diagnose and resolve issues with this monitor. The quarterly mean PM_{10} concentration and the comparison of measured concentrations to standards are based on measurements from the primary Sampler #963B. If a measurement from Sampler #963B was missing or invalid, the measurement from the secondary Sampler #964C would be used.

The highest 24-hour mean PM_{10} concentrations measured during the quarter from the two monitoring locations are summarized in Table I, Table II, and Table III. The three highest concentrations, # of valid samples, and the arithmetic mean concentrations from each of the

sites are listed. All measured PM_{10} concentrations were below the 24-hour National Ambient Air Quality Standard (NAAQS) of 150 $\mu g/m^3$.

Table I - Summary of Measured PM_{10} Concentrations ($\mu g/m^3$)
Background Monitor - 962A

RANK	DATE	PM_{10} CONCENTRATION
Highest	4/16/2013	29.4
2nd Highest	5/16/2013	21.0
Monthly Mean	4/1/13-4/30/13	13.4
Monthly Mean	5/1/13-5/31/13	12.7
Monthly Mean	6/1/13-6/30/13	12.2
Quarterly Mean	4/1/13-6/30/13 (14 valid samples)	12.8

Table II - Summary of Measured PM_{10} Concentrations ($\mu g/m^3$)
Compliance Monitor - 963B

RANK	DATE	PM_{10} CONCENTRATION
Highest	4/22/2013	115.2
2nd Highest	5/22/2013	83.2
Monthly Mean	4/1/13-4/30/13	48.1
Monthly Mean	5/1/13-5/31/13	43.1
Monthly Mean	6/1/13-6/30/13	53.7
Quarterly Mean	4/1/13-6/30/13 (15 valid samples)	48.3

Table III - Summary of Measured PM_{10} Concentrations ($\mu g/m^3$)
Compliance Monitor – 964C

RANK	DATE	PM_{10} CONCENTRATION
Highest	4/22/2013	129.0
2nd Highest	5/22/2013	107.4
Monthly Mean	4/1/13-4/30/13	55.4
Monthly Mean	5/1/13-5/31/13	48.7
Monthly Mean	6/1/13-6/30/13	NA
Quarterly Mean	4/1/13-6/30/13 (10 valid samples)	52.0

Table IV – Mean Quarterly and Monthly Wind Speed

	2nd Quarter 2013	April	May	June
Mean Wind Speed (m/s)	3.42	3.74	3.31	3.21

4.0 DATA RECOVERY AND QUALITY ASSURANCE

4.1 Data Recovery

Monitor 962A

Monitor 962A collected 14 of the 15 samples during the quarter. The percent recovery for this quarter is 93%. The monitor, for the sample date of June 3rd, overran the stop time programed.

Monitor 963B

Monitor 963B collected 15 of the 15 samples during the quarter. The percent recovery for this quarter is 100%.

Monitor 964C

Monitor 964C collected 10 of the 15 samples during the quarter. The percent recovery for this quarter is 67%. For the sample date of June 3rd, the wrong filter was left in the monitor invalidating this run. The monitor, for the sample date of June 9th, overran the stop time programed. For June 15th, 21st, and 27th, the monitor malfunctioned; run time was approximately 3 minutes for each day.

The PM_{10} data recoveries for the three monitoring stations are presented below:

Table V - Summary of Data Recovery

SAMPLER	POSSIBLE SAMPLES	VALID SAMPLES	PERCENT DATA RECOVERY
962A	15	14	93%
963B	15	15	100%
964C	15	10	67%

4.2 Quality Assurance

Quality assurance procedures utilized to verify the integrity of the measured PM_{10} data included the following:

1. Review of PM_{10} precision measurements based upon duplicate, collocated measurements.
2. Independent quarterly audits of the PM_{10} samplers.
3. Monthly zero and single point flow rate checks of the PM_{10} samplers.

4.2.1 Precision of PM_{10} Measurements

The precision of the PM_{10} measurements was determined from the duplicate samples collected from the collocated BGI PQ200 Monitors 963B and 964C. As recommended in *40 CFR, Part 58*, Appendix A, Section 5.3.1, PM_{10} precision checks are reported for instances when the concentrations for duplicate samples both exceed 3 $\mu g/m^3$. Duplicate samples that did not meet this condition were omitted for the purposes of the precision checks. Appendix C, of this report summarizes precision calculations between the compliance monitor and the co-located monitor. Monthly flow rate verification data is also summarized in Appendix C.

Precision calculations were developed based on 5 valid pairs of co-located monitoring data during the quarter. Single point precision based on *40 CFR, Part 58*, Appendix A Equation 10 ranged from -7.4% to 99.2%. The aggregate coefficient of variability (CV) calculated in accordance with *40 CFR, Part 58*, Appendix A Equation 11 is 33.3%. This value is above the 10% goal for aggregate CV. The value for second quarter CV was significantly impacted by the absence of data from the 964C monitor during malfunctions reducing the number of pairs for comparison. Five of the ten values exceeded the 10%, with values of 69.4%, -11.3%, -25.4%, -26.2 and -56.0%. ACD will continue to investigate other causes that may have an effect on the correlation of precision calculations.

4.2.2 Audit Results

The accuracy of the PM_{10} sampler flows was verified by a performance audit conducted by Air Resource Specialist on April 24, 2013. A copy of the audit report is presented in Appendix E and is summarized in Table VI. The audit results indicate that the two samplers were operating properly, the collocated monitor was out for repairs.

Table VI - Audit Summary

SAMPLER	AUDIT % DIFFERENCE	LIMIT*	DESIGN % DIFFERENCE	LIMIT*
962A	-2.5	±4%	2.5	± 5%
963B	-2.6	±4%	2.8	± 5%
964C	-2.6	±4%	2.8	± 5%
*Values between ± 7% and ± 10% require recalibration but no data are invalidated.				

4.2.3 Zero and Single Point Flow Rate Checks

Zero and single-point flow rate verifications are performed by a site technician on a monthly basis. The data was then input into a statistical calculator to calculate percent difference and bias between each of the monitors and the monthly single point flow rate measured by a NIST traceable calibration orifice. The calculator used is called the "Data Assessment Statistical Calculator" DASC Tool. DASC was developed for the data user community and can be found in the Precision and Accuracy Reporting System within the Quality Assurance section of EPA's Ambient Monitoring Technology Information System. This data is presented in Appendix C of this report.

APPENDIX A

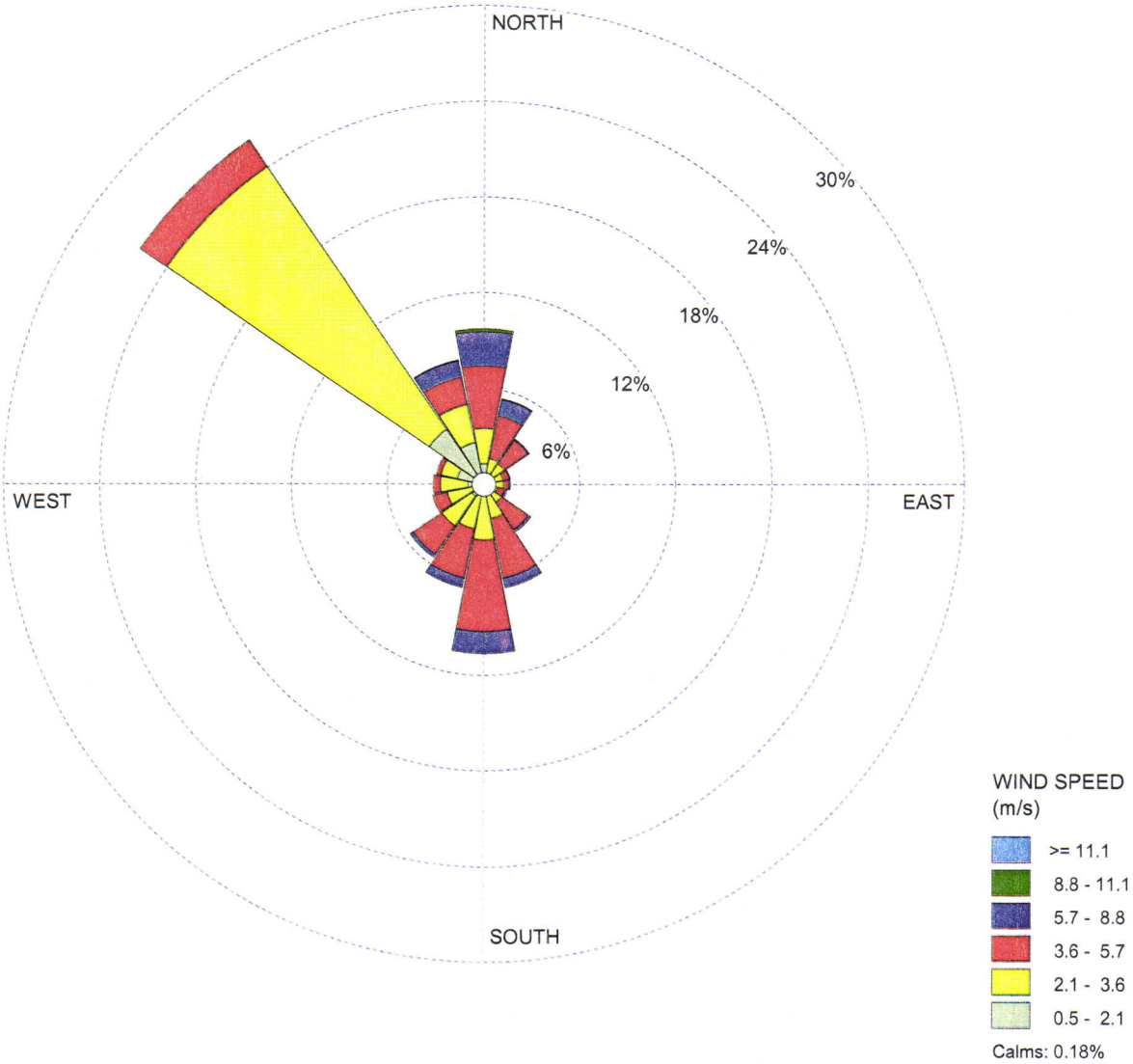
Windrose

WIND ROSE PLOT:

Alton Coal Development , Alton, Utah
2013 2nd Quarter

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 4/1/2013 - 00:00 **End Date: 6/30/2013 - 23:00**	**Alton Coal Development, LLC - Coal Hollow Mine**	
		MODELER: **K. Nicholes**	
	CALM WINDS: **0.18%**	TOTAL COUNT: **2184 hrs.**	
	AVG. WIND SPEED: **3.42 m/s**	DATE: **7/31/2013**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

