

UTAH DEPARTMENT OF
ENVIRONMENTAL QUALITY

JAN 28 2021

DIVISION OF AIR QUALITY

Alton Coal Development, LLC.

Summary of PM₁₀ Data

Collected at Coal Hollow Mine, Utah

During the Fourth Quarter, 2020

ID # 14047

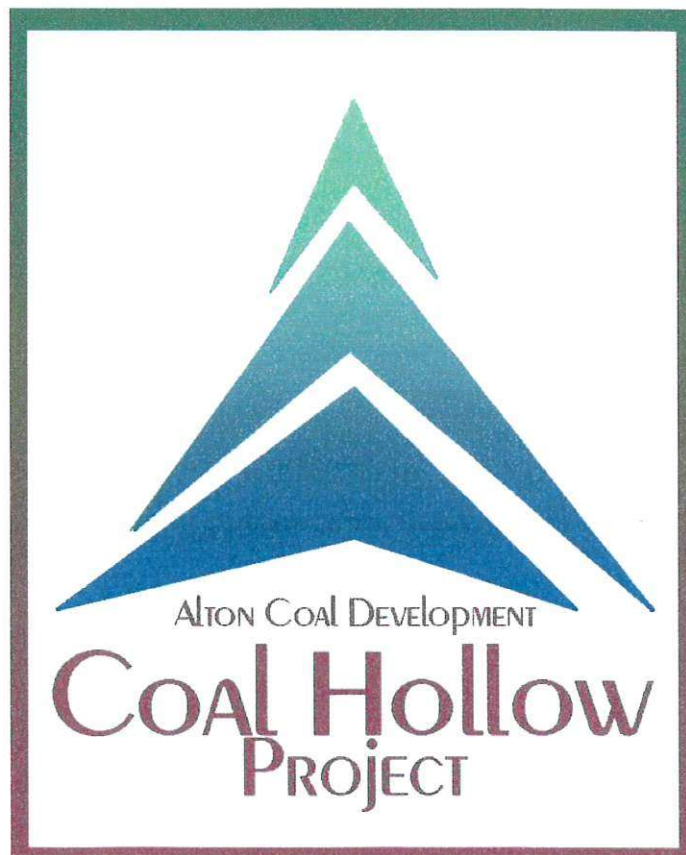
DAQ-2021-001822

Submitted to:

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

Prepared by:

Alton Coal Development, LLC.
463 N 100W, Suite 1
Cedar City, Utah 84721
Contact: Kirk Nicholes
435.867.5331



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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 five 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 five 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 2020.

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 1 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 three 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 for the Coal Hollow Mine (CHM) 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 background monitor coordinates are Northing: 4140856, Easting 373119, (UTM) Datum NAD27, Zone 12. The CHM compliance monitor and the co-located monitor coordinates are Northing: 4140396, Easting 371147, (UTM) Datum NAD27, Zone 12. The North Private Lease area of the CHM is located in Sections 12, 13 of Township 39S, Range 6W and Sections 7, 18 of Township 39S, Range 5W. The compliance monitor for the North Private Lease has a manufactures serial #2366, therefore this monitor will be referred as monitor 2366D. The co-located monitor has a manufactures serial #2398, therefore this monitor will be referred as monitor 2398E. The NPL compliance monitor and the co-located monitor coordinates are Northing: 4141570, Easting 370928, (UTM) Datum NAD27, Zone 12.

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Figure 1 - Site Location Map

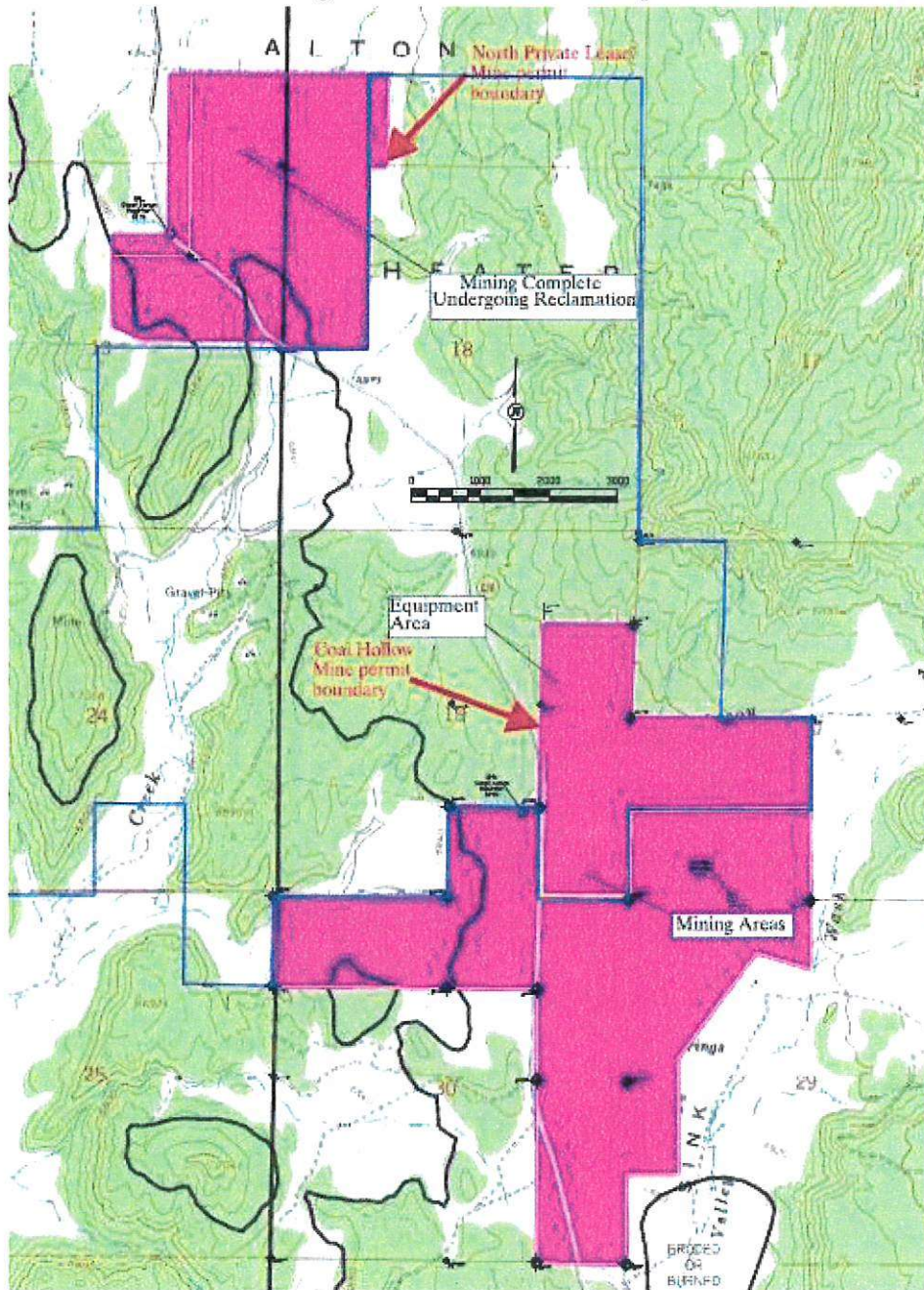
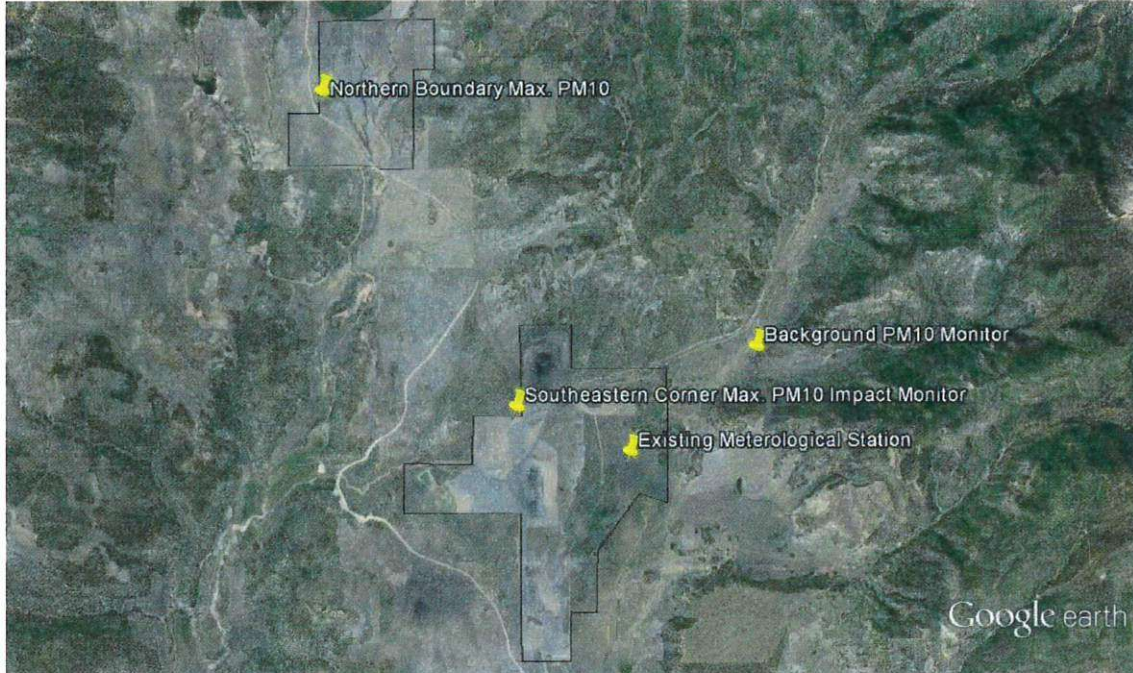


Figure 2 - Satellite View of Monitoring Locations



3.0 AIR QUALITY DATA SUMMARIES

A listing of the measured PM₁₀ 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 PM₁₀ concentration during the midnight to midnight data collection cycle. As required by the operating permit for the CHM, 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 quarterly mean PM₁₀ 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. Also, required by the operating permit for the NPL, duplicate measurements were made with Sampler #2366D (designated as a compliance monitor) and Sampler #2398E (designated as a co-located sampler) to the extent possible. The quarterly mean PM₁₀ concentration and the comparison of measured concentrations to standards are based on measurements from the primary Sampler #2366D. If a measurement from Sampler #2366D was missing or invalid, the measurement from the secondary Sampler #2398E would be used.

The highest 24-hour mean PM₁₀ concentrations measured during the quarter from the three monitoring locations are summarized in Table I, Table II, Table III, Table IV and Table V. The three highest concentrations, # of valid samples, and the arithmetic mean concentrations from each of the sites are listed. All measured PM₁₀ concentrations were below the 24-hour National Ambient Air Quality Standard (NAAQS) of 150 µg/m³.

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

RANK	DATE	PM ₁₀ CONCENTRATION
Highest	10/6/20	21.9
2 nd Highest	10/24/20	13.1
Monthly Mean	10/1/20-10/31/20	10.9
Monthly Mean	11/1/20-11/30/20	3.7
Monthly Mean	12/1/20-12/31/20	5.4
Quarterly Mean	10/1/20-12/31/20 (15 valid samples)	6.7

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

RANK	DATE	PM ₁₀ CONCENTRATION
Highest	10/6/20	119.6
2 nd Highest	10/12/20	77.7
Monthly Mean	10/1/20-10/31/20	56.6
Monthly Mean	11/1/20-11/30/20	N/A*
Monthly Mean	12/1/20-12/31/20	N/A*
Quarterly Mean	10/1/20-12/31/20 (4 valid samples)	67.5

*B monitor was down for repairs in November and December

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

RANK	DATE	PM ₁₀ CONCENTRATION
Highest	10/6/20	124.2
2 nd Highest	11/17/20	113.7
Monthly Mean	10/1/20-10/31/20	57.3
Monthly Mean	11/1/20-11/30/20	40.7
Monthly Mean	12/1/20-12/31/20	27.1
Quarterly Mean	10/1/20-12/31/20 (13 valid samples)	41.8

**Table IV - Summary of Measured PM₁₀ Concentrations (µg/m³)
Compliance Monitor – 2366D**

RANK	DATE	PM ₁₀ CONCENTRATION
Highest	10/12/20	82.6
2 nd Highest	12/23/20	59.8
Monthly Mean	10/1/20-10/31/20	42.0
Monthly Mean	11/1/20-11/30/20	30.3
Monthly Mean	12/1/20-12/31/20	26.2
Quarterly Mean	10/1/20-12/31/20 (9 valid samples)	33.7

**Table V - Summary of Measured PM₁₀ Concentrations (µg/m³)
Collocated Monitor – 2398E**

RANK	DATE	PM ₁₀ CONCENTRATION
Highest	10/12/20	72.6
2 nd Highest	10/6/20	60.7
Monthly Mean	10/1/20-10/31/20	39.6
Monthly Mean	11/1/20-11/30/20	13.3
Monthly Mean	12/1/20-12/31/20	25.9
Quarterly Mean	10/1/20-12/31/20 (15 valid samples)	26.2

Table VI – Mean Quarterly and Monthly Wind Speed

	4th Quarter 2020	Oct.	Nov.	Dec.
Mean Wind Speed (m/s)	3.07	3.35	2.90	2.96

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 4 of the 4 samples during the quarter. The percent recovery for this quarter is 27%. For the sample date of October 30th through December 29th the monitor had incomplete runs which were later determined to be a worn out bearing in the pump.

