



Alton Coal Development, LLC

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January 15, 2013

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

UTAH DEPARTMENT OF
ENVIRONMENTAL QUALITY

DIVISION OF AIR QUALITY

RE: 4th QT 2012 Report - Coal Hollow Mine
Project ID: N14047-0002

Dear Mr. Black,

Please find enclosed the Summary of PM₁₀ Data Collected at the Coal Hollow Mine, Utah during the Fourth Quarter, 2012 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 PM₁₀ Data

**Collected at Coal Hollow Mine, Utah
During the Fourth Quarter, 2012**

Submitted to:

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

Prepared by:

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Cedar City, Utah 84721
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435.867.5331

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Independent PM₁₀ Sampler Performance Audit Report

1.0 INTRODUCTION

This report summarizes measurements of Particulate Matter less than 10 microns nominal aerodynamic diameter (PM₁₀) 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 PM₁₀ is a condition of the mines operating permit.

PM₁₀ monitoring at the site consists of three BGI PQ200 PM₁₀ 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:

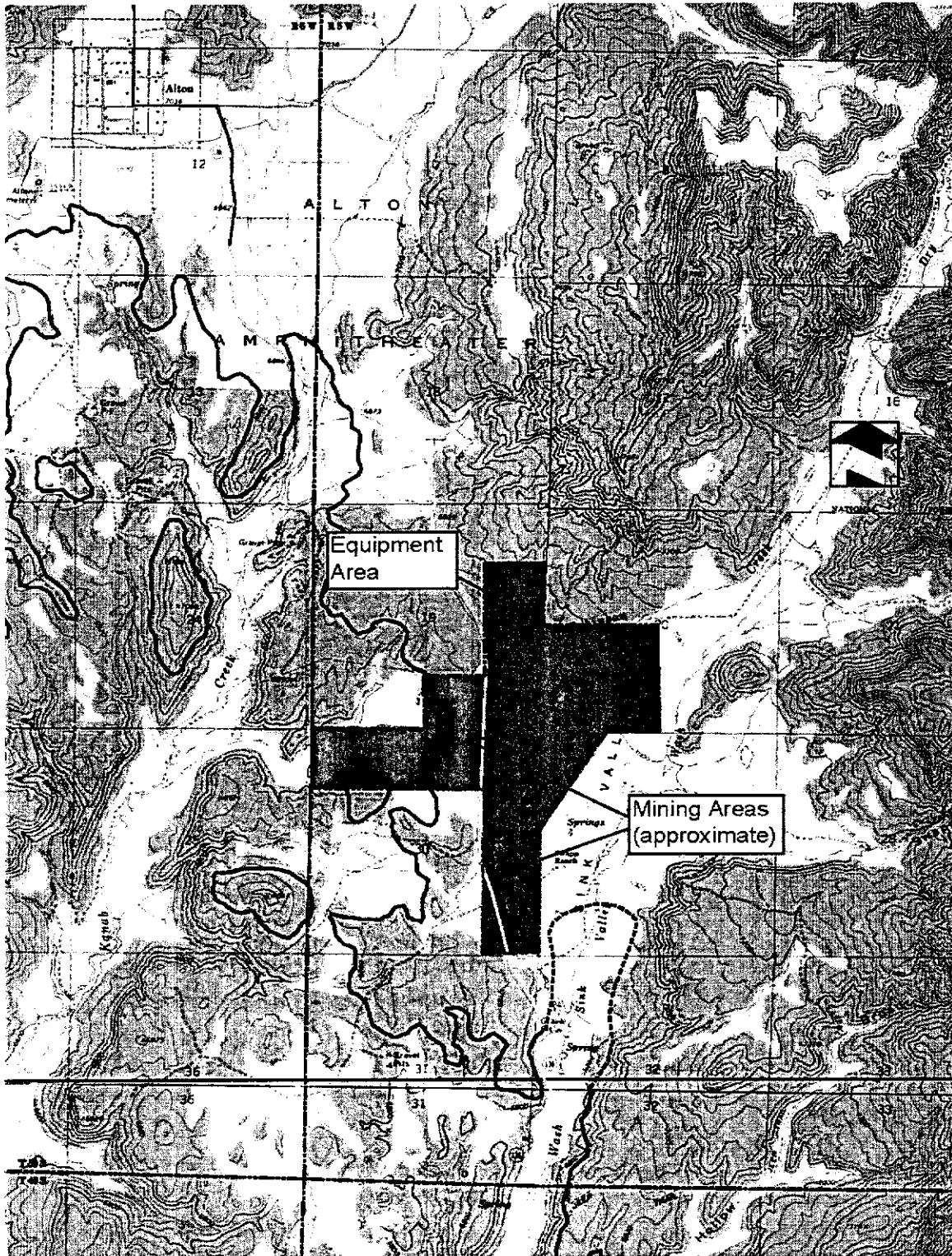
Northing: 41401699 meters

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



**Table I - Summary of Measured PM₁₀ Concentrations (µg/m³)
Background Monitor - 962A**

RANK	DATE	PM ₁₀ CONCENTRATION
Highest	10/06/2012	12.1
2 nd Highest	10/24/2012	7.5
Monthly Mean	10/1/12-10/31/12	5.8
Monthly Mean	11/1/12-11/30/12	4.1
Monthly Mean	12/1/12-12/31/12	3.0
Quarterly Mean	10/1/12-12/31/12 (15 valid samples)	4.3

**Table II - Summary of Measured PM₁₀ Concentrations (µg/m³)
Compliance Monitor - 963B**

RANK	DATE	PM ₁₀ CONCENTRATION
Highest	11/29/2012	66.3
2 nd Highest	10/24/2012	62.8
Monthly Mean	10/1/12-10/31/12	42.6
Monthly Mean	11/1/12-11/30/12	28.6
Monthly Mean	12/1/12-12/31/12	12.4
Quarterly Mean	10/1/12-12/31/12 (15 valid samples)	27.9

**Table III - Summary of Measured PM₁₀ Concentrations (µg/m³)
Compliance Monitor – 964C**

RANK	DATE	PM ₁₀ CONCENTRATION
Highest	11/29/2012	104.6
2 nd Highest	10/24/2012	66.5
Monthly Mean	10/1/12-10/31/12	43.9
Monthly Mean	11/1/12-11/30/12	38.2
Monthly Mean	12/1/12-12/31/12	15.2
Quarterly Mean	10/1/12-12/31/12 (12 valid samples)	32.9

Table IV – Mean Quarterly and Monthly Wind Speed

	4th Quarter 2012*	October*	November	December
Mean Wind Speed (m/s)	2.24	2.11	2.36	2.26

*Information for October and the 4th Quarter are skewed due to sensor that was found to be worn out. It was immediately replaced upon discovery.

4.0 DATA RECOVERY AND QUALITY ASSURANCE

4.1 Data Recovery

Monitor 962A

Monitor 962A collected 15 of the 15 samples during the quarter. The percent recovery for this quarter is 100%.

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 12 of the 15 samples during the quarter. The percent recovery for this quarter is 80.0%. The monitor for the date of November 5th overran the end time for a total of 35 h 19m of run time invalidating this sample. The monitor for the date of November 11th did not run due to a programing error, the month was not changed from October to November. The monitor error code for the date December 29th indicates that the monitor flow rate varied more than +/- 5 percent. A leak checks was performed on the 31st and adjustments made to the filter chamber lock.

The PM₁₀ 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	15	100%
963B	15	15	100%
964C	15	12	80.0%

4.2 Quality Assurance

Quality assurance procedures utilized to verify the integrity of the measured PM₁₀ data included the following:

1. Review of PM₁₀ precision measurements based upon duplicate, collocated measurements.
2. Independent quarterly audits of the PM₁₀ samplers.
3. Monthly zero and single point flow rate checks of the PM₁₀ samplers.

4.2.1 Precision of PM₁₀ Measurements

The precision of the PM₁₀ 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*, PM₁₀ precision checks are reported for instances when the concentrations for duplicate samples both exceed 3 µg/m³. 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 12 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 -44.8% to 9.3% with the majority of precision values occurring in the 10% to -10% range. The aggregate coefficient of variability (CV) calculated in accordance with *40 CFR, Part 58, Appendix A Equation 11* is 15.4%. This value is above the 10% goal for aggregate CV. The value for fourth quarter CV was significantly impacted by the two outlier values of -32.6% and -44.8%. Additionally, the CV value is typically reviewed on an annual basis for assessment of overall measurement error. Improvements have been made in tightening reducing the coefficient of variability, by improved maintenance/cleaning of the monitors. 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 PM₁₀ sampler flows was verified by a performance audit conducted by Air Resource Specialist on October 16, 2012. A copy of the audit report is presented in Appendix E and is summarized in Table VI. The audit results indicate that the three samplers were operating properly.

Table VI - Audit Summary

SAMPLER	AUDIT % DIFFERENCE	LIMIT*	DESIGN % DIFFERENCE	LIMIT*
962A	-3.4	±4%	-3.2	± 5%
963B	-1.3	±4%	-0.2	± 5%
964C	-3.8	±4%	-0.0	± 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

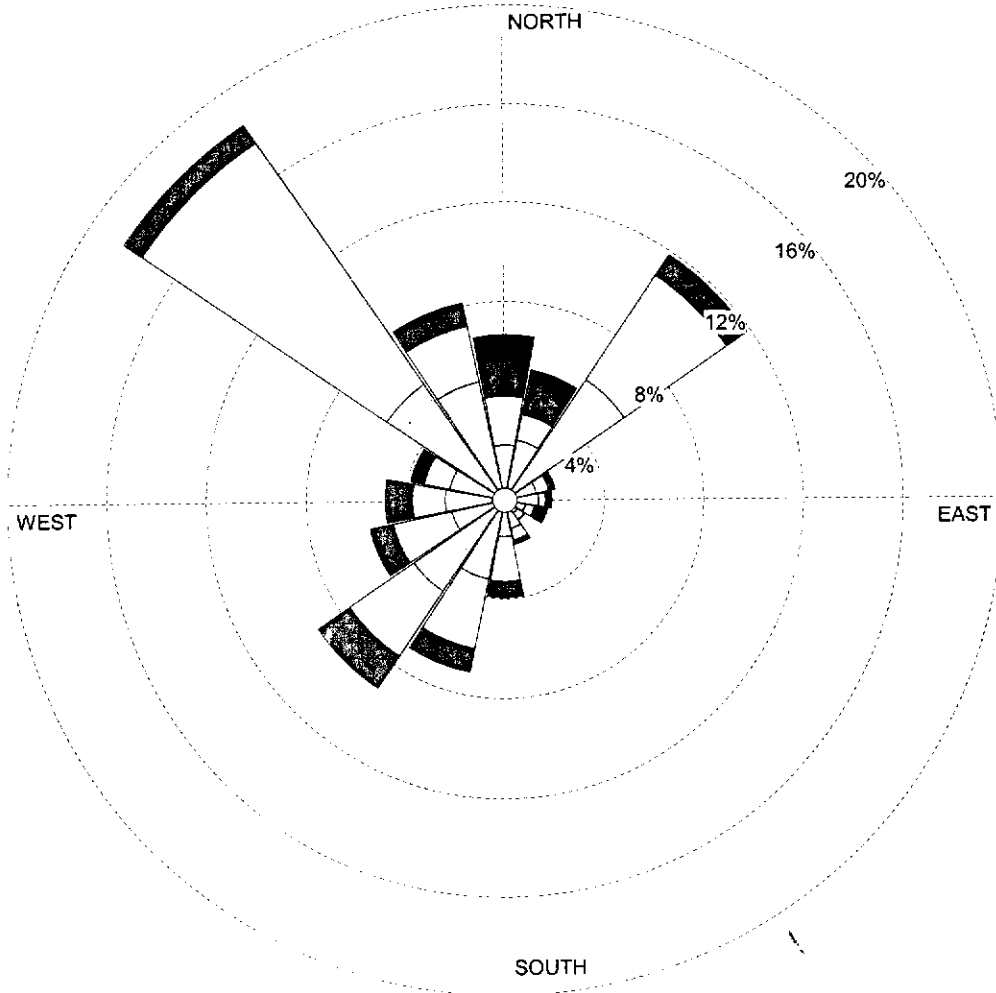
Windrose

WIND ROSE PLOT:

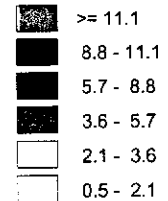
**Alton Coal Development , Alton, Utah
2012 4th QT**

DISPLAY:


**Wind Speed
Direction (blowing from)**



WIND SPEED
(m/s)



Calms: 6.79%

COMMENTS:	DATA PERIOD: Start Date: 10/1/2012 - 00:00 End Date: 12/31/2012 - 23:00	COMPANY NAME: Coal Hollow Mine	
	CALM WINDS: 6.79%	MODELER: K. Nicholes	
	AVG. WIND SPEED: 2.24 m/s	DATE: 1/15/2013	PROJECT NO.:

Station ID: 1
 Start Date: 10/1/2012 - 00:00
 End Date: 12/31/2012 - 23:00

Run ID:

Frequency Distribution
 (Count)

	Wind Direction (Blowing From) / Wind Speed (m/s)						Total
	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	
348.75-11.25	50	43	35	15	4	0	147
11.25-33.75	55	23	30	10	0	0	118
33.75-56.25	129	110	20	2	0	0	261
56.25-78.75	29	11	5	1	0	0	46
78.75-101.25	30	6	5	1	0	0	42
101.25-123.75	19	8	8	4	0	0	39
123.75-146.25	14	7	1	0	0	0	22
146.25-168.75	26	11	4	0	0	0	41
168.75-191.25	33	40	12	2	0	0	87
191.25-213.75	72	63	21	0	0	0	156
213.75-236.25	98	69	34	0	0	0	201
236.25-258.75	48	53	18	3	0	0	122
258.75-281.25	53	29	24	0	0	0	106
281.25-303.75	50	23	12	0	0	0	85
303.75-326.25	126	261	19	0	0	0	406
326.25-348.75	108	50	19	2	0	0	179
Total	940	807	267	40	4	0	2208

Frequency of Calm Winds: 150
 Average Wind Speed: 2.24 m/s

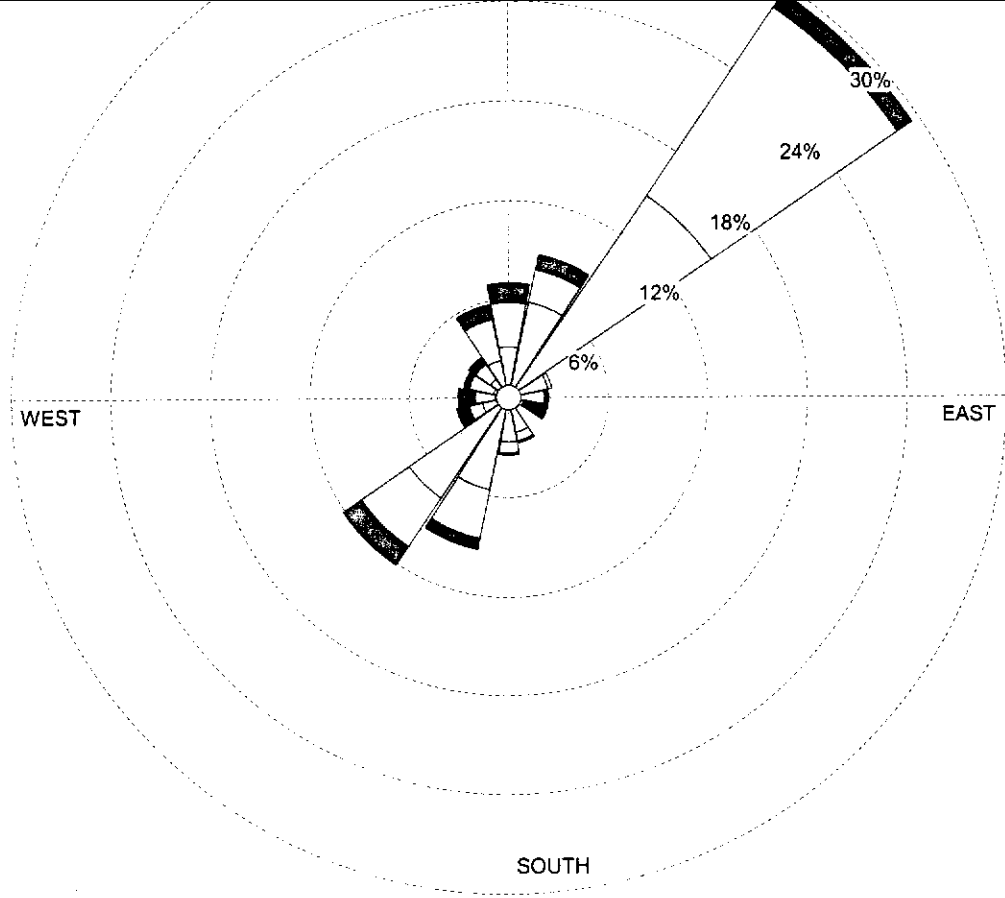
Station ID: 1
 Start Date: 10/1/2012 - 00:00
 End Date: 12/31/2012 - 23:00

Run ID:







Frequency Distribution
 (Normalized)

	Wind Direction (Blowing From) / Wind Speed (m/s)						Total
	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	
348.75-11.25	0.022645	0.019475	0.015851	0.006793	0.001812	0.000000	0.066576
11.25-33.75	0.024909	0.010417	0.013587	0.004529	0.000000	0.000000	0.053442
33.75-56.25	0.058424	0.049819	0.009058	0.000906	0.000000	0.000000	0.118207
56.25-78.75	0.013134	0.004982	0.002264	0.000453	0.000000	0.000000	0.020833
78.75-101.25	0.013587	0.002717	0.002264	0.000453	0.000000	0.000000	0.019022
101.25-123.75	0.008605	0.003623	0.003623	0.001812	0.000000	0.000000	0.017663
123.75-146.25	0.006341	0.003170	0.000453	0.000000	0.000000	0.000000	0.009964
146.25-168.75	0.011775	0.004982	0.001812	0.000000	0.000000	0.000000	0.018569
168.75-191.25	0.014946	0.018116	0.005435	0.000906	0.000000	0.000000	0.039402
191.25-213.75	0.032609	0.028533	0.009511	0.000000	0.000000	0.000000	0.070652
213.75-236.25	0.044384	0.031250	0.015399	0.000000	0.000000	0.000000	0.091033
236.25-258.75	0.021739	0.024004	0.008152	0.001359	0.000000	0.000000	0.055254
258.75-281.25	0.024004	0.013134	0.010870	0.000000	0.000000	0.000000	0.048007
281.25-303.75	0.022645	0.010417	0.005435	0.000000	0.000000	0.000000	0.038496
303.75-326.25	0.057065	0.118207	0.008605	0.000000	0.000000	0.000000	0.183877
326.25-348.75	0.048913	0.022645	0.008605	0.000906	0.000000	0.000000	0.081069
Total	0.425725	0.365489	0.120924	0.018116	0.001812	0.000000	0.932065


Frequency of Calm Winds: 6.79%
 Average Wind Speed: 2.24 m/s



WIND SPEED (m/s)

-  >= 11.1
-  8.8 - 11.1
-  5.7 - 8.8
-  3.6 - 5.7
-  2.1 - 3.6
-  0.5 - 2.1

Calms: 0.81%

COMMENTS:	DATA PERIOD: Start Date: 10/1/2012 - 00:00 End Date: 10/31/2012 - 23:00	COMPANY NAME: Coal Hollow Mine	
	CALM WINDS: 0.81%	MODELER: K. Nicholes	
	AVG. WIND SPEED: 2.11 m/s	TOTAL COUNT: 744 hrs.	
		DATE: 1/15/2013	

Station ID: 1
 Start Date: 10/1/2012 - 00:00
 End Date: 10/31/2012 - 23:00

Run ID:

Frequency Distribution
 (Count)

	Wind Direction (Blowing From) / Wind Speed (m/s)						Total
	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	
348.75-11.25	23	20	9	0	0	0	52
11.25-33.75	44	15	7	0	0	0	66
33.75-56.25	110	101	8	0	0	0	219
56.25-78.75	18	2	0	0	0	0	20
78.75-101.25	16	0	2	0	0	0	18
101.25-123.75	4	3	7	4	0	0	18
123.75-146.25	4	2	0	0	0	0	6
146.25-168.75	16	4	1	0	0	0	21
168.75-191.25	20	5	1	0	0	0	26
191.25-213.75	42	22	5	0	0	0	69
213.75-236.25	54	26	10	0	0	0	90
236.25-258.75	12	6	3	3	0	0	24
258.75-281.25	6	9	8	0	0	0	23
281.25-303.75	7	11	3	0	0	0	21
303.75-326.25	10	8	4	0	0	0	22
326.25-348.75	17	19	7	0	0	0	43
Total	403	253	75	7	0	0	744

Frequency of Calm Winds: 6
 Average Wind Speed: 2.11 m/s

Station ID: 1
 Start Date: 10/1/2012 - 00:00
 End Date: 10/31/2012 - 23:00

Run ID:

Frequency Distribution
 (Normalized)