Station ID: 1
Start Date: 4/1/2013 - 00:00
End Date: 6/30/2013 - 23:00

Run ID:

Frequency Distribution
(Count)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	Total
348.75-11.25	28	48	87	46	4	0	213
11.25-33.75	8	28	60	23	1	0	120
33.75-56.25	9	25	39	2	0	0	75
56.25-78.75	9	18	9	1	0	0	37
78.75-101.25	12	15	8	1	0	0	36
101.25-123.75	9	10	11	3	0	0	33
123.75-146.25	8	22	44	4	0	0	78
146.25-168.75	13	35	83	13	0	0	144
168.75-191.25	9	67	125	30	0	0	231
191.25-213.75	10	52	69	13	0	0	144
213.75-236.25	20	49	47	5	0	0	121
236.25-258.75	15	36	20	0	0	0	71
258.75-281.25	22	37	10	0	0	0	69
281.25-303.75	37	23	6	0	0	0	66
303.75-326.25	90	434	44	0	0	0	568
326.25-348.75	58	53	39	23	1	0	174
Total	357	952	701	164	6	0	2184

Frequency of Calm Winds: 4
Average Wind Speed: 3.42 m/s

Station ID: 1
Start Date: 4/1/2013 - 00:00
End Date: 6/30/2013 - 23:00

Run ID:

Frequency Distribution
(Normalized)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	Total
348.75-11.25	0.012821	0.021978	0.039835	0.021062	0.001832	0.000000	0.097527
11.25-33.75	0.003663	0.012821	0.027473	0.010531	0.000458	0.000000	0.054945
33.75-56.25	0.004121	0.011447	0.017857	0.000916	0.000000	0.000000	0.034341
56.25-78.75	0.004121	0.008242	0.004121	0.000458	0.000000	0.000000	0.016941
78.75-101.25	0.005495	0.006868	0.003663	0.000458	0.000000	0.000000	0.016484
101.25-123.75	0.004121	0.004579	0.005037	0.001374	0.000000	0.000000	0.015110
123.75-146.25	0.003663	0.010073	0.020147	0.001832	0.000000	0.000000	0.035714
146.25-168.75	0.005952	0.016026	0.038004	0.005952	0.000000	0.000000	0.065934
168.75-191.25	0.004121	0.030678	0.057234	0.013736	0.000000	0.000000	0.105769
191.25-213.75	0.004579	0.023810	0.031593	0.005952	0.000000	0.000000	0.065934
213.75-236.25	0.009158	0.022436	0.021520	0.002289	0.000000	0.000000	0.055403
236.25-258.75	0.006868	0.016484	0.009158	0.000000	0.000000	0.000000	0.032509
258.75-281.25	0.010073	0.016941	0.004579	0.000000	0.000000	0.000000	0.031593
281.25-303.75	0.016941	0.010531	0.002747	0.000000	0.000000	0.000000	0.030220
303.75-326.25	0.041209	0.198718	0.020147	0.000000	0.000000	0.000000	0.260073
326.25-348.75	0.026557	0.024267	0.017857	0.010531	0.000458	0.000000	0.079670
Total	0.163462	0.435897	0.320971	0.075092	0.002747	0.000000	0.998168

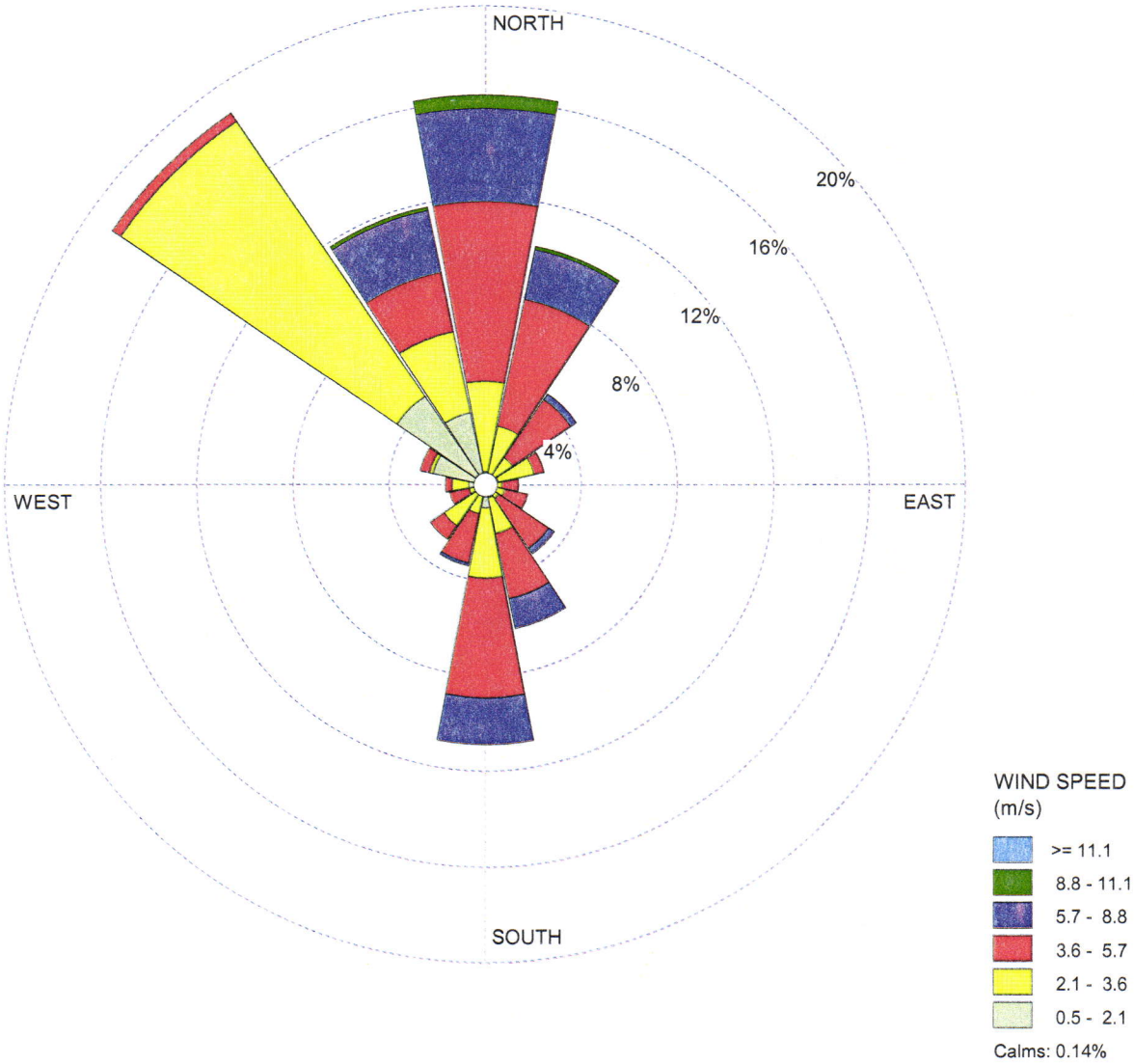
Frequency of Calm Winds: 0.18%
Average Wind Speed: 3.42 m/s

WIND ROSE PLOT:

Alton Coal Development , Alton, Utah
2013 April

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 4/1/2013 - 00:00 **End Date: 4/30/2013 - 23:00**	**Alton Coal Development, LLC - Coal Hollow Mine**	
		MODELER: **K. Nicholes**	
	CALM WINDS: **0.14%**	TOTAL COUNT: **720 hrs.**	
	AVG. WIND SPEED: **3.74 m/s**	DATE: **7/31/2013**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

Station ID: 1
Start Date: 4/1/2013 - 00:00
End Date: 4/30/2013 - 23:00

Run ID:

Frequency Distribution
(Count)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	Total
348.75-11.25	4	27	54	28	4	0	117
11.25-33.75	3	15	39	15	1	0	73
33.75-56.25	2	8	21	2	0	0	33
56.25-78.75	4	11	3	0	0	0	18
78.75-101.25	1	4	5	0	0	0	10
101.25-123.75	2	4	7	0	0	0	13
123.75-146.25	3	2	18	2	0	0	25
146.25-168.75	4	11	20	9	0	0	44
168.75-191.25	7	21	36	14	0	0	78
191.25-213.75	0	9	15	1	0	0	25
213.75-236.25	3	12	5	0	0	0	20
236.25-258.75	1	4	6	0	0	0	11
258.75-281.25	5	5	2	0	0	0	12
281.25-303.75	16	1	3	0	0	0	20
303.75-326.25	32	100	3	0	0	0	135
326.25-348.75	22	25	18	19	1	0	85
Total	109	259	255	90	6	0	720

Frequency of Calm Winds: 1
Average Wind Speed: 3.74 m/s

Station ID: 1
Start Date: 4/1/2013 - 00:00
End Date: 4/30/2013 - 23:00

Run ID:

Frequency Distribution
(Normalized)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	Total
348.75-11.25	0.005556	0.037500	0.075000	0.038889	0.005556	0.000000	0.162500
11.25-33.75	0.004167	0.020833	0.054167	0.020833	0.001389	0.000000	0.101389
33.75-56.25	0.002778	0.011111	0.029167	0.002778	0.000000	0.000000	0.045833
56.25-78.75	0.005556	0.015278	0.004167	0.000000	0.000000	0.000000	0.025000
78.75-101.25	0.001389	0.005556	0.006944	0.000000	0.000000	0.000000	0.013889
101.25-123.75	0.002778	0.005556	0.009722	0.000000	0.000000	0.000000	0.018056
123.75-146.25	0.004167	0.002778	0.025000	0.002778	0.000000	0.000000	0.034722
146.25-168.75	0.005556	0.015278	0.027778	0.012500	0.000000	0.000000	0.061111
168.75-191.25	0.009722	0.029167	0.050000	0.019444	0.000000	0.000000	0.108333
191.25-213.75	0.000000	0.012500	0.020833	0.001389	0.000000	0.000000	0.034722
213.75-236.25	0.004167	0.016667	0.006944	0.000000	0.000000	0.000000	0.027778
236.25-258.75	0.001389	0.005556	0.008333	0.000000	0.000000	0.000000	0.015278
258.75-281.25	0.006944	0.006944	0.002778	0.000000	0.000000	0.000000	0.016667
281.25-303.75	0.022222	0.001389	0.004167	0.000000	0.000000	0.000000	0.027778
303.75-326.25	0.044444	0.138889	0.004167	0.000000	0.000000	0.000000	0.187500
326.25-348.75	0.030556	0.034722	0.025000	0.026389	0.001389	0.000000	0.118056
Total	0.151389	0.359722	0.354167	0.125000	0.008333	0.000000	0.998611