Monitor 964C

Monitor 964C collected 13 of the 15 samples during the quarter. The percent recovery for this quarter is 87%. For the sample dates of November 5th, the monitor did not complete the 24hr sample period. For the sample date of November 11th, an expired filter was used making it an invalid run.

Monitor 2366D

Monitor 2366D collected 9 of the 15 samples during the quarter. The percent recovery for this quarter is 60%. For the dates of October 30th and November 11th through December 5th, the monitor did not run due to a faulty mother board that was affected by colder temperatures.

Monitor 2398E

Monitor 2398E collected 15 of the 15 samples during the quarter. The percent recovery for this quarter is 100%.

The PM₁₀ data recoveries for the five monitoring stations are presented below:

Table VII - Summary of Data Recovery

SAMPLER	POSSIBLE SAMPLES	VALID SAMPLES	PERCENT DATA RECOVERY
962A	15	15	100%
963B	15	4	27%
964C	15	13	87%
2366D	15	9	60%
2398E	15	15	100%

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 at the Coal Hollow Mine and 2366D and 2398E at the North Private Lease. 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 at the Coal Hollow Mine were developed based on 4 valid pairs of co-located monitoring data during the quarter due to equipment malfunctions with both the 962 B and the 963C monitor. Single point precision based on *40 CFR, Part 58, Appendix A Equation 2* results were -16.6% to 27.5%. The aggregate coefficient of variability (CV) calculated in accordance with *40 CFR, Part 58, Appendix A Equation 11* is 31.2%. This value is not within the 10% goal for aggregate CV.

Precision calculations at the North Private Lease were developed based on only 9 valid pairs of co-located monitoring data during the quarter due to equipment malfunctions with the 2366D monitor. Single point precision based on *40 CFR, Part 58, Appendix A Equation 2* results were -73.5% to 58.3%. The aggregate coefficient of variability (CV) calculated in accordance with *40 CFR, Part 58, Appendix A Equation 11* is 44.4%. This value is not within the 10% goal for aggregate CV.

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 28, 2020. A copy of the audit report is presented in Appendix E and is summarized in Table VI. The audit results indicate that all five samplers were operating properly.

Table VIII- Audit Summary

SAMPLER	AUDIT % DIFFERENCE	LIMIT*	DESIGN % DIFFERENCE	LIMIT*
962A	1.8	±4%	-1.8	± 5%
963B	-0.4	±4%	0.4	± 5%
964C	0.4	±4%	-0.3	± 5%
2366D	0.4	±4%	-0.4	± 5%
2398E	-2.3	±4%	2.4	± 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 were performed by a site technician at the time of the audit. 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

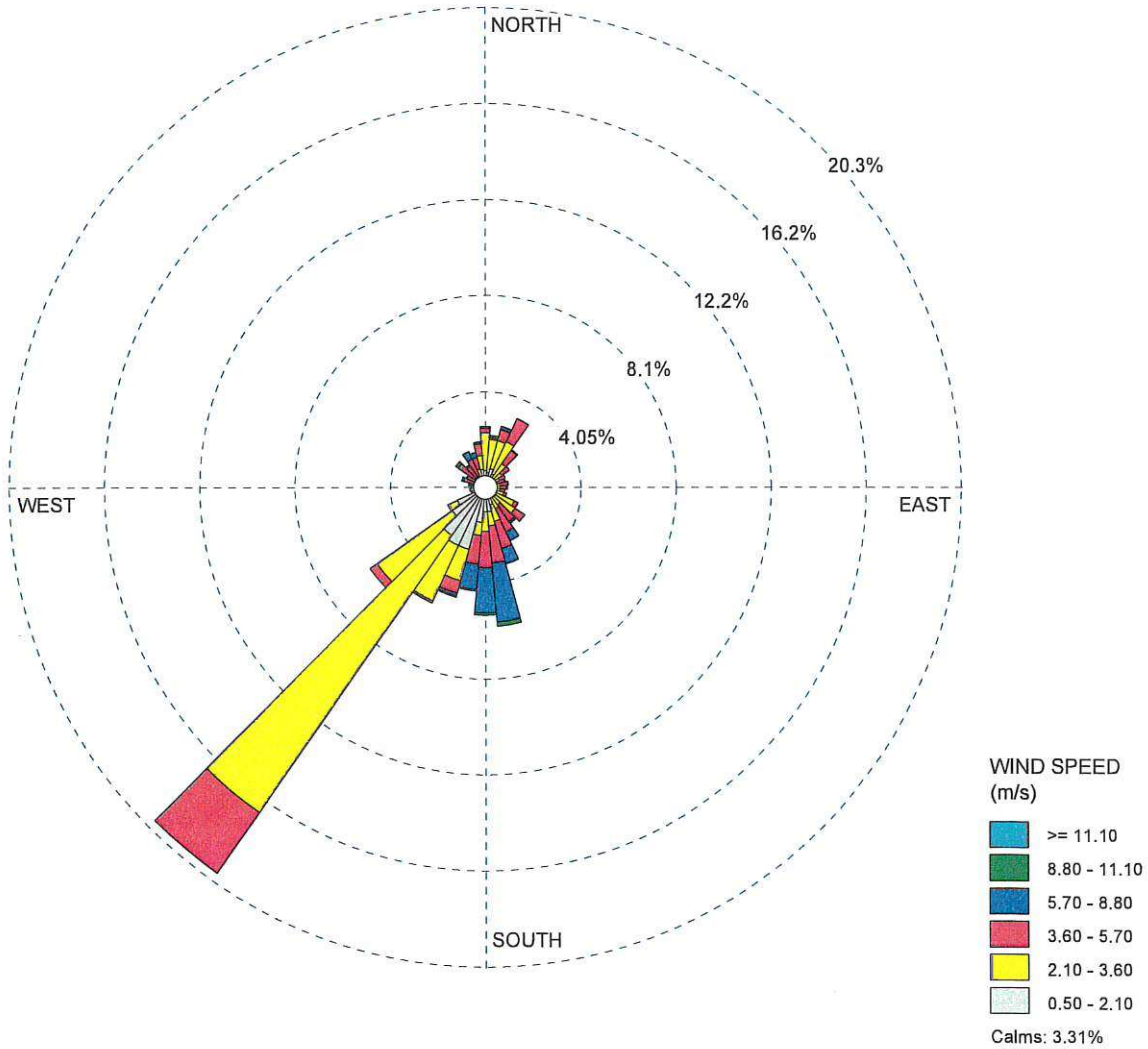
Windrose

WIND ROSE PLOT:

**Alton Coal Development, LLC - Coal Hollow Mine
4th Quarter_2020**

DISPLAY:

**Wind Speed
Flow Vector (blowing to)**



COMMENTS:

DATA PERIOD:

**Start Date: 10/1/2020 - 00:00
End Date: 12/31/2020 - 23:00**

COMPANY NAME:

Alton Coal Development, LLC - Coal Hollow Mine

MODELER:

B. Kirk Nicholes

CALM WINDS:

3.31%

TOTAL COUNT:

2208 hrs.

AVG. WIND SPEED:

3.07 m/s

DATE:

1/6/2021

PROJECT NO.:



Station ID: 1
 Start Date: 10/1/2020 - 00:00
 End Date: 12/31/2020 - 23:00

Run ID: ACD_CHM

Frequency Distribution
 (Count)

	Flow Vector (Blowing To) / Wind Speed (m/s)						
	0.50 - 2.10	2.10 - 3.60	3.60 - 5.70	5.70 - 8.80	8.80 - 11.10	>= 11.10	Total
355-5	16	35	4	1	1	0	57
5-15	14	31	2	0	2	0	49
15-25	18	27	11	3	0	0	59
25-35	14	33	24	0	0	0	71
35-45	8	19	15	1	0	0	43
45-55	6	13	9	0	0	0	28
55-65	2	13	6	0	0	0	21
65-75	7	2	10	1	0	0	20
75-85	7	7	7	1	0	0	22
85-95	6	8	6	1	0	0	21
95-105	8	6	5	0	0	0	19
105-115	5	13	3	0	0	0	21
115-125	7	23	4	0	0	0	34
125-135	12	22	11	0	0	0	45
135-145	10	10	19	2	0	0	41
145-155	10	12	24	9	0	0	55
155-165	17	16	26	15	0	0	74
165-175	23	13	35	55	4	0	130
175-185	23	18	34	42	2	0	119
185-195	33	12	27	24	1	0	97
195-205	60	30	12	3	1	0	106
205-215	60	57	2	0	0	0	119
215-225	55	314	69	0	0	0	438
225-235	38	86	8	0	0	0	132
235-245	29	10	0	0	0	0	39
245-255	9	4	1	0	0	0	14
255-265	11	4	0	0	0	0	15
265-275	9	4	0	0	0	0	13
275-285	6	6	0	4	0	0	16
285-295	5	5	11	2	0	0	23
295-305	4	6	9	1	0	0	20
305-315	5	7	19	3	0	0	34
315-325	5	7	12	2	0	0	26
325-335	8	4	17	8	0	0	37
335-345	5	13	11	5	0	0	34
345-355	17	13	11	1	1	0	43
Total	572	903	464	184	12	0	2208

Frequency of Calm Winds: 73
 Average Wind Speed: 3.07 m/s

Station ID: 1
 Start Date: 10/1/2020 - 00:00
 End Date: 12/31/2020 - 23:00

Run ID: ACD_CHM

Frequency Distribution
 (Normalized)

Flow Vector (Blowing To) / Wind Speed (m/s)

	0.50 - 2.10	2.10 - 3.60	3.60 - 5.70	5.70 - 8.80	8.80 - 11.10	>= 11.10	Total
355-5	0.007246	0.015851	0.001812	0.000453	0.000453	0.000000	0.025815
5-15	0.006341	0.014040	0.000906	0.000000	0.000906	0.000000	0.022192
15-25	0.008152	0.012228	0.004982	0.001359	0.000000	0.000000	0.026721
25-35	0.006341	0.014946	0.010870	0.000000	0.000000	0.000000	0.032156
35-45	0.003623	0.008605	0.006793	0.000453	0.000000	0.000000	0.019475
45-55	0.002717	0.005888	0.004076	0.000000	0.000000	0.000000	0.012681
55-65	0.000906	0.005888	0.002717	0.000000	0.000000	0.000000	0.009511
65-75	0.003170	0.000906	0.004529	0.000453	0.000000	0.000000	0.009058
75-85	0.003170	0.003170	0.003170	0.000453	0.000000	0.000000	0.009964
85-95	0.002717	0.003623	0.002717	0.000453	0.000000	0.000000	0.009511
95-105	0.003623	0.002717	0.002264	0.000000	0.000000	0.000000	0.008605
105-115	0.002264	0.005888	0.001359	0.000000	0.000000	0.000000	0.009511
115-125	0.003170	0.010417	0.001812	0.000000	0.000000	0.000000	0.015399
125-135	0.005435	0.009964	0.004982	0.000000	0.000000	0.000000	0.020380
135-145	0.004529	0.004529	0.008605	0.000906	0.000000	0.000000	0.018569
145-155	0.004529	0.005435	0.010870	0.004076	0.000000	0.000000	0.024909
155-165	0.007699	0.007246	0.011775	0.006793	0.000000	0.000000	0.033514
165-175	0.010417	0.005888	0.015851	0.024909	0.001812	0.000000	0.058877
175-185	0.010417	0.008152	0.015399	0.019022	0.000906	0.000000	0.053895
185-195	0.014946	0.005435	0.012228	0.010870	0.000453	0.000000	0.043931
195-205	0.027174	0.013587	0.005435	0.001359	0.000453	0.000000	0.048007
205-215	0.027174	0.025815	0.000906	0.000000	0.000000	0.000000	0.053895
215-225	0.024909	0.142210	0.031250	0.000000	0.000000	0.000000	0.198370
225-235	0.017210	0.038949	0.003623	0.000000	0.000000	0.000000	0.059783
235-245	0.013134	0.004529	0.000000	0.000000	0.000000	0.000000	0.017663
245-255	0.004076	0.001812	0.000453	0.000000	0.000000	0.000000	0.006341
255-265	0.004982	0.001812	0.000000	0.000000	0.000000	0.000000	0.006793
265-275	0.004076	0.001812	0.000000	0.000000	0.000000	0.000000	0.005888
275-285	0.002717	0.002717	0.000000	0.001812	0.000000	0.000000	0.007246
285-295	0.002264	0.002264	0.004982	0.000906	0.000000	0.000000	0.010417
295-305	0.001812	0.002717	0.004076	0.000453	0.000000	0.000000	0.009058
305-315	0.002264	0.003170	0.008605	0.001359	0.000000	0.000000	0.015399
315-325	0.002264	0.003170	0.005435	0.000906	0.000000	0.000000	0.011775
325-335	0.003623	0.001812	0.007699	0.003623	0.000000	0.000000	0.016757
335-345	0.002264	0.005888	0.004982	0.002264	0.000000	0.000000	0.015399
345-355	0.007699	0.005888	0.004982	0.000453	0.000453	0.000000	0.019475
Total	0.259058	0.408967	0.210145	0.083333	0.005435	0.000000	0.966938