	Wind Direction (Blowing From) / Wind Speed (m/s)						Total
	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	
348.75-11.25	0.030914	0.026882	0.012097	0.000000	0.000000	0.000000	0.069892
11.25-33.75	0.059140	0.020161	0.009409	0.000000	0.000000	0.000000	0.088710
33.75-56.25	0.147849	0.135753	0.010753	0.000000	0.000000	0.000000	0.294355
56.25-78.75	0.024194	0.002688	0.000000	0.000000	0.000000	0.000000	0.026882
78.75-101.25	0.021505	0.000000	0.002688	0.000000	0.000000	0.000000	0.024194
101.25-123.75	0.005376	0.004032	0.009409	0.005376	0.000000	0.000000	0.024194
123.75-146.25	0.005376	0.002688	0.000000	0.000000	0.000000	0.000000	0.008065
146.25-168.75	0.021505	0.005376	0.001344	0.000000	0.000000	0.000000	0.028226
168.75-191.25	0.026882	0.006720	0.001344	0.000000	0.000000	0.000000	0.034946
191.25-213.75	0.056452	0.029570	0.006720	0.000000	0.000000	0.000000	0.092742
213.75-236.25	0.072581	0.034946	0.013441	0.000000	0.000000	0.000000	0.120968
236.25-258.75	0.016129	0.008065	0.004032	0.004032	0.000000	0.000000	0.032258
258.75-281.25	0.008065	0.012097	0.010753	0.000000	0.000000	0.000000	0.030914
281.25-303.75	0.009409	0.014785	0.004032	0.000000	0.000000	0.000000	0.028226
303.75-326.25	0.013441	0.010753	0.005376	0.000000	0.000000	0.000000	0.029570
326.25-348.75	0.022849	0.025538	0.009409	0.000000	0.000000	0.000000	0.057796
Total	0.541667	0.340054	0.100806	0.009409	0.000000	0.000000	0.991935

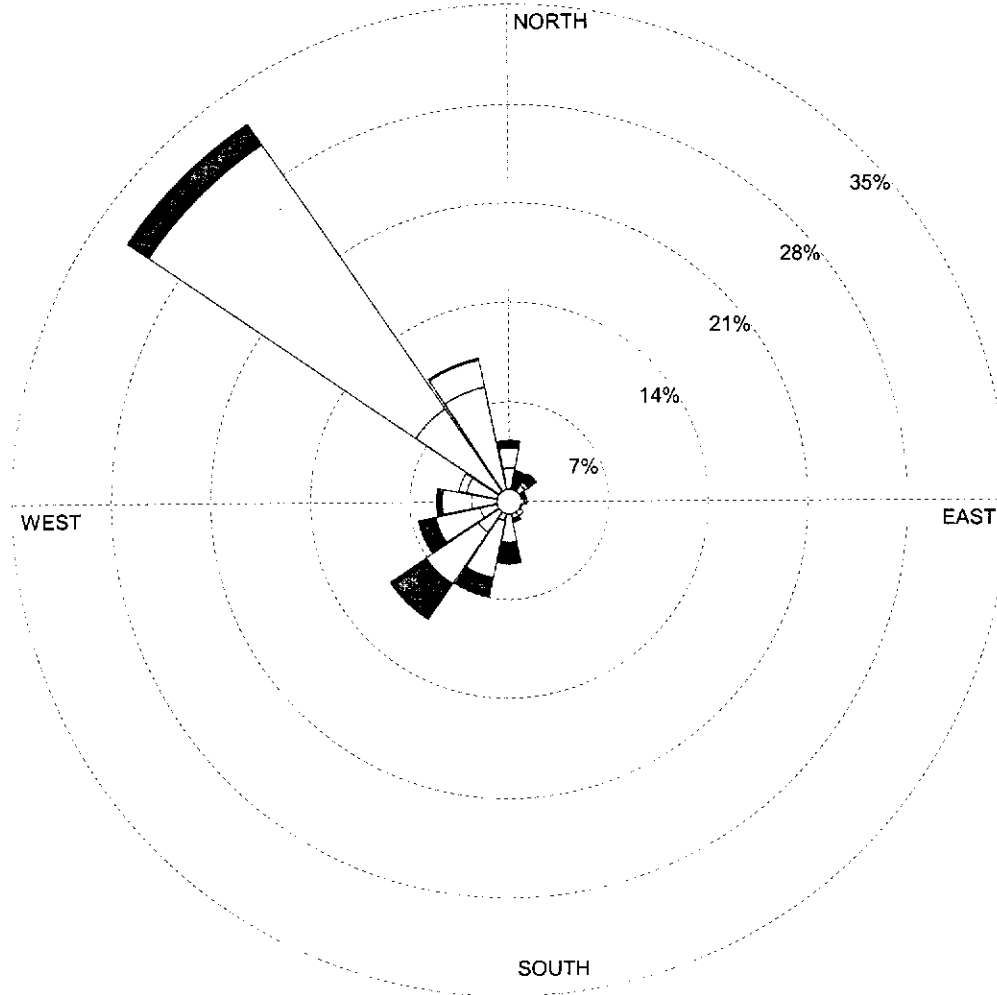
Frequency of Calm Winds: 0.81%
 Average Wind Speed: 2.11 m/s

WIND ROSE PLOT:

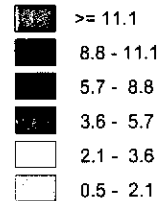
**Alton Coal Development , Alton, Utah
2012 November**

DISPLAY:


**Wind Speed
Direction (blowing from)**



WIND SPEED
(m/s)



Calms: 5.42%

COMMENTS:	DATA PERIOD: Start Date: 11/1/2012 - 00:00 End Date: 11/30/2012 - 23:00	COMPANY NAME: Coal Hollow Mine	
	CALM WINDS: 5.42%	MODELER: K. Nicholes	
	AVG. WIND SPEED: 2.36 m/s	DATE: 1/15/2013	PROJECT NO.:

Station ID: 1
 Start Date: 11/1/2012 - 00:00
 End Date: 11/30/2012 - 23:00

Run ID:

Frequency Distribution
 (Count)

	Wind Direction (Blowing From) / Wind Speed (m/s)						Total
	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	
348.75-11.25	17	10	4	0	0	0	31
11.25-33.75	7	0	9	0	0	0	16
33.75-56.25	10	2	5	0	0	0	17
56.25-78.75	2	4	3	0	0	0	9
78.75-101.25	8	1	0	0	0	0	9
101.25-123.75	7	0	0	0	0	0	7
123.75-146.25	6	3	0	0	0	0	9
146.25-168.75	3	6	2	0	0	0	11
168.75-191.25	3	18	9	2	0	0	32
191.25-213.75	10	30	10	0	0	0	50
213.75-236.25	19	32	22	0	0	0	73
236.25-258.75	15	23	9	0	0	0	47
258.75-281.25	19	15	3	0	0	0	37
281.25-303.75	22	4	0	0	0	0	26
303.75-326.25	57	163	13	0	0	0	233
326.25-348.75	59	14	1	0	0	0	74
Total	264	325	90	2	0	0	720

Frequency of Calm Winds: 39
 Average Wind Speed: 2.36 m/s

Station ID: 1
 Start Date: 11/1/2012 - 00:00
 End Date: 11/30/2012 - 23:00

Run ID:

Frequency Distribution
 (Normalized)

	Wind Direction (Blowing From) / Wind Speed (m/s)						Total
	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	
348.75-11.25	0.023611	0.013889	0.005556	0.000000	0.000000	0.000000	0.043056
11.25-33.75	0.009722	0.000000	0.012500	0.000000	0.000000	0.000000	0.022222
33.75-56.25	0.013889	0.002778	0.006944	0.000000	0.000000	0.000000	0.023611
56.25-78.75	0.002778	0.005556	0.004167	0.000000	0.000000	0.000000	0.012500
78.75-101.25	0.011111	0.001389	0.000000	0.000000	0.000000	0.000000	0.012500
101.25-123.75	0.009722	0.000000	0.000000	0.000000	0.000000	0.000000	0.009722
123.75-146.25	0.008333	0.004167	0.000000	0.000000	0.000000	0.000000	0.012500
146.25-168.75	0.004167	0.008333	0.002778	0.000000	0.000000	0.000000	0.015278
168.75-191.25	0.004167	0.025000	0.012500	0.002778	0.000000	0.000000	0.044444
191.25-213.75	0.013889	0.041667	0.013889	0.000000	0.000000	0.000000	0.069444
213.75-236.25	0.026389	0.044444	0.030556	0.000000	0.000000	0.000000	0.101389
236.25-258.75	0.020833	0.031944	0.012500	0.000000	0.000000	0.000000	0.065278
258.75-281.25	0.026389	0.020833	0.004167	0.000000	0.000000	0.000000	0.051389
281.25-303.75	0.030556	0.005556	0.000000	0.000000	0.000000	0.000000	0.036111
303.75-326.25	0.079167	0.226389	0.018056	0.000000	0.000000	0.000000	0.323611
326.25-348.75	0.081944	0.019444	0.001389	0.000000	0.000000	0.000000	0.102778
Total	0.366667	0.451389	0.125000	0.002778	0.000000	0.000000	0.945833

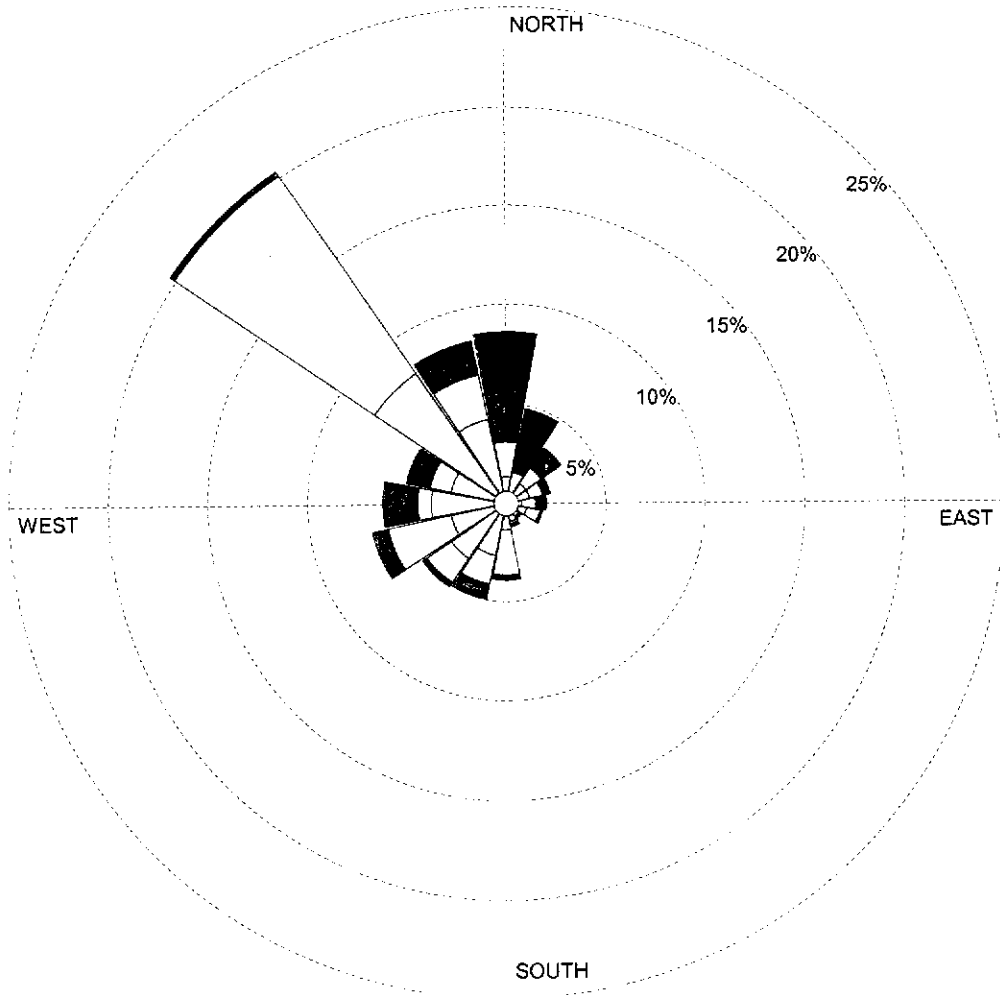
Frequency of Calm Winds: 5.42%
 Average Wind Speed: 2.36 m/s