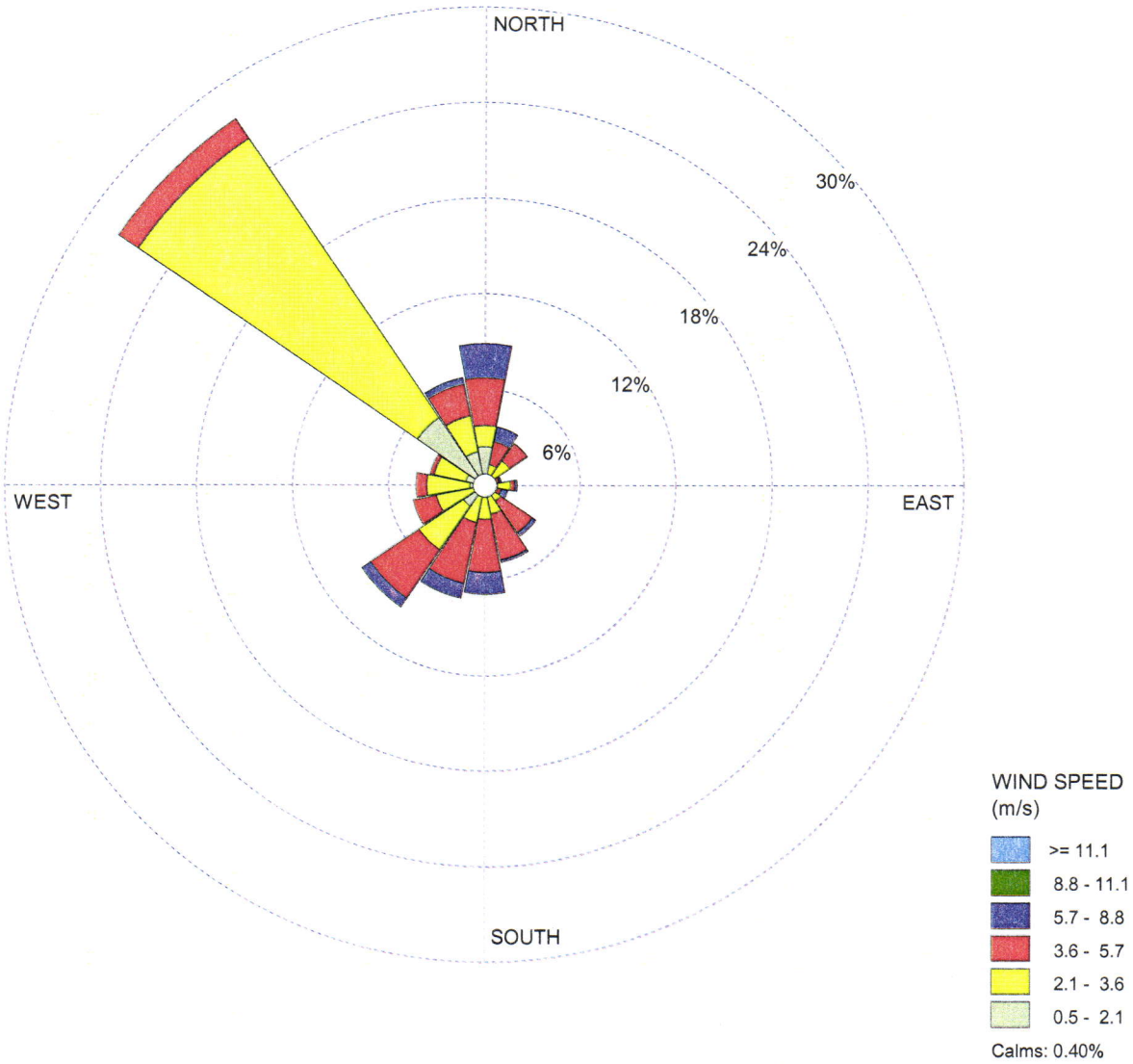
Frequency of Calm Winds: 0.14%
Average Wind Speed: 3.74 m/s

WIND ROSE PLOT:

Alton Coal Development , Alton, Utah
2013 May

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 5/1/2013 - 00:00 **End Date: 5/31/2013 - 23:00**	**Alton Coal Development, LLC - Coal Hollow Mine**	
		MODELER: **K. Nicholes**	
	CALM WINDS: **0.40%**	TOTAL COUNT: **744 hrs.**	
	AVG. WIND SPEED: **3.31 m/s**	DATE: **7/31/2013**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

Station ID: 1
Start Date: 5/1/2013 - 00:00
End Date: 5/31/2013 - 23:00

Run ID:

Frequency Distribution
(Count)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	Total
348.75-11.25	18	10	22	16	0	0	66
11.25-33.75	4	6	11	7	0	0	28
33.75-56.25	3	11	10	0	0	0	24
56.25-78.75	3	3	1	1	0	0	8
78.75-101.25	6	6	2	1	0	0	15
101.25-123.75	2	4	2	3	0	0	11
123.75-146.25	2	7	18	2	0	0	29
146.25-168.75	4	10	22	1	0	0	37
168.75-191.25	1	15	25	10	0	0	51
191.25-213.75	2	16	29	7	0	0	54
213.75-236.25	12	25	27	5	0	0	69
236.25-258.75	4	19	11	0	0	0	34
258.75-281.25	7	20	5	0	0	0	32
281.25-303.75	9	15	2	0	0	0	26
303.75-326.25	38	157	11	0	0	0	206
326.25-348.75	16	17	15	3	0	0	51
Total	131	341	213	56	0	0	744

Frequency of Calm Winds: 3
Average Wind Speed: 3.31 m/s

Station ID: 1
Start Date: 5/1/2013 - 00:00
End Date: 5/31/2013 - 23:00

Run ID:

Frequency Distribution
(Normalized)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	Total
348.75-11.25	0.024194	0.013441	0.029570	0.021505	0.000000	0.000000	0.088710
11.25-33.75	0.005376	0.008065	0.014785	0.009409	0.000000	0.000000	0.037634
33.75-56.25	0.004032	0.014785	0.013441	0.000000	0.000000	0.000000	0.032258
56.25-78.75	0.004032	0.004032	0.001344	0.001344	0.000000	0.000000	0.010753
78.75-101.25	0.008065	0.008065	0.002688	0.001344	0.000000	0.000000	0.020161
101.25-123.75	0.002688	0.005376	0.002688	0.004032	0.000000	0.000000	0.014785
123.75-146.25	0.002688	0.009409	0.024194	0.002688	0.000000	0.000000	0.038978
146.25-168.75	0.005376	0.013441	0.029570	0.001344	0.000000	0.000000	0.049731
168.75-191.25	0.001344	0.020161	0.033602	0.013441	0.000000	0.000000	0.068548
191.25-213.75	0.002688	0.021505	0.038978	0.009409	0.000000	0.000000	0.072581
213.75-236.25	0.016129	0.033602	0.036290	0.006720	0.000000	0.000000	0.092742
236.25-258.75	0.005376	0.025538	0.014785	0.000000	0.000000	0.000000	0.045699
258.75-281.25	0.009409	0.026882	0.006720	0.000000	0.000000	0.000000	0.043011
281.25-303.75	0.012097	0.020161	0.002688	0.000000	0.000000	0.000000	0.034946
303.75-326.25	0.051075	0.211022	0.014785	0.000000	0.000000	0.000000	0.276882
326.25-348.75	0.021505	0.022849	0.020161	0.004032	0.000000	0.000000	0.068548
Total	0.176075	0.458333	0.286290	0.075269	0.000000	0.000000	0.995968

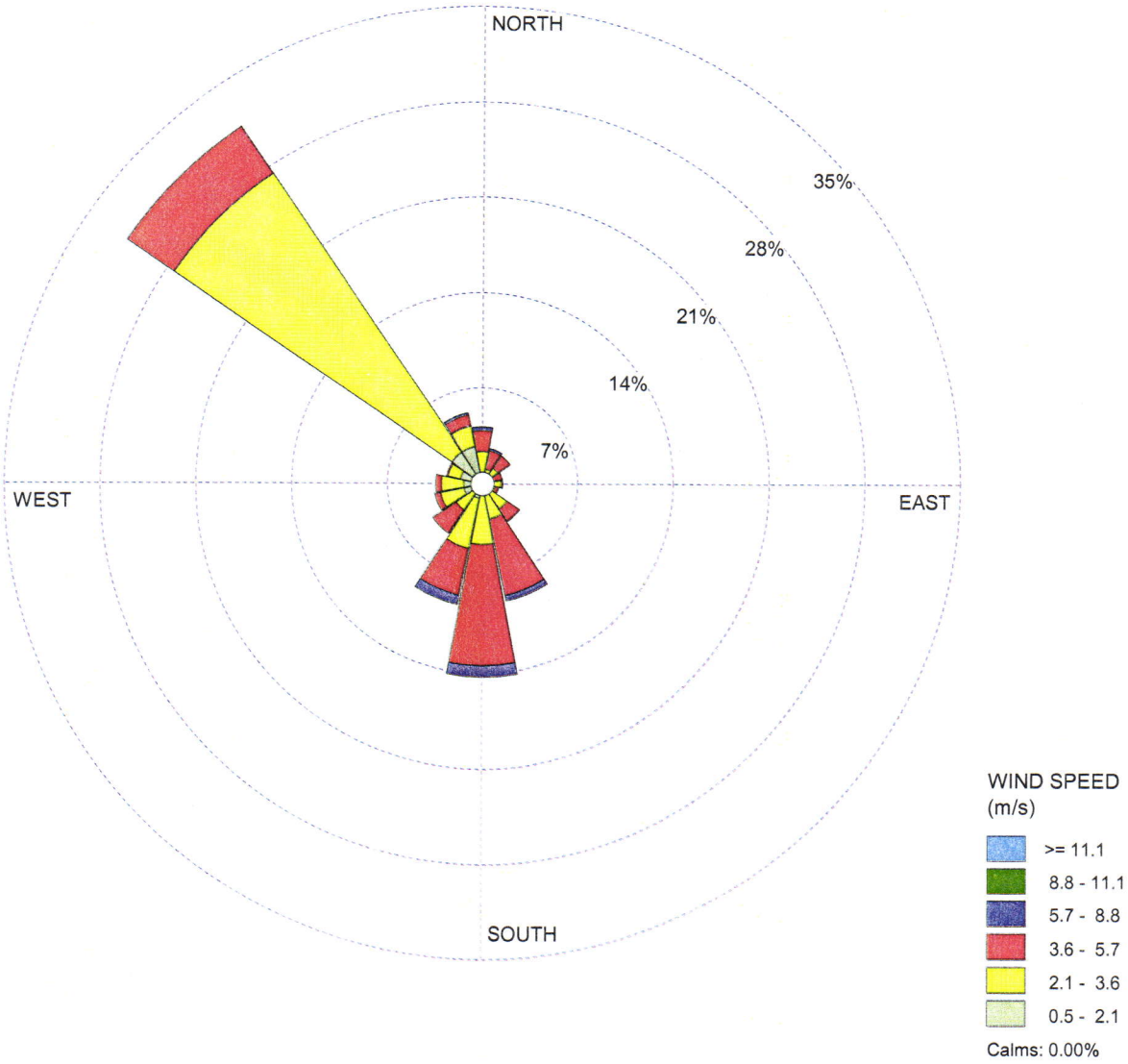
Frequency of Calm Winds: 0.40%
Average Wind Speed: 3.31 m/s