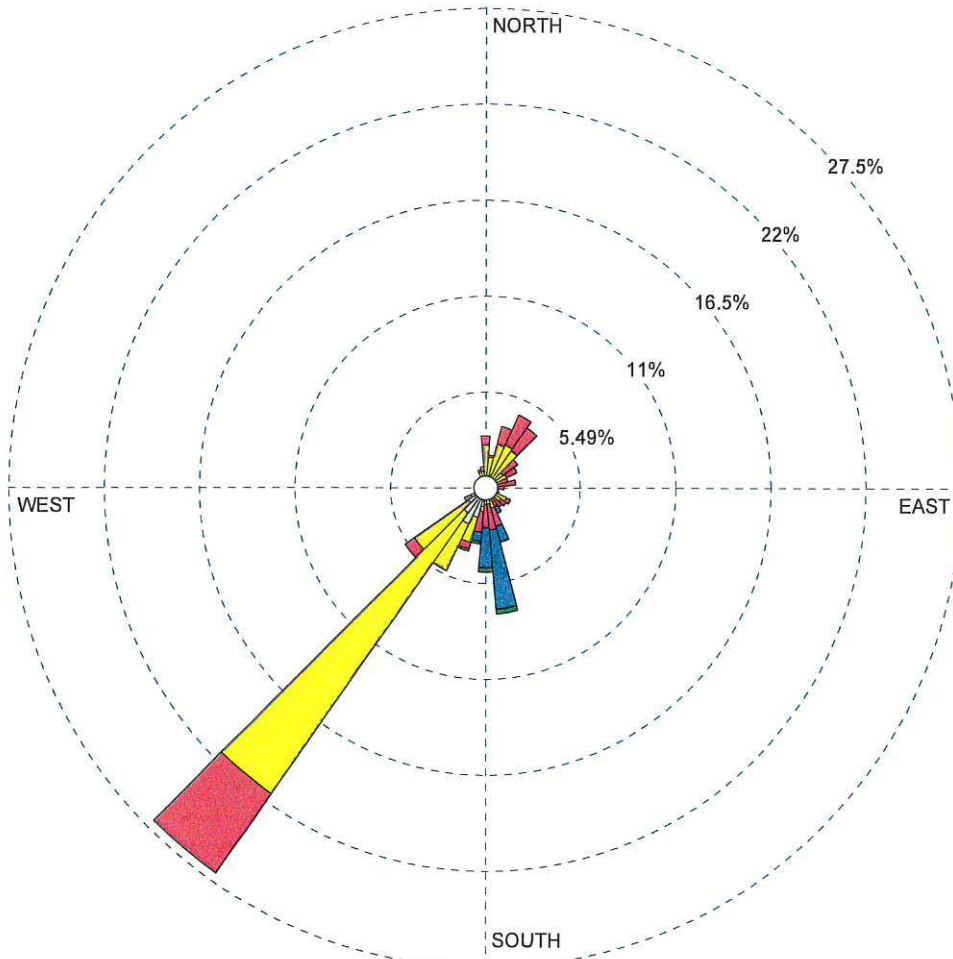
Frequency of Calm Winds: 3.31%
 Average Wind Speed: 3.07 m/s

WIND ROSE PLOT:

Alton Coal Development, LLC - Coal Hollow Mine
October_2020

DISPLAY:


Wind Speed
Flow Vector (blowing to)



WIND SPEED
(m/s)

- >= 11.10
- 8.80 - 11.10
- 5.70 - 8.80
- 3.60 - 5.70
- 2.10 - 3.60
- 0.50 - 2.10

Calms: 0.00%

COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 10/1/2020 - 00:00 End Date: 10/31/2020 - 23:00	Alton Coal Development, LLC - Coal Hollow Mine	
	CALM WINDS:	MODELER:	
	0.00%	B. Kirk Nicholes	
AVG. WIND SPEED:	TOTAL COUNT:	DATE:	PROJECT NO.:
3.35 m/s	744 hrs.	1/6/2021	

Station ID: 1
 Start Date: 10/1/2020 - 00:00
 End Date: 10/31/2020 - 23:00

Run ID: ACD_CHM

Frequency Distribution
 (Count)

	Flow Vector (Blowing To) / Wind Speed (m/s)						Total
	0.50 - 2.10	2.10 - 3.60	3.60 - 5.70	5.70 - 8.80	8.80 - 11.10	>= 11.10	
355-5	4	14	4	0	0	0	22
5-15	4	9	1	0	0	0	14
15-25	6	13	8	0	0	0	27
25-35	2	18	14	0	0	0	34
35-45	4	15	12	0	0	0	31
45-55	1	8	8	0	0	0	17
55-65	0	10	5	0	0	0	15
65-75	1	1	8	0	0	0	10
75-85	3	3	7	0	0	0	13
85-95	2	3	3	0	0	0	8
95-105	1	1	3	0	0	0	5
105-115	1	3	2	0	0	0	6
115-125	4	6	2	0	0	0	12
125-135	4	4	3	0	0	0	11
135-145	2	2	6	0	0	0	10
145-155	2	2	5	3	0	0	12
155-165	6	3	8	7	0	0	24
165-175	5	2	11	34	2	0	54
175-185	3	4	10	17	2	0	36
185-195	8	2	9	4	1	0	24
195-205	13	11	3	0	1	0	28
205-215	17	22	0	0	0	0	39
215-225	13	146	41	0	0	0	200
225-235	9	28	5	0	0	0	42
235-245	7	3	0	0	0	0	10
245-255	0	2	0	0	0	0	2
255-265	3	0	0	0	0	0	3
265-275	4	1	0	0	0	0	5
275-285	2	0	0	0	0	0	2
285-295	2	0	0	0	0	0	2
295-305	1	1	0	0	0	0	2
305-315	0	2	0	0	0	0	2
315-325	1	1	0	0	0	0	2
325-335	2	1	0	0	0	0	3
335-345	3	4	1	0	0	0	8
345-355	5	2	2	0	0	0	9
Total	145	347	181	65	6	0	744

Frequency of Calm Winds: 0
 Average Wind Speed: 3.35 m/s

Station ID: 1
 Start Date: 10/1/2020 - 00:00
 End Date: 10/31/2020 - 23:00

Run ID: ACD_CHM

Frequency Distribution
 (Normalized)

Flow Vector (Blowing To) / Wind Speed (m/s)

	0.50 - 2.10	2.10 - 3.60	3.60 - 5.70	5.70 - 8.80	8.80 - 11.10	>= 11.10	Total
355-5	0.005376	0.018817	0.005376	0.000000	0.000000	0.000000	0.029570
5-15	0.005376	0.012097	0.001344	0.000000	0.000000	0.000000	0.018817
15-25	0.008065	0.017473	0.010753	0.000000	0.000000	0.000000	0.036290
25-35	0.002688	0.024194	0.018817	0.000000	0.000000	0.000000	0.045699
35-45	0.005376	0.020161	0.016129	0.000000	0.000000	0.000000	0.041667
45-55	0.001344	0.010753	0.010753	0.000000	0.000000	0.000000	0.022849
55-65	0.000000	0.013441	0.006720	0.000000	0.000000	0.000000	0.020161
65-75	0.001344	0.001344	0.010753	0.000000	0.000000	0.000000	0.013441
75-85	0.004032	0.004032	0.009409	0.000000	0.000000	0.000000	0.017473
85-95	0.002688	0.004032	0.004032	0.000000	0.000000	0.000000	0.010753
95-105	0.001344	0.001344	0.004032	0.000000	0.000000	0.000000	0.006720
105-115	0.001344	0.004032	0.002688	0.000000	0.000000	0.000000	0.008065
115-125	0.005376	0.008065	0.002688	0.000000	0.000000	0.000000	0.016129
125-135	0.005376	0.005376	0.004032	0.000000	0.000000	0.000000	0.014785
135-145	0.002688	0.002688	0.008065	0.000000	0.000000	0.000000	0.013441
145-155	0.002688	0.002688	0.006720	0.004032	0.000000	0.000000	0.016129
155-165	0.008065	0.004032	0.010753	0.009409	0.000000	0.000000	0.032258
165-175	0.006720	0.002688	0.014785	0.045699	0.002688	0.000000	0.072581
175-185	0.004032	0.005376	0.013441	0.022849	0.002688	0.000000	0.048387
185-195	0.010753	0.002688	0.012097	0.005376	0.001344	0.000000	0.032258
195-205	0.017473	0.014785	0.004032	0.000000	0.001344	0.000000	0.037634
205-215	0.022849	0.029570	0.000000	0.000000	0.000000	0.000000	0.052419
215-225	0.017473	0.196237	0.055108	0.000000	0.000000	0.000000	0.268817
225-235	0.012097	0.037634	0.006720	0.000000	0.000000	0.000000	0.056452
235-245	0.009409	0.004032	0.000000	0.000000	0.000000	0.000000	0.013441
245-255	0.000000	0.002688	0.000000	0.000000	0.000000	0.000000	0.002688
255-265	0.004032	0.000000	0.000000	0.000000	0.000000	0.000000	0.004032
265-275	0.005376	0.001344	0.000000	0.000000	0.000000	0.000000	0.006720
275-285	0.002688	0.000000	0.000000	0.000000	0.000000	0.000000	0.002688
285-295	0.002688	0.000000	0.000000	0.000000	0.000000	0.000000	0.002688
295-305	0.001344	0.001344	0.000000	0.000000	0.000000	0.000000	0.002688
305-315	0.000000	0.002688	0.000000	0.000000	0.000000	0.000000	0.002688
315-325	0.001344	0.001344	0.000000	0.000000	0.000000	0.000000	0.002688
325-335	0.002688	0.001344	0.000000	0.000000	0.000000	0.000000	0.004032
335-345	0.004032	0.005376	0.001344	0.000000	0.000000	0.000000	0.010753
345-355	0.006720	0.002688	0.002688	0.000000	0.000000	0.000000	0.012097
Total	0.194892	0.466398	0.243280	0.087366	0.008065	0.000000	1.000000

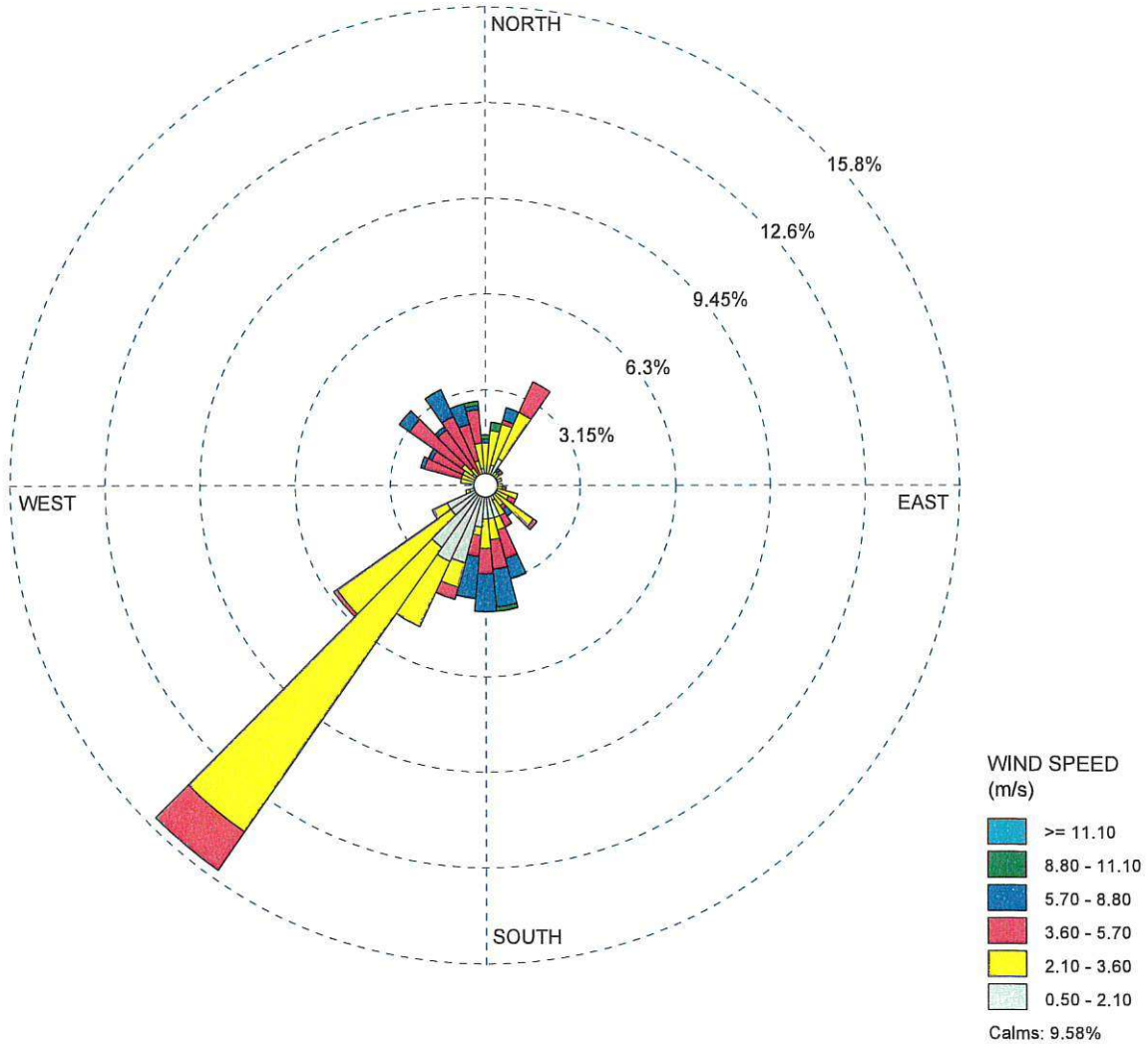
Frequency of Calm Winds: 0.00%
 Average Wind Speed: 3.35 m/s

WIND ROSE PLOT:

**Alton Coal Development, LLC - Coal Hollow Mine
November_2020**

DISPLAY:

**Wind Speed
Flow Vector (blowing to)**



COMMENTS:

DATA PERIOD:

**Start Date: 11/1/2020 - 00:00
End Date: 11/30/2020 - 23:00**

COMPANY NAME:

Alton Coal Development, LLC - Coal Hollow Mine

MODELER:

B. Kirk Nicholes

CALM WINDS:

9.58%

TOTAL COUNT:

720 hrs.