WIND ROSE PLOT:







**Alton Coal Development , Alton, Utah
2012 December**

DISPLAY:


**Wind Speed
Direction (blowing from)**



WIND SPEED
(m/s)

-  ≥ 11.1
-  8.8 - 11.1
-  5.7 - 8.8
-  3.6 - 5.7
-  2.1 - 3.6
-  0.5 - 2.1

Calms: 14.11%

COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 12/1/2012 - 00:00 End Date: 12/31/2012 - 23:00	Coal Hollow Mine	
	CALM WINDS:	MODELER:	
	14.11%	K. Nicholes	
AVG. WIND SPEED:	TOTAL COUNT:	DATE:	PROJECT NO.:
2.26 m/s	744 hrs.	1/15/2013	

Station ID: 1
 Start Date: 12/1/2012 - 00:00
 End Date: 12/31/2012 - 23:00

Run ID:

Frequency Distribution
 (Count)

	Wind Direction (Blowing From) / Wind Speed (m/s)						Total
	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	
348.75-11.25	10	13	22	15	4	0	64
11.25-33.75	4	8	14	10	0	0	36
33.75-56.25	9	7	7	2	0	0	25
56.25-78.75	9	5	2	1	0	0	17
78.75-101.25	6	5	3	1	0	0	15
101.25-123.75	8	5	1	0	0	0	14
123.75-146.25	4	2	1	0	0	0	7
146.25-168.75	7	1	1	0	0	0	9
168.75-191.25	10	17	2	0	0	0	29
191.25-213.75	20	11	6	0	0	0	37
213.75-236.25	25	11	2	0	0	0	38
236.25-258.75	21	24	6	0	0	0	51
258.75-281.25	28	5	13	0	0	0	46
281.25-303.75	21	8	9	0	0	0	38
303.75-326.25	59	90	2	0	0	0	151
326.25-348.75	32	17	11	2	0	0	62
Total	273	229	102	31	4	0	744

Frequency of Calm Winds: 105
 Average Wind Speed: 2.26 m/s

Station ID: 1
 Start Date: 12/1/2012 - 00:00
 End Date: 12/31/2012 - 23:00

Run ID:

Frequency Distribution
 (Normalized)

	Wind Direction (Blowing From) / Wind Speed (m/s)						Total
	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	
348.75-11.25	0.013441	0.017473	0.029570	0.020161	0.005376	0.000000	0.086022
11.25-33.75	0.005376	0.010753	0.018817	0.013441	0.000000	0.000000	0.048387
33.75-56.25	0.012097	0.009409	0.009409	0.002688	0.000000	0.000000	0.033602
56.25-78.75	0.012097	0.006720	0.002688	0.001344	0.000000	0.000000	0.022849
78.75-101.25	0.008065	0.006720	0.004032	0.001344	0.000000	0.000000	0.020161
101.25-123.75	0.010753	0.006720	0.001344	0.000000	0.000000	0.000000	0.018817
123.75-146.25	0.005376	0.002688	0.001344	0.000000	0.000000	0.000000	0.009409
146.25-168.75	0.009409	0.001344	0.001344	0.000000	0.000000	0.000000	0.012097
168.75-191.25	0.013441	0.022849	0.002688	0.000000	0.000000	0.000000	0.038978
191.25-213.75	0.026882	0.014785	0.008065	0.000000	0.000000	0.000000	0.049731
213.75-236.25	0.033602	0.014785	0.002688	0.000000	0.000000	0.000000	0.051075
236.25-258.75	0.028226	0.032258	0.008065	0.000000	0.000000	0.000000	0.068548
258.75-281.25	0.037634	0.006720	0.017473	0.000000	0.000000	0.000000	0.061828
281.25-303.75	0.028226	0.010753	0.012097	0.000000	0.000000	0.000000	0.051075
303.75-326.25	0.079301	0.120968	0.002688	0.000000	0.000000	0.000000	0.202957
326.25-348.75	0.043011	0.022849	0.014785	0.002688	0.000000	0.000000	0.083333
Total	0.366935	0.307796	0.137097	0.041667	0.005376	0.000000	0.858871

Frequency of Calm Winds: 14.11%
 Average Wind Speed: 2.26 m/s

APPENDIX B

Listing of PM₁₀ Concentrations

Background Monitor 962A

PM₁₀ Sampler Summary

October 1, 2012 - December 31, 2012

Network: Alton Coal Development, LLC

Site: Coal Hollow Mine

Sampler ID: 962A

AQS ID:

Sampler Type: BGI FRM Single

Date	Filter ID	Concentration (µg/m ³)		Sample Period (hr:min)	Sample Volume (m ³)	Std Volume (m ³)	Mass (mg)			Flag	Comments	
		LTP	STP				Tare	Gross	Net			
10/06/12	P0481938	9.7	12.1	23:59	24.0	19.3	144.284	144.518	0.234			
10/12/12	P0483003	2.7	3.3	23:59	24.0	19.8	144.090	144.155	0.065			
10/18/12	P0483006	2.2	2.6	23:59	24.0	19.6	143.602	143.654	0.052			
10/24/12	P0483170	6.2	7.5	23:59	24.0	19.8	145.898	146.046	0.148			
10/30/12	P0483173	3.0	3.7	23:59	24.0	19.6	144.497	144.569	0.072			
11/05/12	P0483317	2.0	2.5	23:59	24.0	19.7	144.062	144.111	0.049			
11/11/12	P0483320	5.0	5.7	23:59	24.0	20.8	145.517	145.636	0.119			
11/17/12	P0483323	2.9	3.5	23:59	24.0	19.8	143.491	143.560	0.069			
11/23/12	P0483443	1.5	1.8	23:59	24.0	20.1	143.781	143.817	0.036			
11/29/12	P0483446	6.0	7.2	23:59	24.0	20.0	144.128	144.272	0.144			
12/05/12	P0483617	3.2	3.8	24:00	24.0	19.9	143.072	143.148	0.076			
12/11/12	P0483621	2.2	2.6	23:59	24.0	20.2	145.882	145.935	0.053			
12/17/12	P0483680	2.0	2.4	23:59	24.0	20.3	144.710	144.758	0.048			
12/23/12	P0483683	3.1	3.7	23:59	24.0	20.2	144.296	144.371	0.075			
12/29/12	P0483686	2.0	2.3	23:59	24.0	20.7	144.317	144.365	0.048			
10/15/12	P0483009	Field Blank						144.649	144.663	0.014		
		# Valid	Recovery	Average	St. Dev.	Max	Min					
		15	100%	4.3	2.8	12.1	1.8					

Individual Data Sheets provided on CD

Compliance Monitor 963B

PM₁₀ Sampler Summary

October 1, 2012 - December 31, 2012

Network: Alton Coal Development, LLC

Site: Coal Hollow Mine

Sampler ID: 963B

AQS ID:

Sampler Type: BGI FRM Single

Date	Filter ID	Concentration (µg/m ³)		Sample Period (hr:min)	Sample Volume (m ³)	Std Volume (m ³)	Mass (mg)			Flag	Comments
		LTP	STP				Tare	Gross	Net		
10/06/12	P0481939	41.8	51.6	23:59	24.0	19.5	145.710	146.716	1.006		
10/12/12	P0483004	3.6	4.4	23:59	24.0	19.9	142.111	142.198	0.087		
10/18/12	P0483007	30.8	37.6	23:59	24.0	19.7	142.873	143.614	0.741		
10/24/12	P0483171	52.2	62.8	23:59	24.0	20.0	145.417	146.672	1.255		
10/30/12	P0483174	46.9	56.8	23:59	24.0	19.8	146.269	147.395	1.126		
11/05/12	P0483318	51.0	62.1	23:59	24.0	19.7	145.754	146.980	1.226		
11/11/12	P0483321	5.0	5.7	23:59	24.0	21.0	145.030	145.150	0.120		
11/17/12	P0483324	4.2	5.1	23:59	24.0	20.0	143.905	144.006	0.101		
11/23/12	P0483444	3.0	3.6	23:59	24.0	20.3	141.556	141.629	0.073		
11/29/12	P0483447	55.5	66.3	23:59	24.0	20.1	144.762	146.097	1.335		
12/05/12	P0483618	29.9	35.7	23:59	24.0	20.1	143.664	144.383	0.719		
12/11/12	P0483622	10.8	12.7	23:59	24.0	20.3	146.442	146.701	0.259		
12/17/12	P0483681	4.3	5.1	23:59	24.0	20.4	143.223	143.327	0.104		
12/23/12	P0483684	3.9	4.6	23:59	24.0	20.4	144.773	144.867	0.094		
12/29/12	P0483687	3.2	3.7	23:59	24.0	20.9	144.222	144.300	0.078		
	# Valid	Recovery	Average	St. Dev.	Max	Min					
	15	100%	27.9	26.0	66.3	3.6					

Individual Data Sheets provided on CD

Collocated Monitor 964C

PM₁₀ Sampler Summary

October 1, 2012 - December 31, 2012

Network: Alton Coal Development, LLC

Site: Coal Hollow Mine

Sampler ID: 964C

AQS ID:

Sampler Type: BGI FRM Single

Date	Filter ID	Concentration (µg/m ³)		Sample Period (hr:min)	Sample Volume (m ³)	Std Volume (m ³)	Mass (mg)		Flag	Comments
		LTP	STP				Tare	Net		
10/06/12	P0481940	38.1	47.0	23:59	24.0	19.5	144.402	145.318		0.916
10/12/12	P0483005	3.9	4.7	23:59	24.0	19.9	141.897	141.991		0.094
10/18/12	P0483008	32.6	39.7	23:59	24.0	19.7	144.227	145.010		0.783
10/24/12	P0483172	55.2	66.5	23:59	24.0	20.0	144.494	145.821		1.327
10/30/12	P0483175	50.6	61.4	23:59	24.0	19.8	144.374	145.590		1.216
11/05/12	P0483319	Invalid - AG	Invalid - AG	35:19	35.4	29.2	144.184	145.750	SP	1.566
11/11/12	P0483322	Invalid - AN	Invalid - AN				144.562	144.565	SP	0.003
11/17/12	P0483325	4.2	5.1	23:59	24.0	20.0	144.404	144.505		0.101
11/23/12	P0483445	4.2	5.0	23:59	24.0	20.3	145.366	145.467		0.101
11/29/12	P0483448	87.5	104.6	23:59	24.0	20.1	143.585	145.689		2.104
12/05/12	P0483619	29.5	35.2	23:59	24.0	20.1	144.834	145.542		0.708
12/11/12	P0483620	13.1	15.5	23:59	24.0	20.4	146.246	146.561		0.315
12/17/12	P0483682	4.8	5.6	23:59	24.0	20.4	144.613	144.728		0.115
12/23/12	P0483685	3.8	4.5	23:59	24.0	20.4	143.125	143.217		0.092
12/29/12	P0483688	Invalid - AG	Invalid - AG	18:55	19.0	16.4	143.055	143.118		0.063
10/25/12	P0483176						144.232	144.240		0.008
11/26/12	P0483449						145.465	145.477		0.012
12/06/12	P0483623						144.779	144.792		0.013

# Valid	Recovery	Average	St. Dev.	Max	Min
12	80%	32.9	32.4	104.6	4.5

Individual Data Sheets provided on CD

APPENDIX C

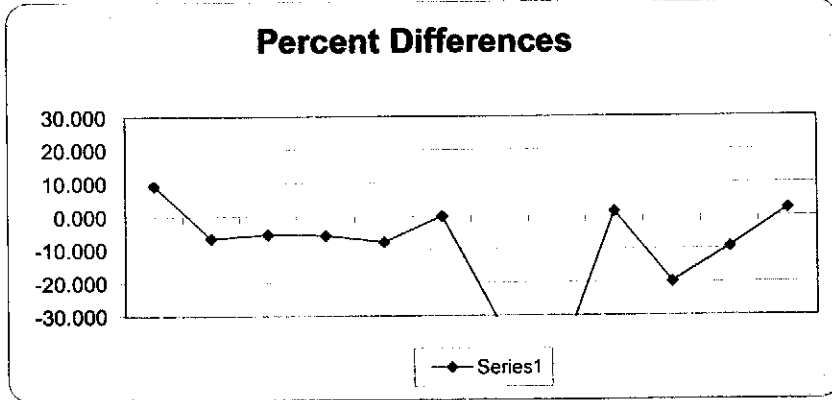
Precision and Single-Point Flow Rate Checks

Alton Coal Development, LLC - Coal Hollow Mine
Precision Estimate (From Collocated Samples)

Monitors 963B & 964C		Pollutant type:		CV _{vb} (%)			
Meas Val (Y)	Audit Val (X)	d (Eqn 10)	25th Percentile	d ²	d	d ²	
51.6	47	9.331	-11.974	87.061	9.331	87.061	
4.4	4.7	-6.593	75th Percentile	43.473	6.593	43.473	n
37.6	39.7	-5.433	0.353	29.522	5.433	29.522	12
62.8	66.5	-5.723		32.754	5.723	32.754	Σ d
56.8	61.4	-7.783		60.582	7.783	60.582	Σd
5.1	5.1	0.000		0.000	0.000	0.000	n-1
3.6	5	-32.558		1060.032	32.558	1060.032	145.056
66.3	104.6	44.822		2008.97	44.822	2008.970	Σd ²
35.7	35.2	1.410		1.989	1.410	1.989	3810.903
12.7	15.5	-19.858		394.3464	19.858	394.346	
5.1	5.6	-9.346		87.344	9.346	87.344	
4.6	4.5	2.198		4.830	2.198	4.830	

n	Σ d	Σ d ²
12	145.056	3810.903
n-1	Σd	Σd ²
11	-119.178	3810.903

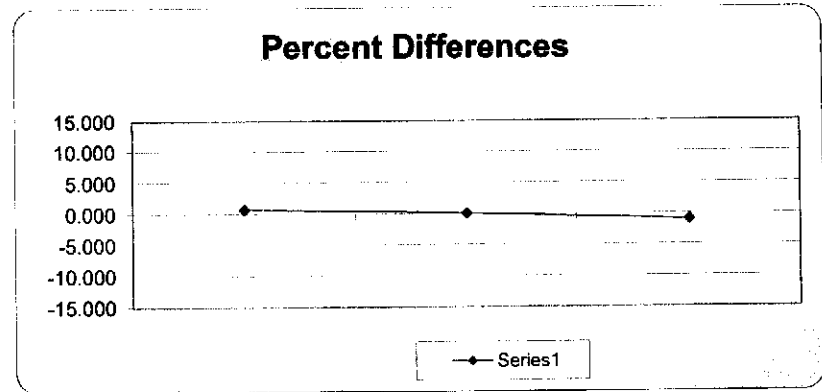
CV (%) (Eqn 11)
15.35



**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		
16.71	16.59	0.723	-0.474	0.523	0.723	0.523		
16.7	16.69	0.060	75th Percentile	0.004	0.060	0.004	n	Σ d
16.7	16.87	-1.008	0.392	1.015	1.008	1.015	3	1.791
							n-1	Σ d ²
							2	1.542
								"AB" (Eqn 4)
								0.597
								"AS" (Eqn 5)
								0.486

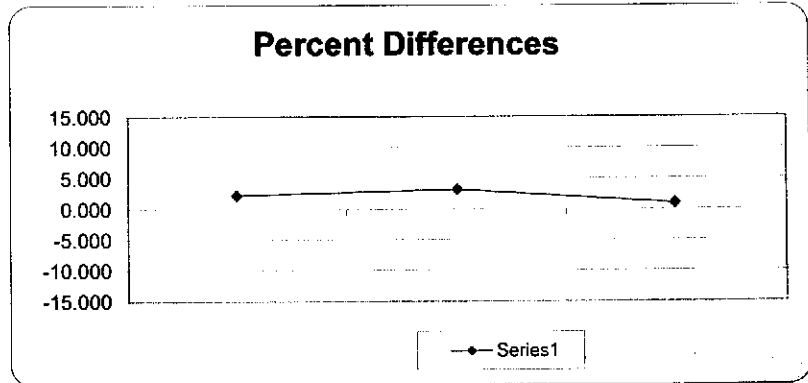
Bias (%) (Eqn 3)	Both Signs Positive
1.42	FALSE
Signed Bias (%)	Both Signs Negative
+/-1.42	FALSE



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	d²	 d 	 d ²	
16.67	16.3	2.270	1.619	5.153	2.270	5.153	
16.7	16.18	3.214	75th Percentile	10.329	3.214	10.329	
16.7	16.54	0.967	2.742	0.936	0.967	0.936	
		n	Σ d 	"AB" (Eqn 4)			
		3	6.451	2.150			
		n-1	Σ d ²	"AS" (Eqn 5)			
		2	16.417	1.128			

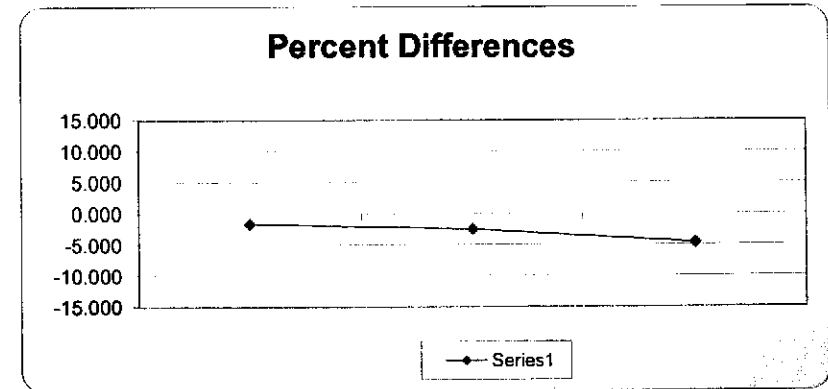
Bias (%) (Eqn 3)	Both Signs Positive
4.05	TRUE
Signed Bias (%)	Both Signs Negative
+4.05	FALSE



**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	
16.71	16.99	-1.648	-3.537	2.716	1.648	2.716	
16.7	17.12	-2.453	75th Percentile	6.019	2.453	6.019	
16.72	17.53	-4.621	-2.051	21.350	4.621	21.350	
				n	Σ d	"AB" (Eqn 4)	
				3	8.722	2.907	
				n-1	Σ d ²	"AS" (Eqn 5)	
				2	30.085	1.537	

Bias (%) (Eqn 3)	Both Signs Positive
5.5	FALSE
Signed Bias (%)	Both Signs Negative
-5.5	TRUE



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
10-1-12	11:37am	10-1-12	11:37 am	14	17	M-M	10-6-12	KN
10-8-12	10:37am	10-8-12	10:37 am	17	4	M-M	10-12-12	KN
10-15-12	9:41AM	10-15-12	9:41AM	4	7	M-M	10-18-12	KN/JKSP
10-19-12	13:34	10-19-12	13:33	7	11	M-M	10-24-12	KN
10-25-12	11:41	10-25-12	11:41	11	14	M-M	10-30-12	JKSP
10-31-12	10:27am	10-31-12	10:26am	14	4	M-M	11-5-12	KN
11-6-12	11:00am	11-6-12	11:00am	4	7	M-M	11-11-12	KN
11-12-12	1:02 pm	11-12-12	13:02	7	10	M-M	11-17-12	KN
11-19-12	10:24am	11-19-12	10:23am	10	11	M-M	11-23-12	KN
11-26-12	10:34	11-26-12	10:34	11	14	M-M	11-29-12	KN/JKSP
11-30-12	10:47am	11-30-12	10:46am	14	4	M-M	12-5-12	KN
12-6-12	10:09am	12-6-12	10:08am	4	8	M-M	12-11-12	KN
12-13-12	13:29	12-13-12	13:28	8	10	M-M	12-17-12	KN
12-18-12	9:15am	12-18-12	9:14 am	10	13	M-M	12-23-12	KN
12-24-12	12:21am	12-24-12	12:19 am	13	16	M-M	12-29-12	KN
12-31-12	11:20am	12-31-12	11:19 am	16	5	M-M	1-6-13	KN

Set for time change

Table II - Monthly Leak Test

Date	Time	Initial SP Value	Final SP Value	Pass/Fail	Initials	Maintenance
10-29-12	11:19am	95	95	Pass	KN	Cleaned Monitor Venturi, ductwork, etc.
11-30-12	12:37am	98	97	Pass	KN	Cleaned Monitor Venturi, ductwork, etc.
12-28-12	11:11am	95	93	Pass	KN	Cleaned Monitor Venturi, ductwork, etc.