WIND ROSE PLOT:

Alton Coal Development , Alton, Utah
2013 June

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 6/1/2013 - 00:00 **End Date: 6/30/2013 - 23:00**	**Alton Coal Development, LLC - Coal Hollow Mine**	
		MODELER: **K. Nicholes**	
	CALM WINDS: **0.00%**	TOTAL COUNT: **720 hrs.**	
	AVG. WIND SPEED: **3.21 m/s**	DATE: **7/31/2013**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

Station ID: 1
Start Date: 6/1/2013 - 00:00
End Date: 6/30/2013 - 23:00

Run ID:

Frequency Distribution
(Count)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	Total
348.75-11.25	6	11	11	2	0	0	30
11.25-33.75	1	7	10	1	0	0	19
33.75-56.25	4	6	8	0	0	0	18
56.25-78.75	2	4	5	0	0	0	11
78.75-101.25	5	5	1	0	0	0	11
101.25-123.75	5	2	2	0	0	0	9
123.75-146.25	3	13	8	0	0	0	24
146.25-168.75	5	14	41	3	0	0	63
168.75-191.25	1	31	64	6	0	0	102
191.25-213.75	8	27	25	5	0	0	65
213.75-236.25	5	12	15	0	0	0	32
236.25-258.75	10	13	3	0	0	0	26
258.75-281.25	10	12	3	0	0	0	25
281.25-303.75	12	7	1	0	0	0	20
303.75-326.25	20	177	30	0	0	0	227
326.25-348.75	20	11	6	1	0	0	38
Total	117	352	233	18	0	0	720

Frequency of Calm Winds: 0
Average Wind Speed: 3.21 m/s

Station ID: 1
Start Date: 6/1/2013 - 00:00
End Date: 6/30/2013 - 23:00

Run ID:

Frequency Distribution
(Normalized)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	Total
348.75-11.25	0.008333	0.015278	0.015278	0.002778	0.000000	0.000000	0.041667
11.25-33.75	0.001389	0.009722	0.013889	0.001389	0.000000	0.000000	0.026389
33.75-56.25	0.005556	0.008333	0.011111	0.000000	0.000000	0.000000	0.025000
56.25-78.75	0.002778	0.005556	0.006944	0.000000	0.000000	0.000000	0.015278
78.75-101.25	0.006944	0.006944	0.001389	0.000000	0.000000	0.000000	0.015278
101.25-123.75	0.006944	0.002778	0.002778	0.000000	0.000000	0.000000	0.012500
123.75-146.25	0.004167	0.018056	0.011111	0.000000	0.000000	0.000000	0.033333
146.25-168.75	0.006944	0.019444	0.056944	0.004167	0.000000	0.000000	0.087500
168.75-191.25	0.001389	0.043056	0.088889	0.008333	0.000000	0.000000	0.141667
191.25-213.75	0.011111	0.037500	0.034722	0.006944	0.000000	0.000000	0.090278
213.75-236.25	0.006944	0.016667	0.020833	0.000000	0.000000	0.000000	0.044444
236.25-258.75	0.013889	0.018056	0.004167	0.000000	0.000000	0.000000	0.036111
258.75-281.25	0.013889	0.016667	0.004167	0.000000	0.000000	0.000000	0.034722
281.25-303.75	0.016667	0.009722	0.001389	0.000000	0.000000	0.000000	0.027778
303.75-326.25	0.027778	0.245833	0.041667	0.000000	0.000000	0.000000	0.315278
326.25-348.75	0.027778	0.015278	0.008333	0.001389	0.000000	0.000000	0.052778
Total	0.162500	0.488889	0.323611	0.025000	0.000000	0.000000	1.000000

Frequency of Calm Winds: 0.00%
Average Wind Speed: 3.21 m/s

APPENDIX B

Listing of PM_{10} Concentrations

Individual Data Sheets provided on CD

Background Monitor 962A

PM_{10} Sampler Summary

April 1, 2013 - June 30, 2013

Network: Alton Coal Development, LLC
Site: Coal Hollow Mine
Sampler ID: 962A **AQS ID:**
Sampler Type: BGI FRM Single

Date	Filter ID	Concentration (µg/m3) LTP	Concentration (µg/m3) STP	Sample Period (hr:min)	Sample Volume (m3)	Std Volume (m3)	Mass (mg) Tare	Mass (mg) Gross	Mass (mg) Net	Flag	Comments
04/04/13	P0529641	**4.9**	**6.0**	24:00	24.0	19.6	144.426	144.544	0.118		
04/10/13	P0529644	**4.7**	**5.6**	23:59	24.0	20.0	145.655	145.767	0.112		
04/16/13	P0529958	**24.2**	**29.4**	1.00	24.0	19.8	145.727	146.308	0.581		
04/22/13	P0529961	**14.1**	**17.5**	1.00	24.0	19.3	145.366	145.704	0.338		
04/28/13	P0674525	**6.7**	**8.4**	24:00	24.0	19.2	141.053	141.215	0.162		
05/04/13	P0674532	**6.3**	**7.9**	23:59	24.0	19.2	140.499	140.651	0.152		
05/10/13	P0674528	**3.7**	**4.6**	23:59	24.0	19.6	142.541	142.631	0.090		
05/16/13	P0675796	**16.7**	**21.0**	23:59	24.0	19.1	140.623	141.024	0.401		
05/22/13	P0675800	**12.1**	**15.3**	23:59	24.0	19.0	136.406	136.696	0.290		
05/28/13	P0706602	**11.6**	**14.5**	23:59	24.0	19.2	141.887	142.166	0.279		
06/03/13	P0706605	**Invalid - AG**	**Invalid - AG**	37:15	37.3	29.4	140.556	141.010	0.454	SP	
06/09/13	P0707170	**6.8**	**8.7**	23:59	24.0	18.6	139.971	140.134	0.163		
06/15/13	P0707173	**10.7**	**13.6**	23:59	24.0	19.0	142.788	143.045	0.257		
06/21/13	P0707176	**14.0**	**17.7**	23:59	24.0	19.0	141.132	141.469	0.337		
06/27/13	P0707952	**6.9**	**8.9**	23:59	24.0	18.7	140.686	140.853	0.167		
04/18/13	P0529962		**Field Blank**				144.314	144.311	-0.003		
05/17/13	P0675799		**Field Blank**				139.624	139.627	0.003		

# Valid	Recovery	Average	St. Dev.	Max	Min
14	**93%**	**12.8**	**7.0**	**29.4**	**4.6**

Compliance Monitor 963B

PM_{10} Sampler Summary

April 1, 2013 - June 30, 2013

Network: Alton Coal Development, LLC
Site: Coal Hollow Mine
Sampler ID: 963B **AQS ID:**
Sampler Type: BGI FRM Single

Date	Filter ID	Concentration (µg/m3) LTP	Concentration (µg/m3) STP	Sample Period (hr:min)	Sample Volume (m3)	Std Volume (m3)	Mass (mg) Tare	Mass (mg) Gross	Mass (mg) Net	Flag	Comments
04/04/13	P0529642	**42.6**	**51.8**	24:00	24.0	19.8	145.622	146.647	1.025		
04/10/13	P0529645	**19.3**	**23.0**	23:59	24.0	20.2	145.958	146.422	0.464		
04/16/13	P0529959	**30.0**	**36.3**	23:59	24.0	19.9	144.587	145.309	0.722		
04/22/13	P0529963	**93.4**	**115.2**	23:59	24.0	19.5	145.480	147.725	2.245		
04/28/13	P0674526	**11.5**	**14.2**	24:00	24.0	19.4	138.368	138.644	0.276		
05/04/13	P0675205	**39.5**	**48.7**	23:59	24.0	19.5	139.946	140.894	0.948		
05/10/13	P0674529	**8.5**	**10.3**	23:59	24.0	19.8	142.677	142.882	0.205		
05/16/13	P0675797	**37.0**	**46.2**	23:59	24.0	19.2	140.806	141.696	0.890		
05/22/13	P0676201	**66.3**	**83.2**	23:59	24.0	19.1	142.650	144.243	1.593		Particles
05/28/13	P0706603	**21.9**	**27.3**	23:59	24.0	19.3	141.609	142.136	0.527		
06/03/13	P0706606	**39.6**	**50.0**	23:59	24.0	19.0	142.086	143.037	0.951		
06/09/13	P0707171	**8.7**	**11.1**	23:59	24.0	18.8	142.500	142.709	0.209		
06/15/13	P0707174	**56.5**	**71.0**	23:59	24.0	19.1	140.054	141.412	1.358		
06/21/13	P0707177	**55.0**	**69.1**	23:59	24.0	19.1	140.092	141.414	1.322		
06/27/13	P0707953	**52.9**	**67.2**	23:59	24.0	18.9	140.640	141.912	1.272		Smudge

# Valid	Recovery	Average	St. Dev.	Max	Min
15	**100%**	**48.3**	**29.6**	**115.2**	**10.3**

Collocated Monitor 964C

PM_{10} Sampler Summary

April 1, 2013 - June 30, 2013

Network: Alton Coal Development, LLC
Site: Coal Hollow Mine
Sampler ID: 964C **AQS ID:**
Sampler Type: BGI FRM Single