AVG. WIND SPEED:

2.90 m/s

DATE:

1/6/2021

PROJECT NO.:



Station ID: 1
 Start Date: 11/1/2020 - 00:00
 End Date: 11/30/2020 - 23:00

Run ID: ACD_CHM

Frequency Distribution
 (Count)

	Flow Vector (Blowing To) / Wind Speed (m/s)						Total
	0.50 - 2.10	2.10 - 3.60	3.60 - 5.70	5.70 - 8.80	8.80 - 11.10	>= 11.10	
355-5	3	7	0	1	1	0	12
5-15	2	11	0	0	2	0	15
15-25	5	10	1	3	0	0	19
25-35	7	12	8	0	0	0	27
35-45	2	2	0	1	0	0	5
45-55	1	3	1	0	0	0	5
55-65	2	0	1	0	0	0	3
65-75	3	1	0	0	0	0	4
75-85	1	2	0	0	0	0	3
85-95	1	3	0	0	0	0	4
95-105	2	2	1	0	0	0	5
105-115	3	5	0	0	0	0	8
115-125	1	5	2	0	0	0	8
125-135	3	11	1	0	0	0	15
135-145	3	3	1	2	0	0	9
145-155	4	4	3	0	0	0	11
155-165	8	3	7	5	0	0	23
165-175	8	5	7	9	1	0	30
175-185	8	7	6	9	0	0	30
185-195	10	2	5	10	0	0	27
195-205	19	6	3	0	0	0	28
205-215	20	17	0	0	0	0	37
215-225	18	82	11	0	0	0	111
225-235	10	33	1	0	0	0	44
235-245	10	4	0	0	0	0	14
245-255	4	1	0	0	0	0	5
255-265	3	0	0	0	0	0	3
265-275	2	0	0	0	0	0	2
275-285	1	5	0	0	0	0	6
285-295	2	4	9	1	0	0	16
295-305	1	5	8	1	0	0	15
305-315	4	3	15	3	0	0	25
315-325	0	5	11	1	0	0	17
325-335	2	0	16	7	0	0	25
335-345	0	6	9	5	0	0	20
345-355	4	6	8	1	1	0	20
Total	177	275	135	59	5	0	720

Frequency of Calm Winds: 69
 Average Wind Speed: 2.90 m/s

Station ID: 1
 Start Date: 11/1/2020 - 00:00
 End Date: 11/30/2020 - 23:00

Run ID: ACD_CHM

Frequency Distribution
 (Normalized)

Flow Vector (Blowing To) / Wind Speed (m/s)

	0.50 - 2.10	2.10 - 3.60	3.60 - 5.70	5.70 - 8.80	8.80 - 11.10	>= 11.10	Total
355-5	0.004167	0.009722	0.000000	0.001389	0.001389	0.000000	0.016667
5-15	0.002778	0.015278	0.000000	0.000000	0.002778	0.000000	0.020833
15-25	0.006944	0.013889	0.001389	0.004167	0.000000	0.000000	0.026389
25-35	0.009722	0.016667	0.011111	0.000000	0.000000	0.000000	0.037500
35-45	0.002778	0.002778	0.000000	0.001389	0.000000	0.000000	0.006944
45-55	0.001389	0.004167	0.001389	0.000000	0.000000	0.000000	0.006944
55-65	0.002778	0.000000	0.001389	0.000000	0.000000	0.000000	0.004167
65-75	0.004167	0.001389	0.000000	0.000000	0.000000	0.000000	0.005556
75-85	0.001389	0.002778	0.000000	0.000000	0.000000	0.000000	0.004167
85-95	0.001389	0.004167	0.000000	0.000000	0.000000	0.000000	0.005556
95-105	0.002778	0.002778	0.001389	0.000000	0.000000	0.000000	0.006944
105-115	0.004167	0.006944	0.000000	0.000000	0.000000	0.000000	0.011111
115-125	0.001389	0.006944	0.002778	0.000000	0.000000	0.000000	0.011111
125-135	0.004167	0.015278	0.001389	0.000000	0.000000	0.000000	0.020833
135-145	0.004167	0.004167	0.001389	0.002778	0.000000	0.000000	0.012500
145-155	0.005556	0.005556	0.004167	0.000000	0.000000	0.000000	0.015278
155-165	0.011111	0.004167	0.009722	0.006944	0.000000	0.000000	0.031944
165-175	0.011111	0.006944	0.009722	0.012500	0.001389	0.000000	0.041667
175-185	0.011111	0.009722	0.008333	0.012500	0.000000	0.000000	0.041667
185-195	0.013889	0.002778	0.006944	0.013889	0.000000	0.000000	0.037500
195-205	0.026389	0.008333	0.004167	0.000000	0.000000	0.000000	0.038889
205-215	0.027778	0.023611	0.000000	0.000000	0.000000	0.000000	0.051389
215-225	0.025000	0.113889	0.015278	0.000000	0.000000	0.000000	0.154167
225-235	0.013889	0.045833	0.001389	0.000000	0.000000	0.000000	0.061111
235-245	0.013889	0.005556	0.000000	0.000000	0.000000	0.000000	0.019444
245-255	0.005556	0.001389	0.000000	0.000000	0.000000	0.000000	0.006944
255-265	0.004167	0.000000	0.000000	0.000000	0.000000	0.000000	0.004167
265-275	0.002778	0.000000	0.000000	0.000000	0.000000	0.000000	0.002778
275-285	0.001389	0.006944	0.000000	0.000000	0.000000	0.000000	0.008333
285-295	0.002778	0.005556	0.012500	0.001389	0.000000	0.000000	0.022222
295-305	0.001389	0.006944	0.011111	0.001389	0.000000	0.000000	0.020833
305-315	0.005556	0.004167	0.020833	0.004167	0.000000	0.000000	0.034722
315-325	0.000000	0.006944	0.015278	0.001389	0.000000	0.000000	0.023611
325-335	0.002778	0.000000	0.022222	0.009722	0.000000	0.000000	0.034722
335-345	0.000000	0.008333	0.012500	0.006944	0.000000	0.000000	0.027778
345-355	0.005556	0.008333	0.011111	0.001389	0.001389	0.000000	0.027778
Total	0.245833	0.381944	0.187500	0.081944	0.006944	0.000000	0.904167

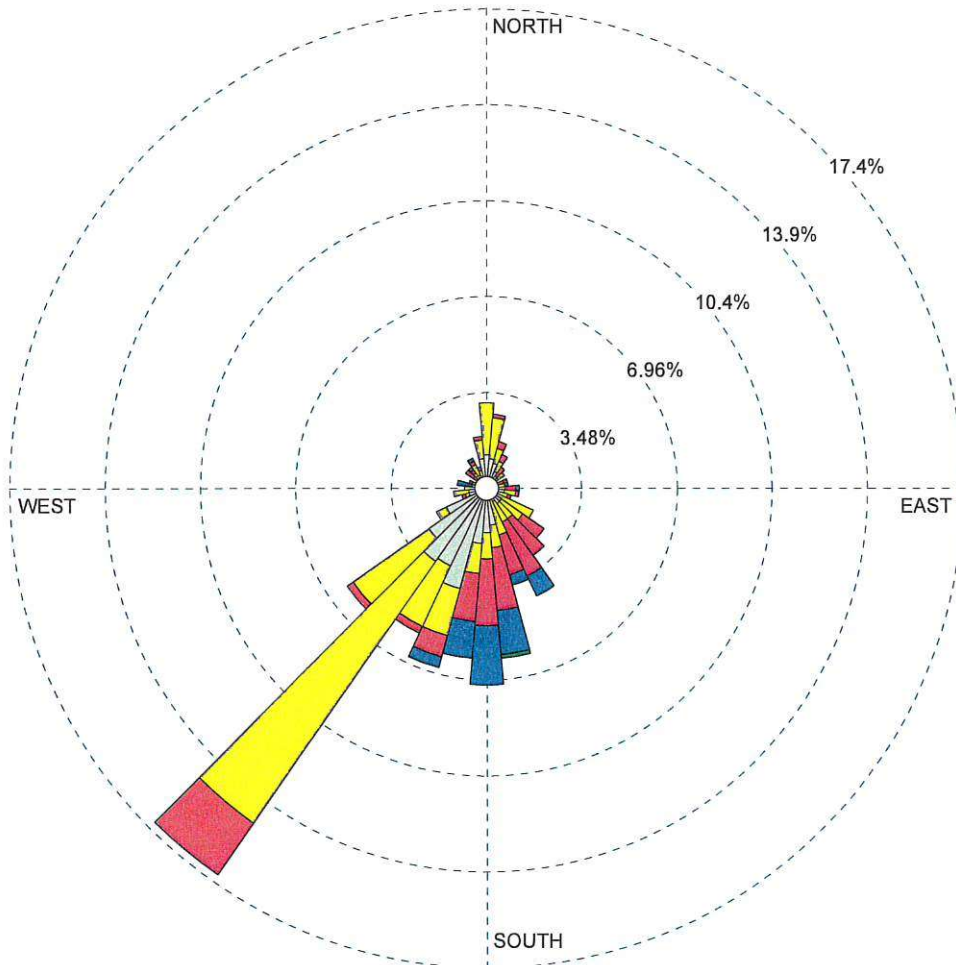
Frequency of Calm Winds: 9.58%
 Average Wind Speed: 2.90 m/s

WIND ROSE PLOT:

Alton Coal Development, LLC - Coal Hollow Mine
December_2020

DISPLAY:

Wind Speed
Flow Vector (blowing to)



WIND SPEED
(m/s)

- >= 11.10
- 8.80 - 11.10
- 5.70 - 8.80
- 3.60 - 5.70
- 2.10 - 3.60
- 0.50 - 2.10

Calms: 0.54%

COMMENTS:

DATA PERIOD:

Start Date: 12/1/2020 - 00:00
End Date: 12/31/2020 - 23:00

COMPANY NAME:

Alton Coal Development, LLC - Coal Hollow Mine

MODELER:

B. Kirk Nicholes

CALM WINDS:

0.54%

TOTAL COUNT:

744 hrs.