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
10-29-12	11:29	16.71	589	591.5	15.8	16.5	13.25	16.59	0.723	KN
11-30-12	12:47	16.70	585	587	6.4	7.4	13.69	16.69	0.060	KN
12-27-12	11:17	16.70	580	582	6.4	5.9	14.40	16.87	-1.008	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
10-1-12	12:11am	10-1-12	12:11	15	18	M-M	10-6-12	KN
10-8-12	11:08am	10-8-12	11:07am	18	5	M-M	10-12-12	KN
10-15-12	9:20 Am	10-15-12	9:20 Am	5	8	M-M	10-18-12	KN/JSR
10-19-12	14:09	10-19-12	14:08	8	12	M-M	10-24-12	KAL
10-25-12	12:39	10-25-12	12:39	12	15	M-M	10-30-12	JSR
10-31-12	10:00am	10-31-12	10:59	15	5	M-M	11-5-12	KAL
11-6-12	11:29am	11-6-12	11:29am	5	8	M-M	11-11-12	KN
11-12-12	1:29 pm	11-12-12	13:29 pm	8	18	M-M	11-17-12	KN
11-19-12	10:50am	11-19-12	10:49 am	18	12	M-M	11-23-12	KN
11-26-12	10:11	11-26-12	10:11	12	15	M-M	11-29-12	KN/JSR
11-30-12	1:12pm	11-30-12	13:11	15	5	M-M	12-5-12	KN
12-6-12	10:35am	12-6-12	10:34am	5	9	M-M	12-11-12	KN
12-13-12	14:05	12-13-12	14:05	9	11	M-M	12-17-12	KN
12-18-12	9:43am	12-18-12	9:43am	11	14	M-M	12-23-12	KN
12-24-12	13:06	12-24-12	13:05	14	17	M-M	12-29-12	KAL
12-29-12	11:56am	12-31-12	11:55	17	6	M-M	1-4-13	KN

set for Timechange

Table II - Monthly Leak Test

Date	Time	Initial SP Value	Final SP Value	Pass/Fail	Initials	Maintenance
10-29-12	12:12	98	96	Pass	KN	Clean Monitor Venturi down to 6
11-30-12	1:16 pm	95	95	Pass	KN	Clean Monitor Venturi down to 6 etc.
12-31-12	11:58am	96	96	Pass	KN	Clean Monitor Venturi down to 6 etc.

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
10-29-12	12:16	16.67	595	597	17.0	17.5	13.12	16.30	2.207	KN
11-30-12	1:21 pm	16.70	591	592.5	7.6	7.8	13.30	16.18	3.214	KN
12-31-12	12:01	16.70	587	588	-3.5	-4.2	14.14	16.54	0.967	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
10-1-12	12:15	10-1-12	12:13	16	19	M-M	10-6-12	KN
10-8-12	11:13	10-8-12	11:11am	19	6	M-M	10-12-12	KN
10-15-12	9:22AM	10-15-12	9:22 AM	6	9	M-M	10-28-12	KN/JKSR
10-19-12	14:13	10-19-12	14:11	9	13	M-M	10-24-12	KN
10-25-12	12:41	10-25-12	12:41	13	16	M-M	10-30-12	JKSR
10-31-12	11:05am	10-31-12	11:02am	16	6	M-M	11-5-12	KN
11-6-12	11:33am	11-6-12	11:32am	6	9	M-M	11-11-12	KN
11-12-12	1:33pm	11-12-12	13:32pm	9	19	M-M	11-17-12	KN
11-19-12	10:55am	11-19-12	10:52am	19	13	M-M	11-23-12	KN
11-26-12	10:08	11-26-12	10:08	13	16	M-M	11-29-12	KN/JKSR
11-26-12	10:08	11-26-12	10:08	17	17	Blank		KN/JKSR
11-30-12	1:29 pm	11-30-12	13:27	16	6	M-M	12-5-12	KN
12-6-12	10:55am	12-6-12	10:57am	6	20	Blank	12-6-12	KN
12-6-12	10:42am	12-6-12	10:41am	20	7	M-M	12-11-12	KN
12-13-12	10:09	12-13-12	9:57	7	15	M-M	12-18-12	KN
12-18-12	9:49	12-18-12	9:47	7	15	M-M	12-22-12	KN
12-24-12	13:09	12-20-12	13:07	15	15	M-M	12-29-12	KN
12-31-12	12:12	12-31-12	12:10	18	7	M-M	1-4-12	KN

set for time change
 - Over run stop time month had not been changed to Nov, still Oct.
 start Oct 11? No Run

29th sample run 18 hrs

Table II - Monthly Leak Test

Date	Time	Initial SP Value	Final SP Value	Pass/Fail	Initials	Maintenance
12-29-12	12:33	105	105	Pass	KN	Cleaned monitor features: drain tabs, etc
12-30-12	1:31pm	98	97	Pass	KN	Cleaned venturi down tube, etc
12-31-12	12:14	101	98	Pass	KN	Cleaned Venturi: down tube etc

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
10-29-12	12:36	16.71	595	596	17.4°C	17.7°C	13.67	16.99	-1.696	KN
10-30-12	1:34pm	16.70	591	592.5	7.5°C	8.0°C	14.13	17.12	-2.145	KN
12-31-12	12:17pm	16.72	587	588	-3.6°C	-3.2°C	14.99	17.53		

APPENDIX E

Independent PM₁₀ Sampler Performance Audit Report



AUDIT REPORT FOR
ALTON COAL DEVELOPMENT MONITORING PROJECT
ALTON, UTAH
FOURTH QUARTER 2012

Prepared by

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December 12, 2012

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1.0 AUDIT SUMMARY

Alton Coal Development is operating three (3) Federal Reference Method (FRM) PM₁₀ 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 October 16, 2012. 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 (3) FRM particulate samplers and all of the meteorological systems were operating within EPA and project accuracy goals, with the exception of the wind direction linearity. 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	No
Temperature	Campbell Scientific CS	Yes
Precipitation	Hydrological Services TB4	Yes

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:

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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 (3) volumetric flow FRM PM₁₀ particulate samplers were audited. ARS audited the sampler with a BIOS Definer 220 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, a measurement of ≥ 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 BIOS. Differences between the operational sampler flow and audit flow that are greater than $\pm 4\%$ are considered out of tolerance. Differences between the designated design flow and the audit flow greater than $\pm 5\%$ 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 $\pm 2.0^\circ\text{C}$ and a barometric pressure difference greater than $\pm 10\text{mm Hg}$ are considered out of tolerance. Audit methods and acceptable criteria for the particulate samplers are summarized in Table 2-1.

Table 2-1

FRM PM₁₀ Particulate Samplers
Audit Methods and Acceptance Criteria

Parameter	Audit Method	Acceptance Criteria
Leak Check	Change in vacuum of closed inlet in 2 minutes	$< 5 \text{ cm H}_2\text{O}$ in 2 min*
Actual Volumetric Sampler Flow	DeltaCal audit flow to actual sampler flow (volumetric)	$\leq \pm 4\%$
Designated Design Flow	Designated design flow to audit flow (volumetric)	$\leq \pm 5\%$
Ambient Temperature ($^\circ\text{C}$)	Audit temperature to sampler temperature	$\leq \pm 2^\circ\text{C}$
Barometric Pressure (mm Hg)	Audit barometric pressure to sampler pressure	$\leq \pm 10\text{mm Hg}$

*As suggested by manufacturer.

2.2 METEOROLOGICAL PARAMETERS

Meteorological measurement systems were 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 were obtained

from the EPA's *On-Site Meteorological Program Guidance for Regulatory Modeling Applications*. ARS used 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 (3) 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 (2) Landmarks	±5° in Any Direction
	• Response Threshold	Starting Torque	≤7.0 gm-cm
Temperature and	• Accuracy and Linearity	Three (3) Temperature Baths: 0°C, Near Ambient, and Near Full-Scale	Temperature ±0.5°C
Precipitation	• Accuracy	Compared to Three (3) Known Amounts of Introduced Water	±10% of Observed
	• Tip Response	Manual Tips	One (1) contact closure per tip

Wind Speed - Dynamic tests of the horizontal wind speed sensors were performed using an R.M. Young model 18810 pulsed motor wind speed calibrator. Each sensor was tested at zero plus three (3) shaft revolution speeds (300, 600, and 900 rpm). The equivalent wind speed was 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 included the verification of sensor orientation, linearity, and bearing integrity. ARS established two (2) 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 was used to establish the declination of the site. Once the compass was oriented based on the magnetic declination, wind direction references were established. The sensor orientation was checked by aligning the direction vane to and from each landmark reference.

Potentiometer linearity was tested by verifying the accuracy of the measured wind direction towards and away from the two (2) designated landmarks. If the checks are within ± 5 degree accuracy, the linearity is also valid. The linearity checked failed one of the eight points tested.

Temperature- The temperature sensor was audited by immersion in three (3) temperature baths with NIST-traceable thermometers. The temperature tests were 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 were compared to the on-site datalogger output.

Precipitation - The tipping bucket precipitation gauge was 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 was verified, and the total datalogger values were 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 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 Number	Serial Number	Recertification Date
FRM Audit	BIOS	Definer 220	117874	12/15/2012
Precipitation Calibrator	Novalynx	2600	N/A	N/A
Temperature	Eutechnics	4400	308288	1/30/2013
Wind Speed	R.M. Young	18802	CA 03806	12/13/2012

4.0 AUDIT RESULTS

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

4.1 AUDIT FINDINGS

Performance Audit Results

- All three (3) PM₁₀ samplers were operating within project accuracy goals.
- The meteorological station was operating within project accuracy goals, with the exception of wind direction linearity.

System Audit Results

- No system problems.

Table 4-1
Summary of Audit Findings
Background FRM Sampler
Alton Coal Development
Alton, Utah
October 16, 2012

Parameter	Manufacturer	Instrument Serial No.	Designated Audit Value	Sampler Observed	Accuracy Goal (±)	Difference	Within Accuracy Goal
FRM PM₁₀	BGI	PQ200S-N962A					
Lk Ck External							
Flow (Volumetric)			17.3	16.7	5.0	-3.4	Y
Flow (Design)							
Ambient Temperature			19.4	19.1	2.0	-0.26	Y
Filter Temperature							
Ambient Pressure			584.0	584.0	10.0	0.0	Y
* PM10 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 manufacturer.							