Date	Filter ID	Concentration (µg/m3) LTP	Concentration (µg/m3) STP	Sample Period (hr:min)	Sample Volume (m3)	Std Volume (m3)	Mass (mg) Tare	Mass (mg) Gross	Mass (mg) Net	Flag	Comments
04/04/13	P0529643	**76.3**	**92.1**	24:00	24.0	19.9	144.795	146.628	1.833		
04/10/13	P0529646	**19.1**	**22.6**	23:59	24.0	20.3	145.751	146.209	0.458		
04/16/13	P0529960	**14.6**	**17.6**	23:59	24.0	20.0	145.777	146.129	0.352		
04/22/13	P0529964	**104.9**	**129.0**	23:59	24.0	19.5	145.579	148.100	2.521		Particles
04/28/13	P0674527	**12.7**	**15.6**	24:00	24.0	19.5	142.693	142.997	0.304		
05/04/13	P0674531	**41.8**	**51.4**	23:59	24.0	19.5	142.708	143.713	1.005		
05/10/13	P0674530	**11.1**	**13.4**	23:59	24.0	19.9	141.291	141.558	0.267		
05/16/13	P0675798	**35.8**	**44.5**	23:59	24.0	19.3	140.685	141.545	0.860		
05/22/13	P0676202	**85.9**	**107.4**	23:59	24.0	19.2	144.224	146.287	2.063		Particles
05/28/13	P0706604	**21.5**	**26.7**	23:59	24.0	19.4	141.058	141.575	0.517		
06/03/13	P0706608	**Invalid - BJ**	**Invalid - BJ**	23:59	24.0	19.1	141.236	141.256	0.020		Not used-wrong filter
06/09/13	P0707172	**Invalid - AG**	**Invalid - AG**	11:05	11.1	8.9	141.478	141.587	0.109	SP	
06/15/13	P0707175	**Invalid - AN**	**Invalid - AN**	0:03	0.0	0.0	142.581	142.617	0.036	SP	
06/21/13	P0707178	**Invalid - AN**	**Invalid - AN**		0.0	0.0	140.597	141.120	0.523	SP	No run
06/27/13	P0707954	**Invalid - AN**	**Invalid - AN**		0.0	0.0	140.998	141.033	0.035	SP	No run
04/05/13	P0529647		**Field Blank**				144.583	144.607	0.024		
05/29/13	P0706607		**Field Blank**				141.392	141.408	0.016		

# Valid	Recovery	Average	St. Dev.	Max	Min
10	**67%**	**52.0**	**42.4**	**129.0**	**13.4**

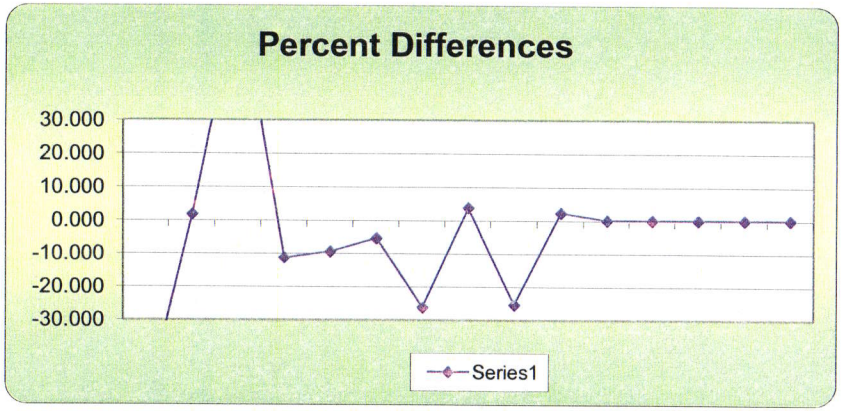
APPENDIX C

Precision and Single-Point Flow Rate Checks

Alton Coal Development, LLC - Coal Hollow Mine

Precision Estimate (From Collocated Samples)

Monitors 963B & 964C		Pollutant type:					CV_{ub} (%)		
Meas Val (Y)	**Audit Val (X)**	**d (Eqn 10)**	**25th Percentile**	**d^2**	**|d|**	**$\|d\|^2$**			
51.8	92.1	-56.011	-21.871	3137.245	56.011	3137.245			
23	22.6	1.754	**75th Percentile**	3.078	1.754	3.078	**n**	**$\Sigma\|d\|$**	**$\Sigma\|d\|^2$**
36.3	17.6	69.388	2.105	4814.661	69.388	4814.661	10	210.771	9548.293
115.2	129	-11.302		127.740	11.302	127.740	**n-1**	**Σd**	**Σd^2**
14.2	15.6	-9.396		88.284	9.396	88.284	9	-56.545	9548.293
48.7	51.4	-5.395		29.102	5.395	29.102			
10.3	13.4	-26.160		684.363	26.160	684.363			
46.2	44.5	3.749		14.05217	3.749	14.052			
83.2	107.4	-25.393		644.830	25.393	644.830	**CV (%) (Eqn 11)**		
27.3	26.7	2.222		4.938272	2.222	4.938	33.27		



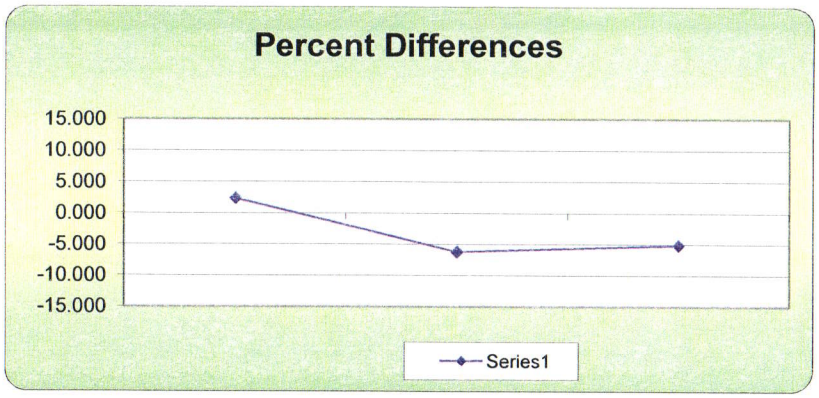
Alton Coal Development, LLC - Coal Hollow Mine

One-Point Flow Rate Bias Estimate

Site ID: Monitor 962A		Pollutant type:					Bias (%)
Meas Val (Y)	Audit Val (X)	d (Eqn. 1)	25th Percentile	d^2	$\|d\|$	$\|d\|^2$	
16.7	16.32	2.328	-5.700	5.422	2.328	5.422	
16.7	17.81	-6.232	75th Percentile	38.843	6.232	38.843	
16.7	17.61	-5.168	-1.420	26.703	5.168	26.703	

n	$\Sigma\|d\|$	"AB" (Eqn 4)
3	13.728	4.576
n-1	$\Sigma\|d\|^2$	"AS" (Eqn 5)
2	70.968	2.018

Bias (%) (Eqn 3)	Both Signs Positive
7.98	FALSE
Signed Bias (%)	Both Signs Negative
-7.98	TRUE



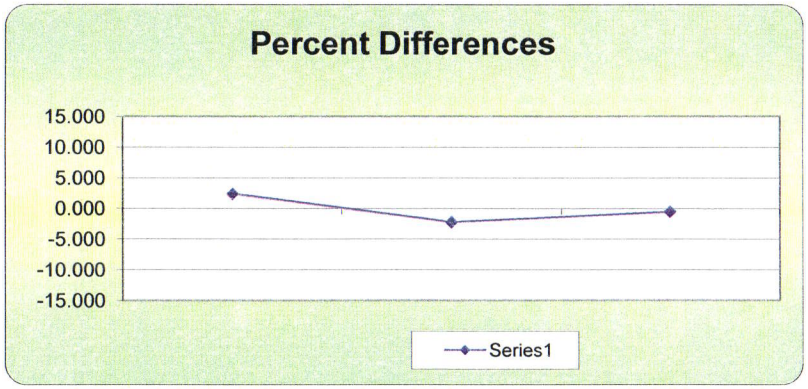
Alton Coal Development, LLC - Coal Hollow Mine

One-Point Flow Rate Bias Estimate

Site ID: Monitor 963B		Pollutant type:					Bias (%)
Meas Val (Y)	**Audit Val (X)**	**d (Eqn. 1)**	**25th Percentile**	**d^2**	**|d|**	**$\|d\|^2$**	
16.7	16.31	2.391	-1.439	5.718	2.391	5.718	
16.7	17.09	-2.282	**75th Percentile**	5.208	2.282	5.208	
16.7	16.8	-0.595	0.898	0.354	0.595	0.354	

n	$\Sigma\|d\|$	**"AB" (Eqn 4)**
3	5.268	1.756
n-1	$\Sigma\|d\|^2$	**"AS" (Eqn 5)**
2	11.280	1.007

Bias (%) (Eqn 3)	Both Signs Positive
3.45	FALSE
Signed Bias (%)	Both Signs Negative
+/-3.45	FALSE



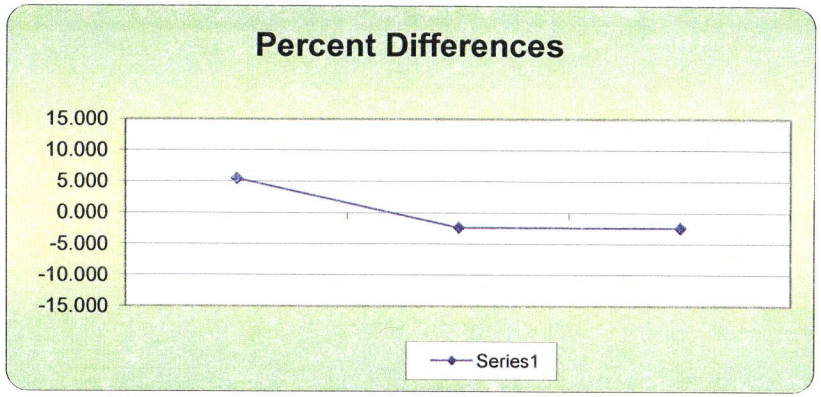
Alton Coal Development, LLC - Coal Hollow Mine

One-Point Flow Rate Bias Estimate

Site ID: Monitor 964C		Pollutant type:					Bias (%)
Meas Val (Y)	Audit Val (X)	d (Eqn. 1)	25th Percentile	d^2	$\|d\|$	$\|d\|^2$	
16.65	15.79	5.446	-2.425	29.664	5.446	29.664	
16.7	17.11	-2.396	75th Percentile	5.742	2.396	5.742	
16.7	17.12	-2.453	1.525	6.019	2.453	6.019	

n	$\Sigma\|d\|$	"AB" (Eqn 4)
3	10.296	3.432
n-1	$\Sigma\|d\|^2$	"AS" (Eqn 5)
2	41.425	1.745

Bias (%) (Eqn 3)	Both Signs Positive
6.37	FALSE
Signed Bias (%)	Both Signs Negative
+/-6.37	FALSE