AVG. WIND SPEED:

2.96 m/s

DATE:

1/6/2021

PROJECT NO.:



Station ID: 1
 Start Date: 12/1/2020 - 00:00
 End Date: 12/31/2020 - 23:00

Run ID: ACD_CHM

Frequency Distribution
 (Count)

	Flow Vector (Blowing To) / Wind Speed (m/s)						Total
	0.50 - 2.10	2.10 - 3.60	3.60 - 5.70	5.70 - 8.80	8.80 - 11.10	>= 11.10	
355-5	9	14	0	0	0	0	23
5-15	8	11	1	0	0	0	20
15-25	7	4	2	0	0	0	13
25-35	5	3	2	0	0	0	10
35-45	2	2	3	0	0	0	7
45-55	4	2	0	0	0	0	6
55-65	0	3	0	0	0	0	3
65-75	3	0	2	1	0	0	6
75-85	3	2	0	1	0	0	6
85-95	3	2	3	1	0	0	9
95-105	5	3	1	0	0	0	9
105-115	1	5	1	0	0	0	7
115-125	2	12	0	0	0	0	14
125-135	5	7	7	0	0	0	19
135-145	5	5	12	0	0	0	22
145-155	4	6	16	6	0	0	32
155-165	3	10	11	3	0	0	27
165-175	10	6	17	12	1	0	46
175-185	12	7	18	16	0	0	53
185-195	15	8	13	10	0	0	46
195-205	28	13	6	3	0	0	50
205-215	23	18	2	0	0	0	43
215-225	24	86	17	0	0	0	127
225-235	19	25	2	0	0	0	46
235-245	12	3	0	0	0	0	15
245-255	5	1	1	0	0	0	7
255-265	5	4	0	0	0	0	9
265-275	3	3	0	0	0	0	6
275-285	3	1	0	4	0	0	8
285-295	1	1	2	1	0	0	5
295-305	2	0	1	0	0	0	3
305-315	1	2	4	0	0	0	7
315-325	4	1	1	1	0	0	7
325-335	4	3	1	1	0	0	9
335-345	2	3	1	0	0	0	6
345-355	8	5	1	0	0	0	14
Total	250	281	148	60	1	0	744

Frequency of Calm Winds: 4
 Average Wind Speed: 2.96 m/s

Station ID: 1
 Start Date: 12/1/2020 - 00:00
 End Date: 12/31/2020 - 23:00

Run ID: ACD_CHM

Frequency Distribution
 (Normalized)

Flow Vector (Blowing To) / Wind Speed (m/s)

	0.50 - 2.10	2.10 - 3.60	3.60 - 5.70	5.70 - 8.80	8.80 - 11.10	>= 11.10	Total
355-5	0.012097	0.018817	0.000000	0.000000	0.000000	0.000000	0.030914
5-15	0.010753	0.014785	0.001344	0.000000	0.000000	0.000000	0.026882
15-25	0.009409	0.005376	0.002688	0.000000	0.000000	0.000000	0.017473
25-35	0.006720	0.004032	0.002688	0.000000	0.000000	0.000000	0.013441
35-45	0.002688	0.002688	0.004032	0.000000	0.000000	0.000000	0.009409
45-55	0.005376	0.002688	0.000000	0.000000	0.000000	0.000000	0.008065
55-65	0.000000	0.004032	0.000000	0.000000	0.000000	0.000000	0.004032
65-75	0.004032	0.000000	0.002688	0.001344	0.000000	0.000000	0.008065
75-85	0.004032	0.002688	0.000000	0.001344	0.000000	0.000000	0.008065
85-95	0.004032	0.002688	0.004032	0.001344	0.000000	0.000000	0.012097
95-105	0.006720	0.004032	0.001344	0.000000	0.000000	0.000000	0.012097
105-115	0.001344	0.006720	0.001344	0.000000	0.000000	0.000000	0.009409
115-125	0.002688	0.016129	0.000000	0.000000	0.000000	0.000000	0.018817
125-135	0.006720	0.009409	0.009409	0.000000	0.000000	0.000000	0.025538
135-145	0.006720	0.006720	0.016129	0.000000	0.000000	0.000000	0.029570
145-155	0.005376	0.008065	0.021505	0.008065	0.000000	0.000000	0.043011
155-165	0.004032	0.013441	0.014785	0.004032	0.000000	0.000000	0.036290
165-175	0.013441	0.008065	0.022849	0.016129	0.001344	0.000000	0.061828
175-185	0.016129	0.009409	0.024194	0.021505	0.000000	0.000000	0.071237
185-195	0.020161	0.010753	0.017473	0.013441	0.000000	0.000000	0.061828
195-205	0.037634	0.017473	0.008065	0.004032	0.000000	0.000000	0.067204
205-215	0.030914	0.024194	0.002688	0.000000	0.000000	0.000000	0.057796
215-225	0.032258	0.115591	0.022849	0.000000	0.000000	0.000000	0.170699
225-235	0.025538	0.033602	0.002688	0.000000	0.000000	0.000000	0.061828
235-245	0.016129	0.004032	0.000000	0.000000	0.000000	0.000000	0.020161
245-255	0.006720	0.001344	0.001344	0.000000	0.000000	0.000000	0.009409
255-265	0.006720	0.005376	0.000000	0.000000	0.000000	0.000000	0.012097
265-275	0.004032	0.004032	0.000000	0.000000	0.000000	0.000000	0.008065
275-285	0.004032	0.001344	0.000000	0.005376	0.000000	0.000000	0.010753
285-295	0.001344	0.001344	0.002688	0.001344	0.000000	0.000000	0.006720
295-305	0.002688	0.000000	0.001344	0.000000	0.000000	0.000000	0.004032
305-315	0.001344	0.002688	0.005376	0.000000	0.000000	0.000000	0.009409
315-325	0.005376	0.001344	0.001344	0.001344	0.000000	0.000000	0.009409
325-335	0.005376	0.004032	0.001344	0.001344	0.000000	0.000000	0.012097
335-345	0.002688	0.004032	0.001344	0.000000	0.000000	0.000000	0.008065
345-355	0.010753	0.006720	0.001344	0.000000	0.000000	0.000000	0.018817
Total	0.336022	0.377688	0.198925	0.080645	0.001344	0.000000	0.994624

Frequency of Calm Winds: 0.54%
 Average Wind Speed: 2.96 m/s

APPENDIX B

Listing of PM₁₀ Concentrations

Individual Data Sheets provided on CD

Background Monitor 962A

PM₁₀ Sampler Summary

October 1, 2020 - December 31, 2020

Network: Alton Coal Development
 Site: Coal Hollow
 Sampler ID: Coal Hollow-A
 Sampler Type: BGI PQ100
 AQS ID:

Date	Filter ID	Concentration (µg/m ³) LTP	Concentration (µg/m ³) STP	Sample Period (hr:min)	Sample Volume (m ³)	Std Volume (m ³)	Tare (mg)	Mass Gross (mg)	Net (mg)	Flag	Comments
10/06/20	P2966024	17.5	21.9	24:00	24.0	19.2	393.9183	394.3394	0.4211		
10/12/20	P2966029	5.6	6.9	24:00	24.0	19.4	388.8845	389.0193	0.1348		
10/18/20	P2966282	4.9	6.1	24:00	24.0	19.3	393.8977	394.0159	0.1182		
10/24/20	P2966287	10.5	13.1	24:00	24.0	19.4	395.3849	395.6394	0.2545		
10/30/20	P2966474	5.5	6.7	24:00	24.0	19.7	391.3973	391.5296	0.1323		
11/05/20	P2966479	5.0	6.2	24:00	24.0	19.5	401.3538	401.4764	0.1226		
11/11/20	P2966292	1.8	2.2	24:00	24.0	20.1	390.5732	390.6180	0.0448		XT
11/17/20	P2966657	2.2	2.7	24:00	24.0	19.4	390.5435	390.5971	0.0536		
11/23/20	P2966663	4.5	5.4	24:00	24.0	19.7	388.7952	388.9035	0.1083		
11/29/20	P2966788	1.8	2.2	24:00	24.0	20.1	395.2368	395.2820	0.0452		
12/05/20	P2966794	2.6	3.1	24:00	24.0	20.2	394.0384	394.1020	0.0636		
12/11/20	P2966798	10.6	12.6	24:00	24.0	20.2	386.6217	386.8771	0.2554		
12/17/20	P2967061	3.2	3.9	24:00	24.0	20.1	390.5679	390.6471	0.0792		
12/23/20	P2967065	3.4	4.0	24:00	24.0	20.7	397.7242	397.8069	0.0827		
12/29/20	P2967068	2.7	3.2	24:00	24.0	20.3	405.2609	405.3275	0.0666		
11/12/20	P2966656		Field Blank				389.9643	389.9722	0.0079		

# Valid	Recovery	Average	St. Dev.	Max	Min
15	100%	6.7	5.4	21.9	2.2

Validation of data is limited by the provided information. Data have been validated based on laboratory QC, field observations and instrument data if made available, as well as other information available to IML Air Science (IML). Additional data validation based on information not provided to IML may be required. Final validation of these data are the responsibility of the data owner.

Compliance Monitor 963B

PM₁₀ Sampler Summary

October 1, 2020 - December 31, 2020

Network: Alton Coal Development
Site: Coal Hollow
Sampler ID: Coal Hollow-B
Sampler Type: BGI PQ100

AQS ID:

Date	Filter ID	Concentration	Concentration	Sample Period	Sample Volume	Std Volume	Tare	Mass Gross	Net	Flag	Comments
		(µg/m ³) LTP	(µg/m ³) STP								
10/06/20	P2966025	96.6	119.6	24:00	24.0	19.4	389.6594	391.9836	2.3242		
10/12/20	P2966030	63.8	77.7	24:00	24.0	19.8	380.4225	381.9584	1.5359		
10/18/20	P2966283	7.3	9.0	24:00	24.0	19.6	398.6305	398.8069	0.1764		
10/24/20	P2966288	16.3	19.9	24:00	24.0	19.7	395.6030	395.9960	0.3930		
10/30/20	P2966475	Invalid - AN	Invalid - AN	0:00	0.0	0.0	402.8142	403.9735	1.1593		SP
11/05/20	P2966480	Invalid - AN	Invalid - AN	0:01	0.0	0.0	402.3834	402.5004	0.1170		SP
11/11/20	P2966293	Invalid - AN	Invalid - AN	0:47	0.8	0.7	386.7792	386.7944	0.0152		XT,SP
11/17/20	P2966658	Invalid - AN	Invalid - AN	0:00	0.0	0.0	399.9186	401.4295	1.5109		SP
11/23/20	P2966664	Invalid - AN	Invalid - AN	0:00	0.0	0.0	389.4500	389.4603	0.0103		SP
11/29/20	P2966789	Invalid - AN	Invalid - AN	0:00	0.0	0.0	402.1190	402.1230	0.0040		SP
12/05/20	P2966795	Invalid - AN	Invalid - AN	0:00	0.0	0.0	391.4806	391.4940	0.0134		SP
12/11/20		Invalid - AN	Invalid - AN								Did not run
12/17/20		Invalid - AN	Invalid - AN								
12/23/20		Invalid - AN	Invalid - AN								
12/29/20		Invalid - AN	Invalid - AN								
11/25/20	P2966792	Field Blank									
							396.2409	396.2413	0.0004		

# Valid	Recovery	Average	St. Dev.	Max	Min
4	27%	56.6	51.7	119.6	9.0

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Collocated Monitor 964C

PM₁₀ Sampler Summary

October 1, 2020 - December 31, 2020

Network: Alton Coal Development
Site: Coal Hollow
Sampler ID: Coal Hollow-C
Sampler Type: BGI PQ100

AQS ID:

Date	Filter ID	Concentration	Concentration	Sample Period (hr:min)	Sample Volume (m3)	Std Volume (m3)	Tare (mg)	Mass		Net (mg)	Flag	Comments
		(µg/m3) LTP	(µg/m3) STP					Gross (mg)	Net (mg)			
10/06/20	P2966026	100.5	124.2	23:59	24.0	19.5	395.2328	397.6500	2.4172			
10/12/20	P2966031	48.3	58.9	23:59	24.0	19.8	382.9260	384.0893	1.1633			
10/18/20	P2966284	6.3	7.8	23:59	24.0	19.6	394.9530	395.1058	0.1528			
10/24/20	P2966289	19.2	23.5	23:59	24.0	19.7	398.4209	398.8828	0.4619			
10/30/20	P2966476	58.9	72.0	23:59	24.0	19.7	403.3602	404.7767	1.4165			
11/05/20	P2966481	Invalid - AN	Invalid - AN	5:29	5.5	4.5	399.8973	400.1231	0.2258		SP,CI	
11/11/20	P2966294	Invalid - AN	Invalid - AN	7:35	7.6	6.0	394.8428	394.9285	0.0857		XT,SP	
11/17/20	P2966659	94.0	113.7	23:59	24.0	19.9	398.7147	400.9749	2.2602			
11/23/20	P2966665	4.4	5.3	23:59	24.0	20.1	387.7446	387.8516	0.1070			
11/29/20	P2966790	2.7	3.2	23:59	24.0	20.5	396.3716	396.4382	0.0666			
12/05/20	P2966796	12.3	14.3	23:59	24.0	20.6	388.2014	388.4974	0.2960			
12/11/20	P2966799	9.1	10.7	23:59	24.0	20.5	390.9080	391.1288	0.2208			
12/17/20	P2967063	29.9	35.1	23:59	24.0	20.5	393.3135	394.0331	0.7196			
12/23/20	P2967066	57.9	66.3	23:59	24.0	21.0	395.3717	396.7638	1.3921			
12/29/20	P2967069	7.6	8.9	23:59	24.0	20.6	401.4699	401.6537	0.1838			
10/01/20	P2966023	Field Blank					378.3194	378.3273	0.0079			
11/30/20	P2966793	Field Blank					400.5133	400.5306	0.0173			

# Valid	Recovery	Average	St. Dev.	Max	Min
13	87%	41.8	41.8	124.2	3.2

Validation of data is limited by the provided information. Data have been validated based on laboratory QC, field observations and instrument data if made available, as well as other information available to IML Air Science (IML). Additional data validation based on information not provided to IML may be required. Final validation of these data are the responsibility of the data owner.