Table 4-2
 Summary of Audit Findings
 West Collocated FRM Sampler
 Alton Coal Development
 Alton, Utah
 October 16, 2012

Parameter	Manufacturer	Instrument Serial No.	Designated Audit Value	Sampler Observed	Accuracy Goal (±)	Difference	Within Accuracy Goal
FRM PM₁₀	BGI	PQ200S-N964C					
Lk Ck External			103.0	102.0	15.0	-1.0	Y
Flow (Volumetric)			16.9	16.7	5.0	-1.3	Y
Flow (Design)			16.7	16.7	4.0	-0.2	Y
Ambient Temperature			19.7	19.5	2.0	-0.21	Y
Filter Temperature			21.1	20.8	2.0	-0.28	Y
Ambient Pressure			591.0	589.0	10.0	-2.0	Y
* PM10 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 manufacturer.							

Table 4-3
 Summary of Audit Findings
 West FRM Sampler
 Alton Coal Development
 Alton, Utah
 October 16, 2012

Parameter	Manufacturer	Instrument Serial No.	Designated Audit Value	Sampler Observed	Accuracy Goal (±)	Difference	Within Accuracy Goal
FRM PM₁₀	BGI	PQ200-N963B					
Lk Ck External			99.0	97.0	5.0	-1.0	Y
Flow (Volumetric)			17.3	16.7	5.0	-3.8	Y
Flow (Design)			16.7	16.7	4.0	0.0	Y
Ambient Temperature			20.6	20.5	2.0	-0.11	Y
Filter Temperature			21.9	21.6	2.0	-0.3	Y
Ambient Pressure			590.0	589.0	10.0	-1.0	Y
* PM10 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 manufacturer.							

Table 4-4
 Summary of Meteorological Parameters Calibrations
 Alton Coal Development
 Alton, Utah
 October 16, 2012

Network: Alton Coal	Location: Alton, Utah	Site: Coal Hollow
Date: 10/16/12	Last Site Visit: 08/15/12	Field Specialist: Mike Slate

Parameter	Criteria	Accuracy Goal	Calibration Results					
			Pre-Maintenance			Post Maintenance		
			Mfg. Model # & Serial #	Value	Pass/Fail	Mfg. Model # & Serial #	Value	Pass/Fail
Precipitation	max error	$\leq \pm 10.0\%$	Hydrological Services TB4 05-94	5.4%	PASS	Hydrological Services TB4 05-94		
Temperature	max error	$\leq \pm 2.0^\circ \text{C}$	Campbell Scientific CS N/A	0.1°	PASS	Campbell Scientific CS N/A		
Wind Direction	<i>Alignment</i>	max error	Met One 034B E2281	3°	PASS	Met One 034B E2281		
	<i>Linearity</i>	max error		5°	FAIL			
Wind Speed	<i>max Wind Speed < 5</i>	max error	Met One 034B E2281	N/A	N/A	Met One 034B E2281	N/A	N/A
	<i>max Wind Speed >= 5</i>	max error		0.1%	PASS		0.1%	PASS

APPENDIX A
Audit Data Sheets

FRM PM_{2.5} Monitor Audit

Date: 10/16/2012 Network: Alton Coal Site: Background Site Auditor: Mike Slate

Manufacturer: BGI Model: PQ200 S/N: PQ200S-N962A

Audit Standards			
Flow Standard	Model BIOS Definer	S/N 117874	Cal. Date 12/15/2011
Temperature Std.	Model Eutechnics 4400	S/N 308288	Cal. Date 1/30/2012
BP Standard	Model BIOS Definer	S/N 117874	Cal. Date 12/15/2011

Leak Check*			
	Start Vacuum	End Vacuum	Difference
Lk Ck Ext (<5.0")	98.0	97.0	-1

Flow Audit lpm			
	Reference/Std	FRM Observed	% Difference
Flow (Volumetric)	17.26	16.67	-3.4
Flow (Design)	17.26	16.70	-3.2

Temperature °C			
	Reference/Std	FRM Observed	Difference
Ambient Temperature	19.36	19.1	-0.26
Filter Temperature	21.25	21.0	-0.3

Barometric Pressure mmHg			
	Reference/Std	FRM Observed	Difference
Ambient Pressure	584	584.0	0

FRM PM_{2.5} Monitor Audit

Date: 10/16/2012 Network: Alton Coal Site: East Collocated Auditor: Mike Slate
 Manufacturer: BGI Model: PQ200 S/N: PQ200-N963B

Audit Standards			
Flow Standard	Model BIOS Definer	S/N 117874	Cal. Date 12/15/2011
Temperature Std.	Model Eutechnics 4400	S/N 308288	Cal. Date 1/30/2012
BP Standard	Model BIOS Definer	S/N 117874	Cal. Date 12/15/2011

Leak Check*			
	Start Vacuum	End Vacuum	Difference
Lk Ck Ext (<5.0")	103.0	102.0	-1

Flow Audit lpm			
	Reference/Std	FRM Observed	% Difference
Flow (Volumetric)	16.89	16.67	-1.3
Flow (Design)	16.70	16.67	-0.2

Temperature °C			
	Reference/Std	FRM Observed	Difference
Ambient Temperature	19.71	19.5	-0.21
Filter Temperature	21.08	20.8	-0.3

Barometric Pressure mmHg			
	Reference/Std	FRM Observed	Difference
Ambient Pressure	591	589.0	-2

FRM PM_{2.5} Monitor Audit

Date: 10/16/2012 Network: Alton Coal Site: West Collocated Auditor: Mike Slate

Manufacturer: BGI Model: PQ200 S/N: PQ200-N963C

Audit Standards			
Flow Standard	Model BIOS Definer	S/N 117874	Cal. Date 12/15/2011
Temperature Std.	Model Eutechnics 4400	S/N 308288	Cal. Date 1/30/2012
BP Standard	Model BIOS Definer	S/N 117874	Cal. Date 12/15/2011

Leak Check*			
	Start Vacuum	End Vacuum	Difference
Lk Ck Ext (<5.0")	99.0	97.0	-2

Flow Audit lpm			
	Reference/Std	FRM Observed	% Difference
Flow (Volumetric)	17.32	16.67	-3.8
Flow (Design)	16.70	16.70	0.0

Temperature °C			
	Reference/Std	FRM Observed	Difference
Ambient Temperature	20.61	20.5	-0.11
Filter Temperature	21.9	21.6	-0.3

Barometric Pressure mmHg			
	Reference/Std	FRM Observed	Difference
Ambient Pressure	590.0	589.0	-1



PRECIPITATION AND BAROMETRIC PRESSURE CALIBRATION FORM

Network: Alton Coal	Location: Alton, Utah	Site: Coal Hollow	Date: 10/16/12	Date of Last Site Visit: 08/15/12
				Field Specialist: Mike Slate

Barometric Pressure Reference S/N: N/A		Calibration Date:
Precipitation Reference S/N: N/A	Calibration Volume: 450 ml	Calibration Date:

PRECIPITATION

SENSOR IDENTIFICATION

	Pre-Maintenance	Post Maintenance
Mfg.	Hydrological Services	Hydrological Services
Model #	TB4	TB4
Serial #	05-94	05-94
Inlet Diameter	8.00"	

Reference

Calibration Volume	Reference		
	Inlet Diameter	mm	mm/tip
900 cc	6.06	48.3	4.73
	8.00	27.8	8.23
	9.66	19.0	4.73
	Novalyrx 260-2500	27.8	8.24
936 cc	6.06	50.3	4.73
	8.00	28.9	8.23
	9.66	19.8	4.73
	Novalyrx 260-2500	28.9	8.24

PRE-MAINTENANCE					POST MAINTENANCE				
Cal Volume (ml)	Designated value in mm	mm	% Difference	Pass/Fail	Cal Volume (ml)	Designated value in mm	mm	% Difference	Pass/Fail
450	0.56	0.59	5.4%	PASS	450				

Pre-Maint Precipitation Comments:	Data logger reports in inches, 14.99 inches (14.99/25.4 mm/inch=0.59 mm)
Post Maint Precipitation Comments:	

BAROMETRIC PRESSURE

SENSOR IDENTIFICATION

	PRE-MAINTENANCE	POST MAINTENANCE
Mfg.		
Model #		
Serial #		

SENSOR RESPONSE

PRE-MAINTENANCE					POST MAINTENANCE				
Reference	DVM (Volts)	DAS (mm Hg)	Difference	Pass/Fail	Reference	DVM (Volts)	DAS (mm Hg)	Difference	Pass/Fail
Maximum:					Maximum:				

Pre-Maint Barometric Pressure Comments:	
Post Maint Barometric Pressure Comments:	



TEMPERATURE AND RELATIVE HUMIDITY CALIBRATION FORM

Network: Alton Coal	Location: Alton, Utah	Site: Coal Hollow	Date: 10/16/12	Date of Last Site Visit: 08/15/12
				Field Specialist: Mike State

Reference Thermometer S/N: 308288	Calibration Date: 01/30/12
Relative Humidity Reference Sensor S/N: N/A	Calibration Date:

TEMPERATURE

SENSOR IDENTIFICATION		
	Pre-Maintenance	Post Maintenance
Mfg.	Campbell Scientific	Campbell Scientific
Model #	CS	CS
Serial #	N/A	N/A
Translator Serial #	N/A	N/A

PRE-MAINTENANCE SENSOR RESPONSE				
REF. TEMP (°C)	TEMPERATURE		Difference (°C)	Pass/Fail
	DVM (volts)	DAS (°C)		
0.2		0.2	0.0	PASS
22.8		22.8	-0.1	PASS
45.7		45.6	-0.1	PASS
Maximum Difference:			0.1	PASS

POST MAINTENANCE SENSOR RESPONSE				
REF. TEMP (°C)	TEMPERATURE		Difference (°C)	Pass/Fail
	DVM (volts)	DAS (°C)		
Maximum Difference:				

Pre-Maint Temperature Comments:	
Post Maint Temperature Comments:	

RELATIVE HUMIDITY

SENSOR IDENTIFICATION		
	Pre-Maintenance	Post Maintenance
Mfg.		
Model #		
Serial #		

PRE-MAINTENANCE SENSOR RESPONSE				
HOUR	DAS	T.STD	Difference	Pass/Fail
10:00				
11:00				
12:00				
13:00				
14:00				
16:00				
Average ABS % Difference:				
Maximum % Difference:				

POST MAINTENANCE SENSOR RESPONSE				
HOUR	DAS	T.STD	Difference	Pass/Fail
10:00				
11:00				
12:00				
13:00				
14:00				
16:00				
Average ABS % Difference:				
Maximum % Difference:				

Screen dirty/clogged on RH pre-maintenance sensor? (check one): Yes No

Pre-Maint Relative Humidity Comments:	
Post Maint Relative Humidity Comments:	



WIND DIRECTION CALIBRATION FORM

Network: Alton Coal	Location: Alton, Utah	Site: Coal Hollow	Date: 10/16/12	Date of Last Site Visit: 08/15/12
				Field Specialist: Mike Slate