APPENDIX D

Field Data Sheets

Background Monitor 962A

Table I - Every 6th Day Sampling

Date	Time	Displayed Date	Displayed Time	Collected Filter ID#	New Filter ID#	Sample Start Time	Sample Start Date	Sampler Initials	
04-05-13	1043	04-05-13	1043	8	12	M-M	04-10-13	JKSR/KN	
04-12-13	0919	04-12-13	0919	12	4	M-M	04-16-13	JKSR/KN	
04-18-13	1500	04-18-13	1500	4	7	M-M	04-22-13	JKSR/KN	
04-18-13	1502	04-18-13	1502	10	—	Blank	—	JKSR/KN	
04-23-13	1041	04-23-13	1041	7	9	M-M	04-28-13	JKSR/KN	
04-29-13	0954	04-29-13	0954	9	IML 8	M-M	05-04-13	JKSR/KN	
05-06-13	0927	05-06-13	0927	IML 8	16	M-M	05-10-13	JKSR	
05-13-13	1014	05-13-13	1014	16	4	M-M	05-16-13	JKSR/KN	
05-17-13	13:16	05-17-13	13:14	4	10	Blank	05-17-13	KN	
05-17-13	13:18	05-17-13	13:16	10	12	M-M	05-22-13	KN	
05-23-13	1049	05-23-13	1049	12	7	M-M	05-28-13	KN/JKSR	
05-29-13	10:51am	05-29-13	10:49am	7	13	M-M	06-03-13	KN	over rain time start & stop same
06-04-13	13:23	06-04-13	13:21	13	4	M-M	06-09-13	KN	
06-11-13	0936	06-11-13	0936	4	8	M-M	06-15-13	JKSR	
06-17-13	1123	06-17-13	1123	8	17	M-M	06-21-13	JKSR	
06-24-13	12:25	06-24-13	12:23	17	7	M-M	06-27-13	KN	
06-28-13	1029	06-28-13	1029	7	12	M-M	07-03-13	JKSR/KN	
07-6-13	9:19am	07-6-13	9:17am	12	IML4	9:18	07-06-13	KN	Field Blank
07-6-13	9:23am	07-6-13	9:21am	IML4	5	M-M	07-09-13	KN	
07-10-13	9:08	07-10-13	9:08am	5	14	M-M	07-15-13	JKSR	

Table II - Monthly Leak Test

Date	Time	Initial SP Value	Final SP Value	Pass/Fail	Initials	Maintenance
4-24-13	13:47	98	98	Pass	KN	Cleaned Venturi, down tube etc
5-29-13	10:58am	98	97	Pass	KN	Cleaned + lubed seals
6-28-13	14:01	98	98	Pass	KN	Cleaned + lubed seals

Table III - Monthly Flow Rate Verification

Date	Time	Monitor Flow (Q Lpm)	Monitor Baro Pressure (mmHg)	Delta Cal Baro Pressure (mmHg)	Monitor Temp (A)	Delta Cal Temp (Ta)	Delta Cal Flow (Qs)	Delta Cal Flow (Qa)	Accuracy	Initials
1-24-13	13:51	16.70	584	586	14.4	14.6	13.02	16.32		KN
5-29-13	11:02am	16.70	580	583	13.3	13.3	14.25	17.81		KN
6-28-13	14:03pm	16.76	588	591	23.0	23.2	17.71	17.61		KN

Compliance Monitor 963B

Table I - Every 6th Day Sampling

Date	Time	Displayed Date	Displayed Time	Collected Filter ID#	New Filter ID#	Sample Start Time	Sample Start Date	Sampler Initials	
04-05-13	1104	04-05-13	1104	9	19	M-M	04-10-13	JKSR/KN	
04-12-13	0939	04-12-13	0939	19	5	M-M	04-16-13	JKSR/KN	
04-18-13	1518	04-18-13	1518	5	13	M-M	04-22-13	JKSR/KN	
04-23-13	1059	04-23-13	1059	13	11	M-M	04-28-13	JKSR/KN	
04-29-13	1157	04-29-13	1157	11	8	M-M	05-04-13	JKSR/KN	
05-06-13	10:10	05-06-13	10:10	8	17	M-M	05-10-13	JKSR	
05-13-13	1030	05-13-13	1030	17	5	M-M	05-16-13	JKSR/KN	
5-17-13	13:44	05-17-13	13:42	5	19	M-M	05-22-13	KN	
05-23-13	11:11	05-23-13	11:11	19	9	M-M	05-28-13	JKSR/KN	
05-29-13	11:34	05-29-13	11:32	9	14	M-M	06-03-13	KN	
06-04-13	13:54	06-04-13	13:53	14	5	M-M	06-09-13	KN	
06-11-13	0959	06-11-13	0959	5	10	M-M	06-15-13	JKSR	
06-17-13	1148	06-17-13	1148	10	18	M-M	06-21-13	JKSR	
06-24-13	12:52	06-24-13	12:51	18	9	M-M	06-27-13	KN	
06-28-13	1046	06-28-13	1046	9	15	M-M	07-03-13	JKSR/KN	
07-06-13	9:45am	07-06-13	9:44am	15	4	9:44	07-06-13	KN	Field Blank
07-06-13	9:49am	07-06-13	9:47am	4	6	M-M	07-09-13	KN	
07-10-13	9:30am	07-10-13	9:30am	6	IMC1	M-M	07-15-13	JKSR	- filter chamber open

Table II - Monthly Leak Test

Date	Time	Initial SP Value	Final SP Value	Pass/Fail	Initials	Maintenance
4-24-13	14:25	97	96	Pass	KN	cleaned down tube, venturi
5-29-13	11:40	99	98	Pass	KN	Cleaned, greased seals
6-28-13	10:40	95	94	Pass	KN	Cleaned, greased seals

Table III - Monthly Flow Rate Verification

Date	Time	Monitor Flow (Q Lpm)	Monitor Baro Pressure (mmHg)	Delta Cal Baro Pressure (mmHg)	Monitor Temp (A)	Delta Cal Temp (Ta)	Delta Cal Flow (Qs)	Delta Cal Flow (Qa)	Accuracy	Initials
4-24-13	14:49	16.70	590	592	15.8	16.2	13.07	16.31		KN
5-29-13	11:50am	16.70	586	588	14.8	14.8	13.07	17.09		KN
6-28-13	10:43	16.70	594	596	22.8	22.9	12.85	16.80		KN

Co-located Monitor 964C

Table I - Every 6th Day Sampling

Date	Time	Displayed Date	Displayed Time	Collected Filter ID#	New Filter ID#	Sample Start Time	Sample Start Date	Sampler Initials	
04-05-13	1102	04-05-13	1102	11	IML 1	M-M	04-10-13	JKSR/KN	
04-12-13	0941	04-12-13	0941	IML 1	6	M-M	04-16-13	JKSR/KN	
04-18-13	1520	04-18-13	1520	6	14	M-M	04-22-13	JKSR/KN	
04-23-13	1104	04-23-13	1104	14	15	M-M	04-28-13	JKSR/KN	
04-29-13	1159	04-29-13	1159	15	20	M-M	05-04-13	JKSR/KN	
05-06-13	1014	05-06-13	1014	20	18	M-M	05-10-13	JKSR	
05-13-13	1034	05-13-13	1034	18	6	M-M	05-16-13	JKSR/KN	
05-17-13	13:48	05-13-13	13:47	6	IML4	M-M	05-22-13	KN	
05-23-13	1113	05-23-13	1113	IML 4	11	M-M	05-28-13	JKSR/KN	Field Blank
5-29-13	11:54	5-29-13	11:53	11	~~IML~~ 15	11:54	5-29-13	KN	
5-29-13	11:58	5-29-13	11:57	15	IML 1	M-M	6-3-13	KN	IML 1 was not put in Blank cuss still in crack
06-04-13	13:59	06-04-13	13:58	IML 1	6	M-M	6-9-13	KN	
06-11-13	~~0935~~ 1001	06-11-13	~~0935~~ 1001	6	16	M-M	06-15-13	JKSR	
06-17-13	1142	06-17-13	1142	16	20	M-M	06-21-13	JKSR	— Run stoped 3 min
06-26-13	15:40	06-26-13	1540	20	11	M-M	06-27-13	KN	Did Not Run
06-28-13	1049	06-28-13	1049	11	19	M-M	07-03-13	JKSR/KN	
07-06-13	9:52am	07-06-13	9:51	19	13	M-M	07-09-13	KN	
07-10-13	9:36 am	07-10-13	9:36 am	13	IML5	M-M	07-15-13	JKSR	- says script is out of range

Table II - Monthly Leak Test

Date	Time	Initial SP Value	Final SP Value	Pass/Fail	Initials	Maintenance
4-24-13	15:16	105	104	Pass	KN	cleaned down tube, ventari
5-29-13	12:00	106	106	Pass	KN	Cleaned, grease Seals
6-28-13	13:08	95	95	Pass	KN	Cleaned, grease Seals

Table III - Monthly Flow Rate Verification

Date	Time	Monitor Flow (Q Lpm)	Monitor Baro Pressure (mmHg)	Delta Cal Baro Pressure (mmHg)	Monitor Temp (A)	Delta Cal Temp (Ta)	Delta Cal Flow (Qs)	Delta Cal Flow (Qa)	Accuracy	Initials
4-24-13	15:18	16.65	593	592	16.0	16.0	12.86	15.79		KN
5-29-13	12:14	16.70	589	588.5	17.1	17.2	13.59	17.11		KN
6-28-13	13:10	16.70	597	596.0	32.7	33.0	13.06	17.12		
										KN

Run 6 min droped to 16.40

APPENDIX E

Independent PM_{10} Sampler Performance Audit Report

AUDIT REPORT FOR

ALTON COAL DEVELOPMENT MONITORING PROJECT
ALTON, UTAH

SECOND QUARTER 2013

Prepared by

AIR RESOURCE SPECIALISTS, INC.
1901 Sharp Point Drive, Suite E
Fort Collins, Colorado 80525
Telephone: 970-484-7941
Fax: 970-484-3423

April 24, 2013

TABLE OF CONTENTS

Section		Page
1.0	**AUDIT SUMMARY**	**1-1**
2.0	**AUDIT METHODS**	**2-1**
	2.1 Particulate Samplers	2-1
	2.2 Meteorological Parameters	2-1
3.0	**AUDIT EQUIPMENT**	**3-1**
4.0	**AUDIT RESULTS**	**4-1**
	4.1 Audit Findings	4-1
APPENDIX A	Audit Data Sheets	A-1
APPENDIX B	Audit Standards Certifications	B-1

LIST OF TABLES

Table		Page
1-1	Summary of Air Quality Audit Results	1-1
2-1	FRM $PM_{2.5}$ Particulate Samplers, Audit Methods and Acceptance Criteria	2-1
2-2	Meteorological Sensors, Audit Ranges and Acceptance Criteria	2-2
3-1	Audit Equipment	3-1
4-1	Summary of Audit Findings, Background FRM Sampler Alton Coal Development, Alton, Utah, April 3, 2013	4-1
4-2	Summary of Audit Findings, East Collocated FRM Sampler Alton Coal Development, Alton, Utah, April 3, 2013	4-2
4-3	Summary of Audit Findings, West Collocated FRM Sampler Alton Coal Development, Alton, Utah, April 3, 2013	4-2

1.0 AUDIT SUMMARY

Alton Coal Development is operating three Federal Reference Method (FRM) PM_{10} particulate samplers and a meteorological station at the Coal Hollow Mine near Alton, Utah. Air Resources Specialists, Inc. (ARS) conducted a performance audit of the monitoring systems on April 3, 2013. Guidance from the following EPA documents was used to establish the audit procedures:

- 40 CFR 58, Appendix A. *Quality Assurance Requirements for SLAMS, SPMs, and PSD Air Monitoring*

- EPA *Quality Assurance Handbook for Air Pollution Measurement Systems:*
  - *Volume I. A Field Guide to Environmental Quality Assurance*
  - *Volume II. Ambient Air Quality Monitoring Program*

At the time of the audit, all three FRM particulate samplers were functional and were found to be operating within EPA and project accuracy goals. The meteorological parameters were not audited during this visit. Air quality audit results are summarized by parameter in Table 1-1.