Compliance Monitor 2366D

PM₁₀ Sampler Summary

October 1, 2020 - December 31, 2020

Network: Alton Coal Development
Site: Coal Hollow
Sampler ID: Coal Hollow-D
Sampler Type: BGI PQ100

AQS ID:

Date	Filter ID	Concentration	Concentration	Sample Period (hr:min)	Sample Volume (m3)	Std Volume (m3)	Tare (mg)	Mass Gross (mg)	Net (mg)	Flag	Comments
		(µg/m3) LTP	(µg/m3) STP								
10/06/20	P2966027	35.1	43.8	24:00	24.0	19.3	395.7175	396.5637	0.8462		
10/12/20	P2966032	67.4	82.6	24:00	24.0	19.6	385.6592	387.2796	1.6204		
10/18/20	P2966285	14.0	17.4	24:00	24.0	19.4	399.9433	400.2813	0.3380		
10/24/20	P2966290	19.6	24.0	24:00	24.0	19.6	389.8458	390.3177	0.4719		
10/30/20	P2966477	Invalid - AH	Invalid - AH	0:00	0.0	0.0	390.8135	392.3737	1.5602		SP,CV
11/05/20	P2966482	24.9	30.3	24:00	24.0	19.8	398.7147	399.3134	0.5987		
11/11/20	P2966295	Invalid - AN	Invalid - AN				404.0806	404.2175	0.1369		XT,SP,MD
11/17/20	P2966660	Invalid - AN	Invalid - AN	0:00	0.0	0.0	401.0172	401.4399	0.4227		SP
11/23/20	P2966666	Invalid - AN	Invalid - AN				390.7349	391.1114	0.3765		SP,MD
11/29/20		Invalid - AN	Invalid - AN								Test run
12/05/20		Invalid - AN	Invalid - AN								
12/11/20	P2966800	23.8	27.7	24:00	24.0	20.7	399.7952	400.3692	0.5740		
12/17/20	P2967062	11.2	13.0	24:00	24.0	20.7	391.5177	391.7875	0.2698		
12/23/20	P2967067	52.5	59.8	24:00	24.0	21.1	394.7661	396.0301	1.2640		
12/29/20	P2967070	3.7	4.3	24:00	24.0	20.9	394.2735	394.3648	0.0913		

# Valid	Recovery	Average	St. Dev.	Max	Min
9	60%	33.7	24.7	82.6	4.3

Validation of data is limited by the provided information. Data have been validated based on laboratory QC, field observations and instrument data if made available, as well as other information available to IML Air Science (IML). Additional data validation based on information not provided to IML may be required. Final validation of these data are the responsibility of the data owner.

Collocated Monitor 2398E

PM₁₀ Sampler Summary

October 1, 2020 - December 31, 2020

Network: Alton Coal Development
Site: Coal Hollow
Sampler ID: Coal Hollow-E
Sampler Type: BGI PQ100

AQSI ID:

Date	Filter ID	Concentration	Concentration	Sample Period (hr:min)	Sample Volume (m3)	Std Volume (m3)	Tare (mg)	Mass		Flag	Comments
		(µg/m3) LTP	(µg/m3) STP					Gross (mg)	Net (mg)		
10/06/20	P2966028	49.1	60.7	24:00	24.0	19.5	394.5098	395.6925	1.1827		
10/12/20	P2966033	59.6	72.6	24:00	24.0	19.7	394.1379	395.5726	1.4347		
10/18/20	P2966286	20.6	25.3	24:00	24.0	19.6	397.1865	397.6831	0.4966		
10/24/20	P2966291	12.0	14.6	24:00	24.0	19.8	398.6990	398.9888	0.2898		
10/30/20	P2966478	20.5	24.6	24:00	24.0	20.0	402.1965	402.6904	0.4939		
11/05/20	P2966483	26.1	31.6	24:00	24.0	19.9	396.3027	396.9324	0.6297		
11/11/20	P2966296	3.2	3.7	24:00	24.0	20.5	393.7604	393.8374	0.0770	XT	
11/17/20	P2966661	16.2	19.5	24:00	24.0	20.0	391.7219	392.1125	0.3906		
11/23/20	P2966667	6.7	8.0	24:00	24.0	20.1	392.9438	393.1061	0.1623		
11/29/20	P2966791	3.0	3.5	24:00	24.0	20.5	399.0751	399.1486	0.0735		
12/05/20	P2966797	28.4	33.3	24:00	24.0	20.5	396.2976	396.9808	0.6832		
12/11/20	P2966801	26.4	31.0	24:00	24.0	20.5	402.8194	403.4557	0.6363		
12/17/20	P2967064	23.9	28.1	24:00	24.0	20.5	399.7221	400.2990	0.5769		
12/23/20	P2967194	28.6	32.8	24:00	24.0	21.0	394.1561	394.8449	0.6888		
12/29/20	P2967071	3.6	4.2	24:00	24.0	20.7	401.5101	401.5984	0.0883		
11/23/20	P2966662	Field Blank					394.9449	394.9517	0.0068		

# Valid	15	Recovery	100%	Average	26.2	St. Dev.	19.8	Max	72.6	Min	3.5
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Validation of data is limited by the provided information. Data have been validated based on laboratory QC, field observations and instrument data if made available, as well as other information available to IML Air Science (IML). Additional data validation based on information not provided to IML may be required. Final validation of these data are the responsibility of the data owner.

APPENDIX C

Precision and Single-Point Flow Rate Checks

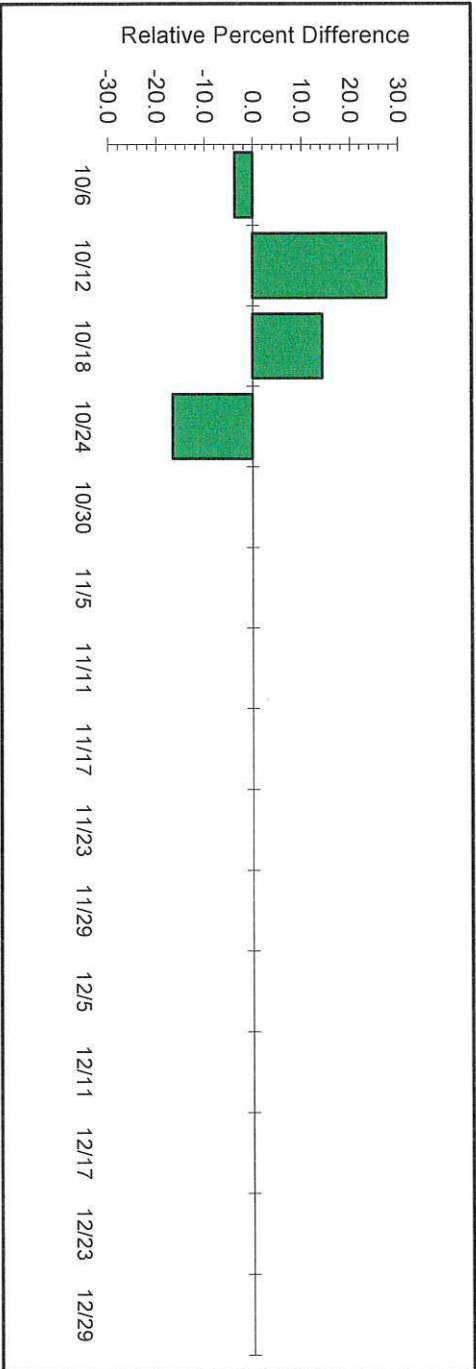
Alton Coal Development Coal Hollow

Precision Report For Collocated Samplers

STP PM10 Concentrations($\mu\text{g}/\text{m}^3$)
October 1, 2020 - December 31, 2020

Date	10/6	10/12	10/18	10/24	10/30	11/5	11/11	11/17	11/23	11/29	12/5	12/11	12/17	12/23	12/29
Coal Hollow-B	119.6	77.7	9.0	19.9				113.7	5.3	3.2	14.3	10.7	35.1	66.3	8.9
Coal Hollow-C	124.2	58.9	7.8	23.5	72.0										
Rel. %Diff.	-3.8	27.5	14.3	-16.6	*	*	*	*	*	*	*	*	*	*	*

Relative Percent Difference = $(X - Y) / ((X + Y) / 2) * 100$ X=Coal Hollow-B Y =Coal Hollow-C



Statistical Calculations:
n= 4.0 S Dev= 19.5 %
Mean= 5.4 ** CV= 31.2 %

* Both sample concentrations must be greater than or equal to 3 $\mu\text{g}/\text{m}^3$ to be used for these precision calculations.
For a detailed discussion of these precision calculations, refer to 40 CFR 58, Appendix A.

** CV - Upper 90% Confidence bound for Coefficient of Variation

Alton Coal Development Coal Hollow

Precision Report For Collocated Samplers

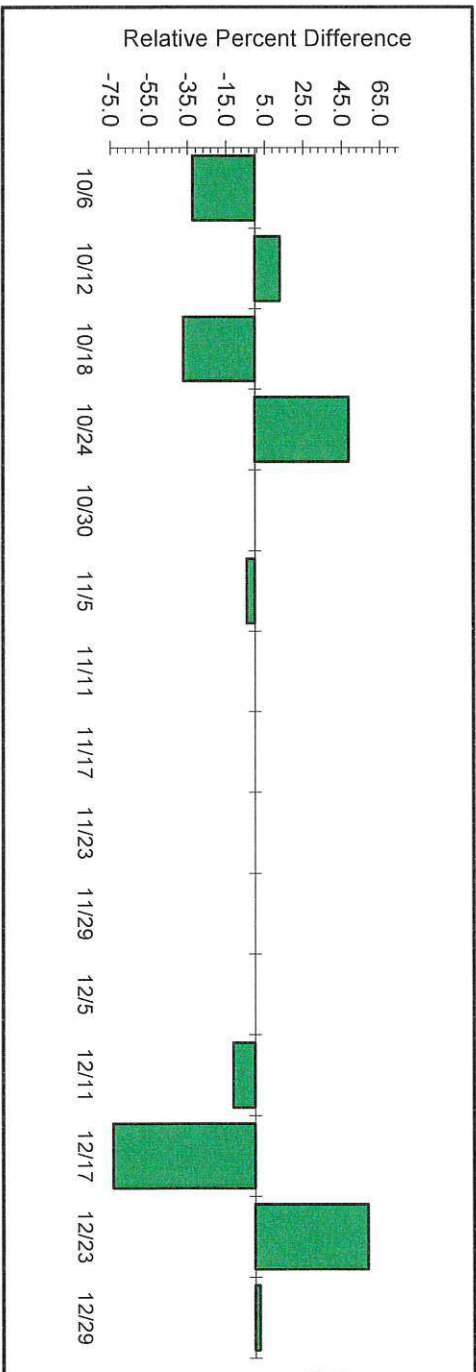
STP PM10 Concentrations($\mu\text{g}/\text{m}^3$)
October 1, 2020 - December 31, 2020

Date	10/6	10/12	10/18	10/24	10/30	11/5	11/11	11/17	11/23	11/29	12/5	12/11	12/17	12/23	12/29	
Coal Hollow-D	43.8	82.6	17.4	24.0		30.3							27.7	13.0	59.8	4.3
Coal Hollow-E	60.7	72.6	25.3	14.6	24.6	31.6	3.7	19.5	8.0	3.5	33.3	31.0	28.1	32.8	4.2	
Rel. %Diff.	-32.3	12.9	-37.0	48.7	*	-4.2	*	*	*	*	*	*	-11.2	-73.5	58.3	2.4

Relative Percent Difference = $((X - Y) / ((X + Y) / 2)) * 100$

X=Coal Hollow-D

Y=Coal Hollow-E



Statistical Calculations:

n= 9.0 S Dev= 41.5 %
Mean= -4.0 ** CV= 44.4 %

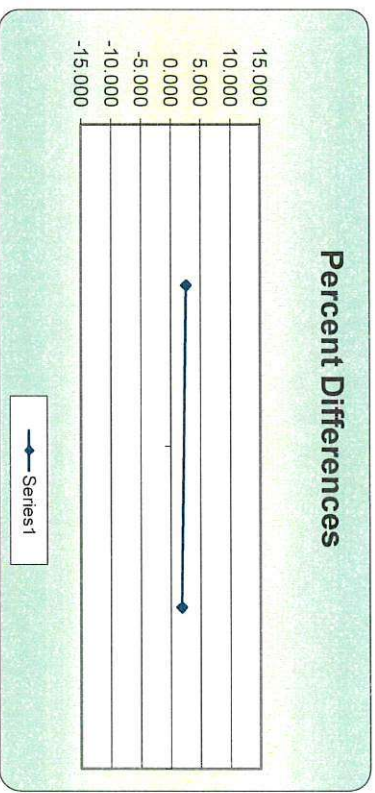
* Both sample concentrations must be greater than or equal to 3 $\mu\text{g}/\text{m}^3$ to be used for these precision calculations.
For a detailed discussion of these precision calculations, refer to 40 CFR 58, Appendix A.