To Landmark #1: 251 Degrees True	From Landmark #1: 71	LM Description: Tallest tower to the west
To Landmark #2: 119 Degrees True	From Landmark #2: 299	LM Description: Lone pine of ridge east of dome
Declination: Degrees		
Wind Direction Reference S/N: 5040791148		Calibration Date:

WIND DIRECTION

SENSOR IDENTIFICATION		
	PRE-MAINTENANCE	POST MAINTENANCE
Mfg.	Met One	Met One
Model #	034B	034B
Serial #	E2281	E2281
Translator Serial #	N/A	N/A

Land Mark Reference	PRE-MAINTENANCE				POST MAINTENANCE			
	DVM (volts)	DAS (degrees)	Degrees Difference	Pass/Fail	DVM (volts)	DAS (degrees)	Degrees Difference	Pass/Fail
To 1		251	0	PASS				
From 1		74	3	PASS				
To 2		116	-3	PASS				
From 2		297	-2	PASS				
Average Difference:			2	PASS	Average Difference:			
Maximum Difference:			3	PASS	Maximum Difference:			

Check Point	PRE-MAINTENANCE				POST MAINTENANCE			
	DVM (volts)	DAS (degrees)	Degrees Difference	Pass/Fail	DVM (volts)	DAS (degrees)	Degrees Difference	Pass/Fail
1		353	5	FAIL				
2		36	-2	PASS				
3		83	2	PASS				
4		127	-1	PASS				
5		170	-2	PASS				
6		216	1	PASS				
7		258	-3	PASS				
8		303	0	PASS				
Average Difference:			2	PASS	Average Difference:			
Maximum Difference:			5	FAIL	Maximum Difference:			

Pre-Maint Wind Direction Comments:	Sent replacement bearings and potentiometer.
Post Maint Wind Direction Comments:	



WIND SPEED CALIBRATION FORM

Network: Alton Coal	Location: Alton, Utah	Site: Coal Hollow	Date: 10/16/12	Date of Last Site Visit: 08/15/12
				Field Specialist: Mike Slate

Wind Speed Reference S/N: CA 03806	Calibration Date: 12/13/11
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WIND SPEED

SENSOR IDENTIFICATION

	PRE-MAINTENANCE	POST MAINTENANCE
Mfg.	Met One	Met One
Model #	034B	034B
Serial #	E2281	E2281
Translator Serial #	N/A	N/A

Motor Speed (rpm)	WIND SPEED PRE-MAINTENANCE						WIND SPEED POST MAINTENANCE					
	Met One (mA)	DVM (volts)	DAS (m/s)	Difference (m/s)	% Difference	Pass/Fail	DVM (volts)	DAS (m/s)	Difference (m/s)	% Difference	Pass/Fail	
300	8.27		8.27	0.00	0.0%	PASS		8.27	0.00	0.0%	PASS	
600	16.27		16.26	-0.01	-0.1%	PASS		16.26	-0.01	-0.1%	PASS	
900	24.25											
1200	32.24											
1800	48.22											
Maximum ABS Difference (use if Wind Speed <5):				0.010					0.010			
Maximum ABS % Difference (use if Wind Speed >=5):					0.1%	PASS				0.1%	PASS	

Pre-Maint Wind Speed Comments:	Performed checks in both clockwise and counter clockwise direction.
Post Maint Wind Speed Comments:	

APPENDIX B
Audit Standards Certifications



MesaLabs



Calibration Certificate

Certificate No.	5010692	Sold to:	Air Resource Specialists - Fort Collins
Product	Definer 220 High Flow		1901 Sharp Point Drive, Suite E
Serial No.	117874		Fort Collins, CO 80525
Cal. Date	12/15/2011		USA

All calibrations are performed in accordance with ISO 17025 at Bios International, a division of Mesa Laboratories, Inc., 10 Park Place, Butler, NJ, 07405, 800-663-4977, an ISO 17025:2005 - accredited laboratory through NVLAP. This report shall not be reproduced except in full without the written approval of the laboratory. Results only relate to the items calibrated. This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

All units tested in accordance with our test number PR18-13 using high-purity nitrogen or filtered laboratory air.

As Received Calibration Data

Technician	Sonia Otero	Lab. Pressure	766 mmHg
		Lab. Temperature	22.4 °C

Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Received
500.04 sccm	500.665 sccm	-0.12%	1.00%	In Tolerance
5017.4 sccm	5005.15 sccm	0.24%	1.00%	In Tolerance
3017.1 sccm	3005.7 sccm	0.38%	1.00%	In Tolerance
21.6 °C	22 °C	-0.4°C	±0.8°C	In Tolerance
766 mmHg	765 mmHg	1 mmHg	±3.5mmHg	In Tolerance

Bios International Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML-800-44	103521	11/15/2011	11/14/2012
Precision Thermometer	305460	8/15/2011	8/14/2012
Precision Barometer	2981392	5/27/2011	5/26/2012

Bios International, a division of Mesa Laboratories Inc. 10 Park Place Butler, NJ 07405 USA
(973) 492-8400 FAX (973) 492-8270 www.biosint.com www.mesalabs.com Symbol "MLAB" on the NASDAQ



MesaLabs



As Shipped Calibration Data

Certificate No. 5010692
Technician Sonia Otero

Lab. Pressure 755 mmHg
Lab. Temperature 22.5 °C

Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Shipped
503.07 sccm	501.82 sccm	0.25%	1.00%	In Tolerance
5014.1 sccm	5004.95 sccm	0.18%	1.00%	In Tolerance
30151 sccm	30036.5 sccm	0.38%	1.00%	In Tolerance
22.1 °C	22.1 °C	-	±0.8°C	In Tolerance
755 mmHg	755 mmHg	-	±3.5mmHg	In Tolerance

Bios International Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML-800-44	101897	11/3/2011	11/2/2012
Precision Thermometer	305460	8/15/2011	8/14/2012
Precision Barometer	2981392	5/27/2011	5/26/2012

Calibration Notes

Bios is an ISO 17025-accredited metrology laboratory. Each Bios primary gas flow standard is dynamically verified by comparing it to one of our laboratory standards, which is a Proven DryCal® Technology volumetric piston prover of much higher accuracy (±0.25 % or less) but of similar operating principles. For this purpose, a flow generator of ±0.10 % or less stability is used. Our laboratory standards are qualified by direct measurement of their dimensions (diameter, length and time) using NIST-traceable precision gauges and instruments, such as depth micrometers and laser micrometers. Calibration Certificates for these gauges and instruments are available upon request. Rigorous analyses of our laboratory standards' uncertainties have been performed, in accordance with The Guide to the Expression of Uncertainty in Measurement (the GUM), assuring their traceable accuracy.

Flow readings in sccm performed at STP of 21.1°C and 760 mm-Hg.

Technician Notes: _____

David W. Wilson, Chief Metrologist

Bios International, a division of Mesa Laboratories Inc. 10 Park Place Butler, NJ 07405 USA
(973) 492-8400 FAX (973) 492-8270 www.biosint.com www.mesalabs.com Symbol "MLAB" on the NASDAQ



MICRO PRECISION CALIBRATION
 22835 INDUSTRIAL PLACE
 GRASS VALLEY CA 95949
 (530) 268-1860

Certificate of Calibration

Date: 1/30/2012

Certificate #: 1661633

Customer:

AIR RESOURCE SPECIALIST, INC
 1901 SHARP POINT DR, STE E
 FORT COLLINS, CO, 80525

Purchase Order: A25785
 Work Order: 145249

MPC Control #: CJ6336
 Asset ID: N/A
 Gage Type: DIGITAL THERMOMETER
 Manufacturer: EUTECHNICS
 Model Number: 4400
 Size: N/A
 Temp./RH: 22 °C / 34 %

Serial Number: 308288
 Department: N/A
 Performed By: ANDREW BORICH
 Received Condition: IN TOLERANCE
 Returned Condition: IN TOLERANCE
 Cal Date: January 30, 2012
 Cal. Interval: 12 MONTHS
 Cal. Due Date: January 30, 2013

Found conditions meet or exceed manufacturer specifications.

*Calibration Notes:

Test Points

Description	Standard	Tolerance -	Tolerance +	As Found	As Left	UOM	Result
TEMPERTATURE	0.00	-0.03	0.03	0.00	0.00	°C	Pass
TEMPERTATURE	22.00	21.97	22.03	22.01	22.01	°C	Pass
TEMPERTATURE	100.00	99.97	100.03	99.99	99.99	°C	Pass

Standards Used To Calibrate Equipment

I.D.	Description	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
AG7135	RTD THERMOMETER	A1011	T1019-7090	AZONIX	11/21/2012	1590511
AV2077	MICRO-BATH W/AV2076	7012 & 2083	A83355	HART SCIENTIFIC	2/22/2012	1264248
CE4731	TEMPERATURE CALIBRATOR	D55	911552	JOFRA	11/3/2012	1585988

Procedures Used In This Event:

Procedure Name	Description
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Calibrating Technician: 
ANDREW BORICH

QC Approval: 
BRIAN GOLD

Unless Otherwise Noted, Uncertainty Estimated at ± 4 to 1. Uncertainties have been estimated at a 95 percent confidence level (k=2). Services rendered comply with ISO 17025:2005, ISO 9001:2008, ANSI/NCCL Z540-3, MPC Quality Manual, MPC CSD and with customer purchase order instructions

Calibration cycles and resulting due dates were submitted/approved by the customer. Any number of factors may cause an instrument to drift out of tolerance before the next scheduled calibration. Recalibration cycles should be based on frequency of use, environmental conditions and customer's established systematic accuracy. The information on this report, pertains only to the instrument identified.

All standards are traceable to the National Institute of Standards and Technology (NIST). Services rendered include proper manufacturer's service instructions and are warranted for no less than thirty (30) days. This report may not be reproduced in part or in whole without the prior written approval of the issuing MPC lab.



MICRO PRECISION CALIBRATION
22835 INDUSTRIAL PLACE
GRASS VALLEY CA 95949
(530) 268-1860

Certificate of Calibration

Date: 1/30/2012
THERMOMETER DIGITAL

THERMOMETER, DIG 17-20ST-183 (GEN)

Certificate #: 1661633

Calibrating Technician:

ANDREW BORICH

QC Approval:

BRIAN GOLD

Unless Otherwise Noted, Uncertainty Estimated at ≥ 4 to 1. Uncertainties have been estimated at a 95 percent confidence level (k=2). Services rendered comply with ISO 17025:2005, ISO 9001:2008, ANSI/NCSL Z540-3, MPC Quality Manual, MPC CSO and with customer purchase order instructions.

Calibration cycles and resulting due dates were submitted/approved by the customer. Any number of factors may cause an instrument to drift out of tolerance before the next scheduled calibration. Recalibration cycles should be based on frequency of use, environmental conditions and customer's established systematic accuracy. The information on this report, pertains only to the instrument identified.

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