Table 1-1

Summary of Air Quality Audit Results

Parameter	Manufacturer/Instrument	Within Accuracy Goal
Particulate Sampler		
PM_{10}	BGI PQ200 – Background	Yes
PM_{10}	BGI PQ200 – East Collocated	Yes
PM_{10}	BGI PQ200 – West Collocated	Yes
Meteorological Equipment		
Wind Speed/Direction	Met One 034B	Not Audited
Temperature	Campbell Scientific CS	Not Audited
Precipitation	Hydrological Services TB4	Not Audited

Details of the audit are presented in the following sections:

Section 2.0	Audit Methods
Section 3.0	Audit Equipment
Section 4.0	Audit Results
Appendix A	Audit Data Sheets
Appendix B	Audit Standards Certifications

Any questions related to this audit or audit report should be addressed to:

Mike Slate
Air Resource Specialists, Inc.
1901 Sharp Point Drive, Suite E
Fort Collins, Colorado 80525
Telephone: 970-484-7941
Fax: 970-484-3423
E-mail: mslate@air-resource.com

2.0 AUDIT METHODS

Audit procedures, audit challenge ranges, and acceptance criteria are described below. These ranges and limits exceed or conform to the Alton Coal Quality Assurance Project Plan prepared by JBR. Audit results were verbally communicated to the Alton Coal Development Environmental Manager prior to departure from the site. Audit data forms are provided in Appendix A.

2.1 PARTICULATE SAMPLERS

Three volumetric flow FRM PM_{10} particulate samplers were audited. ARS audited the sampler with a BGI deltaCal instrument which measures flow, ambient temperature, and barometric pressure. After conducting the flow audit, a system leak check was performed. During a leak check, the Model PQ200 FRM sampler will not measure flow rate; therefore, a change in vacuum over a two-minute period is used to identify a leak. The instrument manufacturer states in the operation manual that a measurement of $\geq$5 cm of water in a two-minute period is considered a leak. This value will be used to identify if a leak is present. The observed volumetric operational flow and design flow of the sampler were compared to the audit flows measured by the ARS deltaCal. Differences between the operational sampler flow and audit flow that are greater than ±4% are considered out of tolerance. Differences between the designated design flow and the audit flow greater than ±5% are considered out of tolerance as indicated in 40 CFR Part 58 Appendix A. In addition to the flow audits, the FRM's observed ambient temperature and barometric pressure sensors were also audited by comparison to the BIOS values. A temperature difference greater than ±2.0°C and a barometric pressure difference greater than ±10mm Hg are considered out of tolerance. Audit methods and acceptable criteria for the particulate samplers are summarized in Table 2-1.

Table 2-1

FRM PM_{10} Particulate Samplers
Audit Methods and Acceptance Criteria

Parameter	Audit Method	Acceptance Criteria
Leak Check	Change in vacuum of closed inlet in 2 minutes	< 5 cm H_2O in 2 min*
Actual Volumetric Sampler Flow	deltaCal audit flow to actual sampler flow (volumetric)	$\leq$ ±4%
Designated Design Flow	Designated design flow to audit flow (volumetric)	$\leq$ ±5%
Ambient Temperature (°C)	Audit temperature to sampler temperature	$\leq$ ±2°C
Barometric Pressure (mm Hg)	Audit barometric pressure to sampler pressure	$\leq$ ±10mm Hg

*As suggested by the manufacturer.

2.2 METEOROLOGICAL PARAMETERS

Meteorological measurement systems are audited in accordance with the EPA's *Quality Assurance Handbook for Air Pollution Measurement Systems: Volume IV – Meteorological Measurements*, (March 2008). Accuracy goals for the meteorological parameters are obtained from the EPA's *On-Site Meteorological Program Guidance for Regulatory Modeling Applications*. ARS uses National Institute of Standards and Technologies (NIST)-traceable test equipment for all meteorological parameters. Audit ranges and acceptable criteria for each parameter are summarized in Table 2-2. Meteorological audit procedures follow.

Table 2-2

Meteorological Sensors
Audit Ranges and Acceptance Criteria

Sensor	Parameter	Audit Challenge Ranges	Acceptance Criteria
Wind Speed (Horizontal)	• Speed Accuracy	Three RPM Values	0.447 mph + 5% of Observed
	• Starting Threshold	Starting Torque	≤0.2 gm-cm (horizontal) ≤2.0 gm-cm (vertical)
Wind Direction	• Orientation Accuracy	To and From Two Landmarks	±5° in Any Direction
	• Response Threshold	Starting Torque	≤7.0 gm-cm
Temperature and	• Accuracy and Linearity	Three Temperature Baths: 0°C, Near Ambient, and Near Full-Scale	Temperature ±0.5°C
Precipitation	• Accuracy	Compared to Three Known Amounts of Introduced Water	±10% of Observed
	• Tip Response	Manual Tips	One contact closure per tip

Wind Speed - Dynamic tests of the horizontal wind speed sensors are performed using an R.M. Young model 18802 pulsed motor wind speed calibrator. Each sensor is tested at zero plus three shaft revolution speeds (300, 600, and 900 rpm). The equivalent wind speed is calculated corresponding to the manufacturer's specified values for shaft rpm versus wind velocity and compared to readings obtained from the on-site datalogger and backup strip chart recorder.

Wind Direction - Wind direction sensor audits include the verification of sensor orientation, linearity, and bearing integrity. ARS establishes two reference landmarks separated by approximately 90°. Accuracy of the landmarks was verified by use of a Brunton compass mounted on a tripod and knowledge of the site location in terms of latitude and longitude. A computer program is used to establish the declination of the site. Once the compass was oriented based on the magnetic declination, wind direction references are established. The sensor orientation is checked by aligning the direction vane to and from each landmark reference.

Potentiometer linearity is tested by verifying the accuracy of the measured wind direction towards and away from the two designated landmarks. If the checks are within ±5 degree accuracy, the linearity is also valid.

Temperature - The temperature sensor is audited by immersion in three temperature baths with NIST-traceable thermometers. The temperature tests are performed at 0°C, ambient (approximately 20°C), and as near to full-scale as possible. Bath temperature readings obtained with the NIST-traceable thermometer are compared to the on-site datalogger output.

Precipitation - The tipping bucket precipitation gauge is audited by using a volumetric precipitation gauge calibrator and transferring a known amount of water through the gauge orifice at a rate equivalent to 2.0 inches/hour of precipitation. The tip response of the on-site datalogger is verified, and the total datalogger values are compared to the actual introduced volumes.

3.0 AUDIT EQUIPMENT

All audit equipment and reference standards were in current calibration and traceable to the NIST or other authoritative references. Table 3-1 lists the specific audit equipment used and its required recertification dates. Copies of standards certifications for the equipment used in the audit are provided in Appendix C.

Table 3-1

Audit Equipment

References	Manufacturer	Model	Serial Number	Expiration Date
FRM Audit	BGI	deltaCal	1236	1/30/2014

4.0 AUDIT RESULTS

Alton Coal Development monitoring system audit results for the particulate samplers are shown in Tables 4-1 through 4-3; meteorological results (when applicable) are presented in Table 4-4. Audit findings and recommendations are discussed below.

4.1 AUDIT FINDINGS

Performance Audit Results

- Three PM_{10} samplers were audited and all were found to be operating within project accuracy goals.

System Audit Results

- The on-site flow reference, deltaCal SN 957, should be sent to the manufacturer for recertification. No other system problems were found.

Table 4-1
Summary of Audit Findings
Background FRM Sampler
Alton Coal Development
Alton, Utah
April 3, 2013

Parameter	Manufacturer	Instrument Serial No.	Designated Audit Value	Sampler Observed	Accuracy Goal (±)	Difference	Within Accuracy Goal
FRM PM_{10}	**BGI**	**PQ200S-N962A**					
Leak Check External			102.0	101.0	15.0	-1.0	**Y**
Flow (Volumetric)			17.13	16.7	5.0	-2.5	**Y**
Flow (Design)			17.13	16.7	4.0	2.5	**Y**
Ambient Temperature			12.3	12.9	2.0	0.6	**Y**
Filter Temperature			13.3	13.7	2.0	0.4	**Y**
Ambient Pressure			588.5	586.0	10.0	-2.5	**Y**

* PM_{10} measurement quality objectives were taken from CFR Part 58 Appendix A Section 10.2.

* Leak check accuracy goals are based on < 5 cm vacuum drop in two minutes, as suggested by the manufacturer.

Table 4-2
Summary of Audit Findings
East Collocated FRM Sampler
Alton Coal Development
Alton, Utah
April 3, 2013

Parameter	Manufacturer	Instrument Serial No.	Designated Audit Value	Sampler Observed	Accuracy Goal (±)	Difference	Within Accuracy Goal
FRM PM_{10}	**BGI**	**PQ200S-N964C**					
Leak Check External			104.0	104.0	15.0	0.0	**Y**
Flow (Volumetric)			16.78	16.7	5.0	-0.5	**Y**
Flow (Design)			16.78	16.7	4.0	0.7	**Y**
Ambient Temperature			13.5	13.2	2.0	-0.3	**Y**
Filter Temperature			15.6	15.4	2.0	-0.2	**Y**
Ambient Pressure			594.5	595	10.0	0.5	**Y**

* PM_{10} measurement quality objectives were taken from CFR Part 58 Appendix A Section 10.2.

* Leak check accuracy goals are based on < 5 cm vacuum drop in two minutes, as suggested by the manufacturer.