** CV - Upper 90% Confidence bound for Coefficient of Variation

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	n	Σ d	Σ d ²	"AB" (Eqn 4)	"AS" (Eqn 5)
16.7	16.28	2.580	2.017	6.656	2.580	6.656	2	4.409	10.002	2.205	0.531
16.7	16.4	1.829	75th Percentile	3.346	1.829	3.346	1	10.002			
			2.392								

Bias (%) (Eqn 3)	4.57	Both Signs Positive
Signed Bias (%)	+4.57	TRUE
		Both Signs Negative
		FALSE

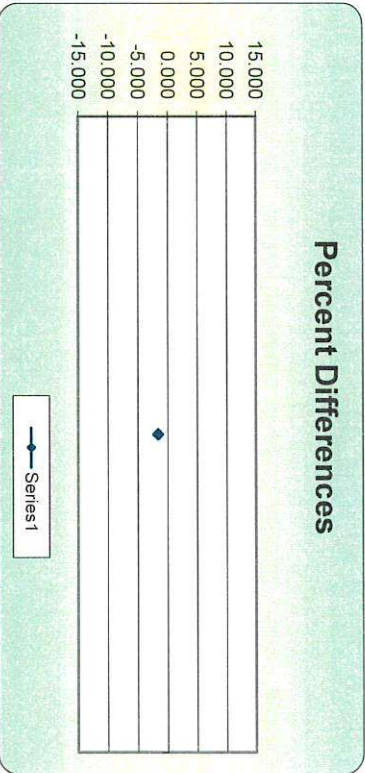


Alton Coal Development, LLC - Coal Hollow Mine
One-Point Flow Rate Bias Estimate

Site ID: Monitor 963B	Pollutant type:		Bias (%)	
Meas Val (Y) 16.7	Audit Val (X) 16.98	d (Eqn. 1) -1.649	25th Percentile -1.649	75th Percentile -1.649
		d ² 2.719	d 1.649	d ² 2.719

n	Σ d	"AB" (Eqn 4)
1	1.649	1.649
n-1	Σ d ²	"AS" (Eqn 5)
0	2.719	#DIV/0!

Bias (%) (Eqn 3) Both Signs Positive
 #NUM!
 Signed Bias (%) Both Signs Negative
 #NUM!
 TRUE

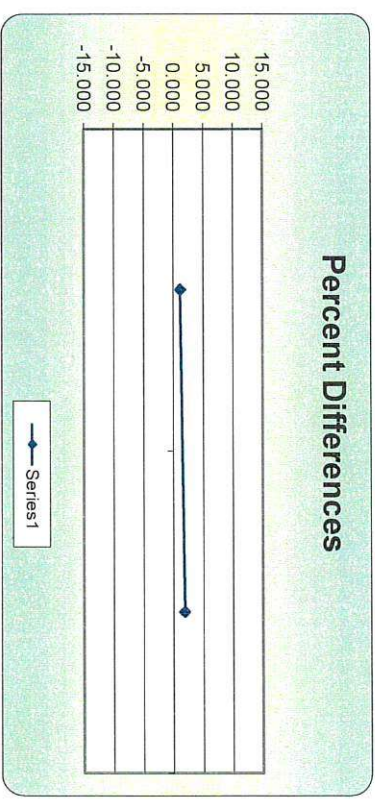


Alton Coal Development, LLC - Coal Hollow Mine
One-Point Flow Rate Bias Estimate

Site ID: Monitor 964C		Pollutant type:		Bias (%)		
Meas Val (Y)	Audit Val (X)	d (Eqn. 1)	25th Percentile	d ²	d	d ²
16.7	16.51	1.151	1.336	1.324	1.151	1.324
16.71	16.4	1.890	75th Percentile	3.573	1.890	3.573
			1.705			

n	Σ d	"AB" (Eqn 4)
2	3.041	1.521
n-1	Σ d ²	"AS" (Eqn 5)
1	4.897	0.523

Bias (%) (Eqn 3) Both Signs Positive
 3.85 TRUE
 Signed Bias (%) Both Signs Negative
 +3.85 FALSE

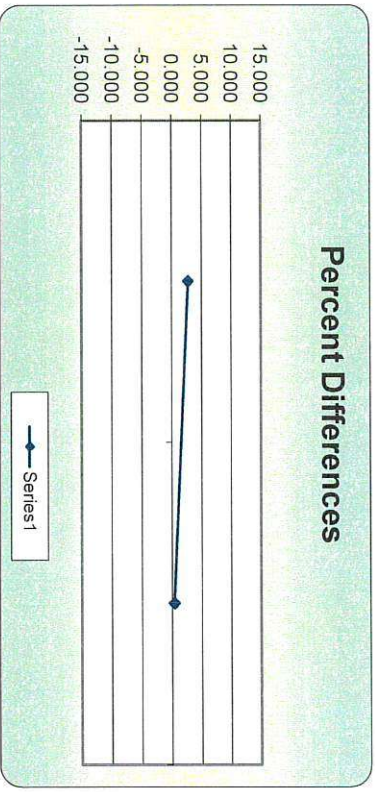


Alton Coal Development, LLC - Coal Hollow Mine
One-Point Flow Rate Bias Estimate

Site ID: Monitor 2366D		Pollutant type:	
Meas Val (Y)	Audit Val (X)	d (Eqn. 1)	25th Percentile
16.7	16.25	2.769	0.963
16.7	16.64	0.361	75th Percentile
			2.167
		d^2	7.669
		$ d $	2.769
		$ d ^2$	7.669

Bias (%)	
n	$\sum d $
2	3.130
n-1	$\sum d ^2$
1	7.799
	"AB" (Eqn 4)
	1.565
	"AS" (Eqn 5)
	1.703

Bias (%) (Eqn 3) Both Signs Positive
 9.17 TRUE
 Signed Bias (%) Both Signs Negative
 +9.17 FALSE

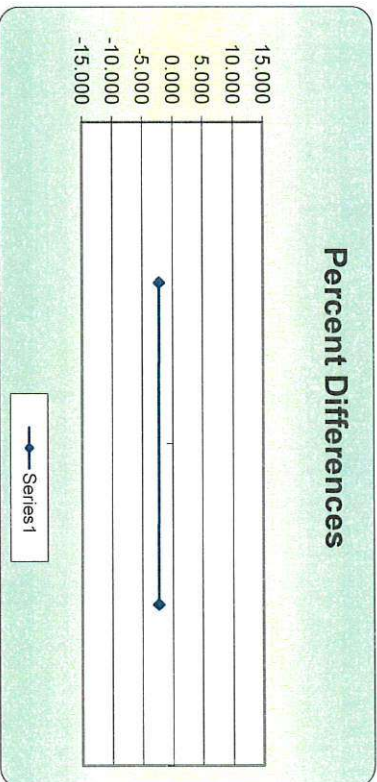


Alton Coal Development, LLC - Coal Hollow Mine
One-Point Flow Rate Bias Estimate

Site ID: Monitor 2398E		Pollutant type:	
Meas Val (Y)	Audit Val (X)	d (Eqn. 1)	25th Percentile
16.7	17.08	-2.225	-2.311
16.7	17.1	-2.339	75th Percentile
			-2.253
		d ²	d
		4.950	2.225
		5.472	2.339
			d ²
			4.950
			5.472

	Bias (%)
n	2
$\sum d $	4.564
$\sum d ^2$	10.422
n-1	1
	10.422
"AB" (Eqn 4)	2.282
"AS" (Eqn 5)	0.081

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



APPENDIX D

Field Data Sheets

APPENDIX E

Independent PM₁₀ Sampler Performance Audit Report

**AUDIT REPORT
FOR**

**ALTON COAL DEVELOPMENT, LLC
COAL HOLLOW MINE
ALTON, UTAH
FOURTH QUARTER 2020**

Prepared for

Kirk Nicholes
Alton Coal Development, LLC
463 N 100 W
Cedar City, Utah, 84721

Prepared by



1901 Sharp Point Drive, Suite F
Fort Collins, CO 80525
970-484-7941

Site Audited: October 28, 2020



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1.0 INTRODUCTION

Air Resource Specialists, Inc. (ARS) conducted a performance audit of Alton Coal Development, LLC ambient air quality monitoring systems on October 28, 2020. The monitoring sites are located at the Coal Hollow Mine near Alton, Utah.

Table 1-1

Site Location Information

	Primary CHM	Background	Primary NPL	Meteorological
Latitude	37° 24' 5.0" N	37° 24' 20.9" N	37° 24' 43" N	37° 23' 53.2" N
Longitude	112° 27' 21.0" W	112° 26' 1.1" W	112° 27' 30.6" W	112° 26' 43.1" W
UTM	12S 371147 4140396	12S 373119 4140856	12S 370928 4141570	12S 372073 4140018
Elevation	6,890 feet MSL	7,158 feet MSL	6,959 feet MSL	7,007 feet MSL

Audit results for the particulate samplers are summarized in Table 1-2. Audit results for the meteorological measurements are summarized in Table 1-3. Detailed discussions of performance audit findings and other findings can be found in Section 3.0.

Table 1-2

Summary of Particulate Sampler Audit Results

	Parameter	Instrument	Within Accuracy Goal
Primary CHM	PM ₁₀	BGI PQ200S	Yes
	PM ₁₀ (collocated)	BGI PQ200S	Yes
Background #1	PM ₁₀	BGI PQ200S	Yes
Primary NPL	PM ₁₀	BGI PQ200	Yes
	PM ₁₀ (collocated)	BGI PQ200	Yes

Details of the audit are presented in the following sections:

Section 2.0	Audit Methods and Equipment
Section 3.0	Audit Results
Appendix A	Audit Data Forms
Appendix B	Audit Standards Certifications

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

Christian A. Kirk
Quality Assurance Officer / Lead Auditor
Air Resource Specialists, Inc.
1901 Sharp Point Drive, Suite F
Fort Collins, Colorado 80525
Telephone: 970-484-7941
Fax: 970-484-3423
E-mail: ckirk@air-resource.com

2.0 AUDIT METHODS

Audit procedures, audit challenge ranges, and acceptance criteria are described below. These ranges and limits conform to EPA's PSD guidelines. Audit results were verbally communicated to the site operator prior to departure from the site. A follow-up e-mail summarizing audit findings was also sent to Alton Coal Development, LLC personnel. Audit details are provided in Appendix A.

Guidance from the following EPA documents was used to establish the audit procedures:

- 40 CFR 58, Appendix B. *Quality Assurance Requirements for Prevention of Significant Deterioration (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*
 - *Volume IV. Meteorological Measurements*
- EPA *Meteorological Monitoring Guidance for Regulatory Modeling Applications*

2.1 PARTICULATE SAMPLERS (FRM PM₁₀)

The filter-based FRM PM₁₀ particulate samplers are audited in their normal operating mode. ARS audits the samplers with a BGI deltaCal audit standard which measures flow, temperature, and barometric pressure. Prior to conducting the flow audit, a system leak check is performed in accordance with the manufacturer's specifications. The observed volumetric operational flow and design flow of the sampler are compared to the audit flows measured by the audit standard. Differences between the operational sampler flow and audit flow that are greater than ±10% are considered out of tolerance. Differences between the designated design flow and the audit flow greater than ±10% are considered out of tolerance. In addition to the flow audits, observed ambient temperature, filter temperature, and barometric pressure measurements of the particulate samplers are also audited by comparison to the audit standard. A temperature difference greater than ±2°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

Particulate Samplers
Audit Acceptance Criteria

Parameter	Audit Method	Acceptance Criteria
FRM PM ₁₀	Leak Check	Manufacturer specs
	Audit flow to actual sampler flow	≤ ± 10%
	Design criteria flow to audit flow	≤ ± 10%
	Audit temperature to sampler temperature	≤ ± 2 °C
	Audit temperature to sampler filter temperature	≤ ± 2 °C
	Audit barometric pressure to sampler pressure	≤ ±10mm Hg

Table 2-2

Particulate Samplers
Audit Equipment

References	Manufacturer	Model Number	Serial Number	Expiration Date
FRM Flow	BGI	DeltaCal	1220	5/20/2021

3.0 AUDIT RESULTS

Audit findings and recommendations are discussed below. Detailed audit results are provided in Appendix A.

Performance Audit Results

There were no performance audit failures or findings.

APPENDIX A
AUDIT DATA FORMS



FRM AUDIT (PM₁₀)

ABBR.	N/A	
CLIENT	Alton Coal Development	FIELD SPECIALIST Jonathan Furst
SITE NAME	Coal Hollow Mine	DATE 10/28/2020
		DATE OF LAST VISIT 7/21/2020

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	1220	5/20/2021
PM Temperature Standard #1	BGI	deltaCal	1220	5/20/2021
PM Barometric Pressure Standard #1	BGI	deltaCal	1220	5/20/2021

MANUFACTURER	BGI
MODEL	PQ200S
SERIAL NUMBER	N963B

Date and Time correct?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
If no, time off by:
0 min

SETTINGS	
Total Flow	16.70

Automated LEAK CHECK		
Vacuum Loss Rate	Pass/Fail	
-3.0	PASS	

FLOW VERIFICATION					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	16.77	16.70	-0.4%	0.4%	PASS

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

AMBIENT TEMPERATURE SENSOR (°C)			
Reference	Instrument	Difference	
6.9	6.5	-0.4	PASS

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

FILTER TEMPERATURE SENSOR (°C)			
Reference	Instrument	Difference	
6.1	5.7	-0.4	PASS

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

PRESSURE SENSOR (mmHg)			
Reference	Instrument	Difference	
589.5	592.0	2.5	PASS

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

NOTES:



FRM AUDIT (PM₁₀)

ABBR.	N/A				
CLIENT	Alton Coal Development	FIELD SPECIALIST	Jonathan Furst	DATE	10/28/2020
SITE NAME	Coal Hollow Mine			DATE OF LAST VISIT	7/21/2020

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	1220	5/20/2021
PM Temperature Standard #1	BGI	deltaCal	1220	5/20/2021
PM Barometric Pressure Standard #1	BGI	deltaCal	1220	5/20/2021

MANUFACTURER	BGI
MODEL	PQ200S
SERIAL NUMBER	N964C

Date and Time correct?	
<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
If no, time off by:	
- 1 min	

SETTINGS	
Total Flow	16.70

Automated LEAK CHECK		
Vacuum Loss Rate	Pass/Fail	
-3.0	PASS	

FLOW VERIFICATION					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	16.65	16.71	0.4%	-0.3%	PASS

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

AMBIENT TEMPERATURE SENSOR (°C)			
Reference	Instrument	Difference	
6.4	6.5	0.1	PASS

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

FILTER TEMPERATURE SENSOR (°C)			
Reference	Instrument	Difference	
6.4	5.6	-0.8	PASS

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

PRESSURE SENSOR (mmHg)			
Reference	Instrument	Difference	
590.0	593.0	3.0	PASS

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

NOTES:



FRM AUDIT (PM₁₀)

ABBR.	N/A	
CLIENT	Alton Coal Development	FIELD SPECIALIST Jonathan Furst
SITE NAME	Coal Hollow Mine	DATE 10/28/2020
		DATE OF LAST VISIT 7/21/2020

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	1220	5/20/2021
PM Temperature Standard #1	BGI	deltaCal	1220	5/20/2021
PM Barometric Pressure Standard #1	BGI	deltaCal	1220	5/20/2021

MANUFACTURER	BGI
MODEL	PQ200S
SERIAL NUMBER	N962A

Date and Time correct?
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
If no, time off by:
- 5 min

SETTINGS	
Total Flow	16.70

Automated LEAK CHECK	
Vacuum Loss Rate	Pass/Fail
-4.0	PASS

FLOW VERIFICATION				
	Reference	Instrument	Actual Diff	Design Diff
Total Flow	16.40	16.70	1.8%	-1.8% PASS

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

AMBIENT TEMPERATURE SENSOR (°C)			
Reference	Instrument	Difference	
9.3	10.1	0.8	PASS

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

FILTER TEMPERATURE SENSOR (°C)			
Reference	Instrument	Difference	
9.0	8.7	-0.3	PASS

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

PRESSURE SENSOR (mmHg)			
Reference	Instrument	Difference	
584.0	584.0	0.0	PASS

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

NOTES:



FRM AUDIT (PM₁₀)

ABBR.	N/A				
CLIENT	Alton Coal Development	FIELD SPECIALIST	Jonathan Furst	DATE	10/28/2020
SITE NAME	Coal Hollow Mine			DATE OF LAST VISIT	7/21/2020

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	1220	5/20/2021
PM Temperature Standard #1	BGI	deltaCal	1220	5/20/2021
PM Barometric Pressure Standard #1	BGI	deltaCal	1220	5/20/2021

MANUFACTURER	BGI
MODEL	PQ200
SERIAL NUMBER	2366D

Date and Time correct?
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
If no, time off by:
-3 min

SETTINGS	
Total Flow	16.70

Automated LEAK CHECK	
Vacuum Loss Rate	Pass/Fail
-3.0	PASS

FLOW VERIFICATION				
	Reference	Instrument	Actual Diff	Design Diff
Total Flow	16.64	16.70	0.4%	-0.4% PASS

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

AMBIENT TEMPERATURE SENSOR (°C)			
Reference	Instrument	Difference	
6.8	6.9	0.1	PASS

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

FILTER TEMPERATURE SENSOR (°C)			
Reference	Instrument	Difference	
6.8	6.3	-0.5	PASS

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

PRESSURE SENSOR (mmHg)			
Reference	Instrument	Difference	
590.0	590.0	0.0	PASS

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

NOTES:



FRM AUDIT (PM₁₀)

ABBR.	N/A	
CLIENT	Alton Coal Development	FIELD SPECIALIST Jonathan Furst
SITE NAME	Coal Hollow Mine	DATE 10/28/2020
		DATE OF LAST VISIT 7/21/2020

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	1220	5/20/2021
PM Temperature Standard #1	BGI	deltaCal	1220	5/20/2021
PM Barometric Pressure Standard #1	BGI	deltaCal	1220	5/20/2021

MANUFACTURER	BGI
MODEL	PQ200
SERIAL NUMBER	2398E

Date and Time correct?
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
If no, time off by:
-2 min

SETTINGS	
Total Flow	16.70

Automated LEAK CHECK	
Vacuum Loss Rate	Pass/Fail
-6.0	PASS

FLOW VERIFICATION					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	17.10	16.70	-2.3%	2.4%	PASS

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

AMBIENT TEMPERATURE SENSOR (°C)			
Reference	Instrument	Difference	
6.6	6.2	-0.4	PASS

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

FILTER TEMPERATURE SENSOR (°C)			
Reference	Instrument	Difference	
6.3	5.7	-0.6	PASS

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

PRESSURE SENSOR (mmHg)			
Reference	Instrument	Difference	
590.0	593.0	3.0	PASS

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

NOTES:



SITE INFORMATION

ABBR.	N/A	
CLIENT	Alton Coal Development	FIELD SPECIALIST Jonathan Furst
SITE NAME	Coal Hollow Mine	DATE 10/28/2020
		DATE OF LAST VISIT 7/21/2020

		Deg	Min	Sec
LATITUDE	North	37	24	22
LONGITUDE	West	112	27	16

--CALCULATE-->

Decimal
37.4061
112.4544

NOTES:



ABBR.	N/A		CLIENT	Alton Coal Development	FIELD SPECIALIST	Jonathan Furst	DATE	10/28/2020
SITE NAME		Coal Hollow Mine			DATE OF LAST VISIT		7/21/2020	

	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 (high rpm)				
Wind Speed Reference (low rpm)				
Wind Speed Torque Gauge				
Wind Direction Alignment Reference				
Wind Direction Linearity Reference				
Wind Direction Torque Gauge				
Solar Radiation Reference				
Multiplier		W/m ² / mV		
UV Radiation Reference				
Multiplier		W/m ² / mV		
Precipitation Reference				
Volume		mL		

PM Flow Standard #1	BGI	deltaCal	1220	5/20/2021
PM Flow Standard #2				
PM Flow Standard #3				
PM Flow Standard #4				

PM Temperature Standard #1	BGI	deltaCal	1220	5/20/2021
PM Temperature Standard #2				
PM Temperature Standard #3				
PM Temperature Standard #4				

PM Barometric Pressure Standard #1	BGI	deltaCal	1220	5/20/2021
PM Barometric Pressure Standard #2				
PM Barometric Pressure Standard #3				
PM Barometric Pressure Standard #4				

TEOM MTV Standard				
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HiVol Direct Flow Reference				
Orifice				
ΔP orifice manometer				

APPENDIX B
AUDIT STANDARDS CERTIFICATIONS



MICRO PRECISION CALIBRATION INC
 12071 Tejon Street Suite # 100
 Westminster Colorado 80234
 720-535-4470

Certificate of Calibration

Date: May 20, 2020

Cert No. 551220083619512

Customer:

AIR RESOURCE SPECIALISTS
 1901 SHARP POINT DRIVE, SUITE F
 FORT COLLINS CO 80525

Work Order #: DEN-1500307
 Purchase Order #: A33947
 Serial Number: 1220
 Department: N/A
 Performed By: JERROD SALAZAR
 Received Condition: IN TOLERANCE
 Returned Condition: IN TOLERANCE
 Cal. Date: May 20, 2020
 Cal. Interval: 12 MONTHS
 Cal. Due Date: May 20, 2021

MPC Control #: DV0036
 Asset ID: DV0036
 Gage Type: AIR FLOW CALIBRATOR
 Manufacturer: BGI DELTACAL
 Model Number: DELTACAL
 Size: -30-55C 1.5 TO 19.5LPM
 Temp/RH: 20.3°C / 44.8%
 Location: Calibration performed at MPC facility

Calibration Notes:

SEE ATTACHED DATA.

Standards Used to Calibrate Equipment

I.D.	Description.	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
DR9852	THERMOMETER READOUT W/PROBE	1529 W/5162	B25661	FLUKE	Aug 31, 2020	551220083156238
Y2340	DRYCAL DC1 BASE	DC1-B	866	BIOS INTERNATIONAL	Mar 14, 2022	551220083563785
N6643	PRECISION BAROMETER	DUO +	DA010827	MINITAKA	Jul 25, 2021	NIST 290079 V485

Procedures Used in this Event

Procedure Name	Description
MPC-AIR-001 Rev. 01	Air Velocity, Temperature and Flow Meters, General, rev01, Feb-11-2020

Calibrating Technician:

JERROD SALAZAR

QC Approval:

ROBERT MEANS

STATEMENTS OF PASS OR FAIL CONFORMANCE: The uncertainty of measurement has been taken into account when determining compliance with specification, as per ILAC-G8:03/2009. All measurements and test results guard banded to ensure the probability of false-accept does not exceed 2% in compliance with ANSI/NCSL Z540.3-2006 and in case without guard banded the probability of false-accept depending on test uncertainty ratio.

THE CALIBRATION REPORT STATUS:

PASS- Term used when compliance statement is given, and the measurement result is PASS.
 PASS*- Term used when compliance statement is given, and the measurement result is conditional passed or PASS*.
 FAIL- Term used when compliance statement is given, and the measurement result is FAIL.
 FAIL*- Term used when compliance statement is given, and the measurement result is conditional failed or FAIL*.
 REPORT OF VALUE - Term used when reported measurement is not requiring compliance statement in report.
 ADJUSTED- When adjustments are made to an instrument which changes the value of measurement from what was measured as found to new value as left.
 LIMITED - When an instrument fails calibration but is still functional in a limited manner.

The expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%, unless otherwise stated. This calibration report complies with ISO/IEC 17025:2017 and ANSI/NCSL Z540.3. 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. All standards are traceable to SI through the National Institute of Standards and Technology (NIST) and/or recognized national or international standards laboratories. Services rendered include proper manufacturer's service instruction and are warranted for no less than thirty (30) days. The information on this report pertains only to the instrument identified, this may not be reproduced in part or in a whole without the prior written approval of the issuing MP Calibration Laboratory.



Calibration Report of BGI DeltaCal DC1 Air Flow Calibrator

MPC Control #: <u>DV0036</u>	Serial Number: <u>1220</u>
Asset ID: <u>DV0036</u>	Calibration Date: <u>May 20, 2020</u>

Flow Accuracy

Range	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result
1.5 to 19.5 L/min	2.000 L/min	1.985 L/min	1.998 L/min	1.998 L/min	2.015 L/min	PASS
1.5 to 19.5 L/min	6.000 L/min	5.955 L/min	6.008 L/min	6.008 L/min	6.045 L/min	PASS
1.5 to 19.5 L/min	10.00 L/min	9.93 L/min	10.02 L/min	10.02 L/min	10.08 L/min	PASS
1.5 to 19.5 L/min	16.00 L/min	15.88 L/min	15.97 L/min	15.97 L/min	16.12 L/min	PASS
1.5 to 19.5 L/min	19.00 L/min	18.86 L/min	19.04 L/min	19.04 L/min	19.14 L/min	PASS

Barometric Pressure and Absolute Pressure

deltaCal:

Barometric Pressure (set): 747 mm of Hg

Room Temperature

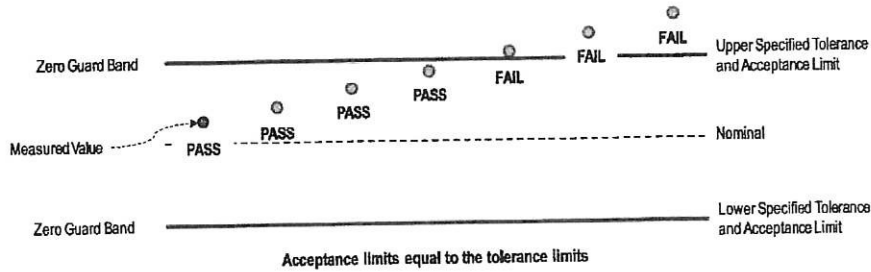
deltaCal:

Ambient Temperature (set): 21.7° C

Statements of Pass or Fail Conformance

The status of compliance with the acceptance criteria is reported as:

- PASS — Compliant with specification.
- FAIL — Not compliant with specification.



- End of Calibration Report -