Table 4-3
Summary of Audit Findings
West Collocated FRM Sampler
Alton Coal Development
Alton, Utah
April 3, 2013

Parameter	Manufacturer	Instrument Serial No.	Designated Audit Value	Sampler Observed	Accuracy Goal (±)	Difference	Within Accuracy Goal
FRM PM_{10}	**BGI**	**PQ200S-N963B**					
Leak Check External			96.0	96.0	15.0	0.0	**Y**
Flow (Volumetric)			17.14	16.2	5.0	-2.6	**Y**
Flow (Design)			17.14	16.7	4.0	2.8	**Y**
Ambient Temperature			13.6	13.6	2.0	0	**Y**
Filter Temperature			14.8	15.1	2.0	0.3	**Y**
Ambient Pressure			594.5	593.0	10.0	-1.5	**Y**

* PM_{10} measurement quality objectives were taken from CFR Part 58 Appendix A Section 10.2.

* Leak check accuracy goals are based on < 5 cm vacuum drop in two minutes, as suggested by the manufacturer.

APPENDIX A

Audit Data Sheets

Air Resource Specialists, Inc.

FRM AUDIT (PM_{10})

ABBR.	ALTO	CLIENT	Alton Coal	FIELD SPECIALIST	M. Slate	DATE	4/3/2013
SITE NAME		Background Site					
Network type		PSD					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
Flow Reference 2	BGI	DeltaCal	1236	1/30/2014
Temperature Reference 2	BGI	DeltaCal	1236	1/30/2014
Barometric Pressure Reference 2	BGI	DeltaCal	1236	1/30/2014

MANUFACTURER	BGI
MODEL	PQ-200S
SERIAL NUMBER	N962A

Date and Time correct?
☑ Yes ☐ No
If no, time off by:
0 min

SETTINGS	
Total Flow	16.67

Automated LEAK CHECK		
	Vacuum Loss Rate	Pass/Fail
	1 cm over 2 minutes	PASS

FLOW VERIFICATION					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	17.13	16.70	-2.5%	2.8%	PASS

AUDIT CRITERIA (<=)	
Actual Flow % Diff	10%
Design Flow % Diff	10%

AMBIENT TEMPERATURE SENSOR (°C)				
	Reference	Instrument	Difference	
	12.3	12.9	0.6	PASS

AUDIT CRITERIA (<=)	
Temperature Difference (°C)	2

FILTER TEMPERATURE SENSOR (°C)				
	Reference	Instrument	Difference	
	13.3	13.7	0.4	PASS

AUDIT CRITERIA (<=)	
Temperature Difference (°C)	2

PRESSURE SENSOR (mmHg)				
	Reference	Instrument	Difference	
	588.5	586.0	-2.5	PASS

AUDIT CRITERIA (<=)	
Pressure Difference (mmHg)	10

NOTES:

Air Resource Specialists, Inc.

FRM AUDIT (PM_{10})

ABBR.	ALTO	CLIENT	Alton Coal	FIELD SPECIALIST	M. Slate	DATE	4/3/2013
SITE NAME		East Collocated					
Network type		PSD					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
Flow Reference 2	BGI	DeltaCal	1236	1/30/2014
Temperature Reference 2	BGI	DeltaCal	1236	1/30/2014
Barometric Pressure Reference 2	BGI	DeltaCal	1236	1/30/2014

MANUFACTURER	BGI
MODEL	PQ-200S
SERIAL NUMBER	N964C

Date and Time correct?
☑ Yes ☐ No
If no, time off by:
0 min

SETTINGS	
Total Flow	16.67

Automated LEAK CHECK		
	Vacuum Loss Rate	Pass/Fail
	<1 cm over 2 minutes	PASS

FLOW VERIFICATION					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	16.78	16.70	-0.5%	0.7%	PASS

AUDIT CRITERIA (<=)	
Actual Flow % Diff	10%
Design Flow % Diff	10%

AMBIENT TEMPERATURE SENSOR (°C)				
	Reference	Instrument	Difference	
	13.5	13.2	-0.3	PASS

AUDIT CRITERIA (<=)	
Temperature Difference (°C)	2

FILTER TEMPERATURE SENSOR (°C)				
	Reference	Instrument	Difference	
	15.6	15.4	-0.2	PASS

AUDIT CRITERIA (<=)	
Temperature Difference (°C)	2

PRESSURE SENSOR (mmHg)				
	Reference	Instrument	Difference	
	594.5	595.0	0.5	PASS

AUDIT CRITERIA (<=)	
Pressure Difference (mmHg)	10

NOTES:

Air Resource Specialists, Inc.

FRM AUDIT (PM_{10})

ABBR.	ALTO	CLIENT	Alton Coal	FIELD SPECIALIST	M. Slate	DATE	4/3/2013
SITE NAME		West Collocated					
Network type		PSD					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
Flow Reference 2	BGI	DeltaCal	1236	1/30/2014
Temperature Reference 2	BGI	DeltaCal	1236	1/30/2014
Barometric Pressure Reference 2	BGI	DeltaCal	1236	1/30/2014

MANUFACTURER	BGI
MODEL	PQ-200S
SERIAL NUMBER	N963B

Date and Time correct?
☑ Yes ☐ No
If no, time off by:
0 min

SETTINGS	
Total Flow	16.67

	Automated LEAK CHECK	
	Vacuum Loss Rate	Pass/Fail
	<1 cm over 2 minutes	PASS

	FLOW VERIFICATION				
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	17.14	16.70	-2.6%	2.8%	PASS

AUDIT CRITERIA (<=)	
Actual Flow % Diff	10%
Design Flow % Diff	10%

	AMBIENT TEMPERATURE SENSOR (°C)			
	Reference	Instrument	Difference	
	13.6	13.6	0.0	PASS

AUDIT CRITERIA (<=)	
Temperature Difference (°C)	2

	FILTER TEMPERATURE SENSOR (°C)			
	Reference	Instrument	Difference	
	14.8	15.1	0.3	PASS

AUDIT CRITERIA (<=)	
Temperature Difference (°C)	2

	PRESSURE SENSOR (mmHg)			
	Reference	Instrument	Difference	
	594.5	593.0	-1.5	PASS

AUDIT CRITERIA (<=)	
Pressure Difference (mmHg)	10

NOTES:

Air Resource Specialists, Inc.

CALIBRATION AND VERIFICATION STANDARDS

ABBR.	ALTO	CLIENT	Alton Coal	AUDITOR	M. Slate	DATE	4/3/2013
SITE NAME		Background Site					
Network type		PSD					

	MANUFACTURER	MODEL	SERIAL #	Calibration Expiration Date
Ozone Transfer Standard				
Gas Dilution Transfer Standard				
MFC High Flow Reference				
MFC Low Flow Reference				
Temperature Reference				
AT/RH Sensor Reference				
Barometric Pressure Reference				
Wind Speed Reference				
Wind Speed Torque Gauge				
Wind Direction Alignment Reference				
Wind Direction Linearity Reference				
Wind Direction Torque Gauge				
Solar Radiation Reference Multiplier ___ W/m2 / mV				
UV Radiation Reference Multiplier ___ W/m2 / mV				
Precipitation Reference Volume ___ mL				
PM Flow Reference				
PM Temperature Reference				
PM Barometric Pressure Reference				
TEOM MTC Verification Reference				
Voltage Measurement Reference				
Voltage Source				
PM Flow Reference 2	BGI	DeltaCal	1236	1/30/2014
PM Temperature Reference 2	BGI	DeltaCal	1236	1/30/2014
PM Barometric Pressure Reference 2	BGI	DeltaCal	1236	1/30/2014

Air Resource Specialists, Inc.

SITE INFORMATION

ABBR.	ALTO	CLIENT	Alton Coal	AUDITOR	M. Slate	DATE	4/3/2013
SITE NAME		Background Site					
NETWORK TYPE		PSD					

		Deg	Min	Sec		Decimal
LATITUDE	North	37	24	20.86	--CALCULATE->	37.4058
LONGITUDE	West	112	26	1.02		112.4336

Decimal		Deg	Min	Sec
	--CALCULATE->			

	Meters		Feet
ELEVATION		--CALCULATE->	

Feet		Meters
7158	--CALCULATE->	2182

SITE STANDARDS	Please verify site standards used by the site operator			
PM Flow Reference	BGI	DeltaCal	957	3/15/2012

NOTES:

APPENDIX B

Audit Standards Certifications

BGI INCORPORATED 58 GUINAN STREET WALTHAM, MA 02451
NIST Traceable Calibration Facility, ISO 9001:2008 Registered

deltaCal

CERTIFICATE OF CALIBRATION - NIST TRACEBILITY

(Refer to instruction manual for further details of calibration)

deltaCal Serial Number: 001236 DATE: 2-Jan-13

Calibration Operator: YI TIAN

Critical Venturi Flow Meter: Max Uncertainty = 0.346%
Serial Number: 1A *CEESI NVLAP NIST Data File 07BGI-0001*
Serial Number: 2A *CEESI NVLAP NIST Data File 07BGI-0003*
Serial Number: 3A *CEESI NVLAP NIST Data File 07BGI-0004*
Serial Number: 4A *CEESI NVLAP NIST Data File 07BGI-0002*

Room Temperature : Uncertainty = 0.071% Room Temperature: 21.1 C
Brand: *Accu-Safe* Serial Number: 254881
NIST Traceability No. 516837
deltaCal:
Ambient Temperature (set): 21.1 C
Aux (filter) Temperature (set): 21.1 C

Barometric Pressure and Absolute Pressure
Vaisala Model PTB330(50-1100) Digital Accuracy: 0.03371%
S/N DH0850001
NIST Traceable (Princo Primary Standard Model 453 S/N W12537) Certificate No. P-7485
deltaCal:
Barometric Pressure (set): 758.5 mm of Hg

Results of Venturi Calibration

Flow Rate (Q) vs. Pressure Drop (ΔP). Where: Q=Lpm, ΔP= Cm of H_2O

Q= 3.87048 ΔP ^ 0.52398

Overall Uncertainty: 0.35%

Date Placed In Service 1/30/13 SH
(To be filled in by operator upon receipt)

Recommended Recalibration Date 1/30/13 SH
(12 months from date placed in service)

Revised: March 2012

To Check a deltaCal 2-Jan-13 YT

1.5-19.5 Ver 3.7

mm of Hg 758.45

Maximum allowable error at any flow rate is .75%. Room Temp= 21.1 C

Serial No. 1236

Venturi	Reading Abs. P Crit. Vent. mm of Hg	Crit. Vent. Temp	Q 720/20 Flow Lpm	QA Flow Lpm	QA Delta Cal indicated	**% Error**	Set Point
# 5	75.4	20.80	2.30	2.32	2.31	**-0.23**	81
	157.5	20.80	5.04	5.07	5.05	**-0.47**	42
	343.7	20.80	11.26	11.33	11.26	**-0.59**	68
	505.3	20.80	16.66	16.75	16.76	**0.04**	45
	572.4	20.80	18.90	19.01	19.06	**0.28**	37
					Average %	**-0.19**	