

# **Alton Coal Development, LLC.**

## **Summary of PM<sub>10</sub> Data**

**Collected at Coal Hollow Mine, Utah  
Annual Report, 2019**

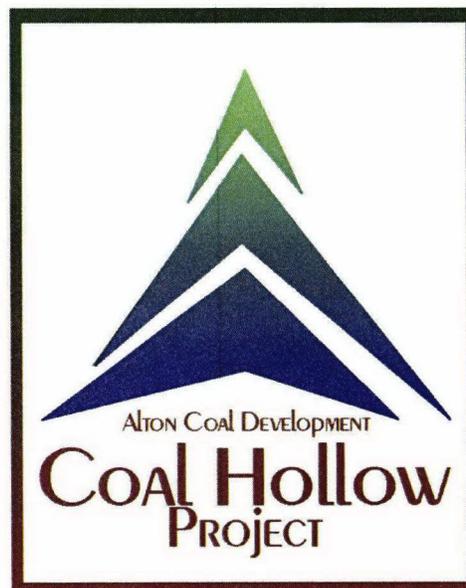
**DAQ-2019-022641**

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## 1.0 INTRODUCTION

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

PM<sub>10</sub> monitoring at the site consists of five BGI PQ200 PM<sub>10</sub> 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 year of 2019.

## 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:

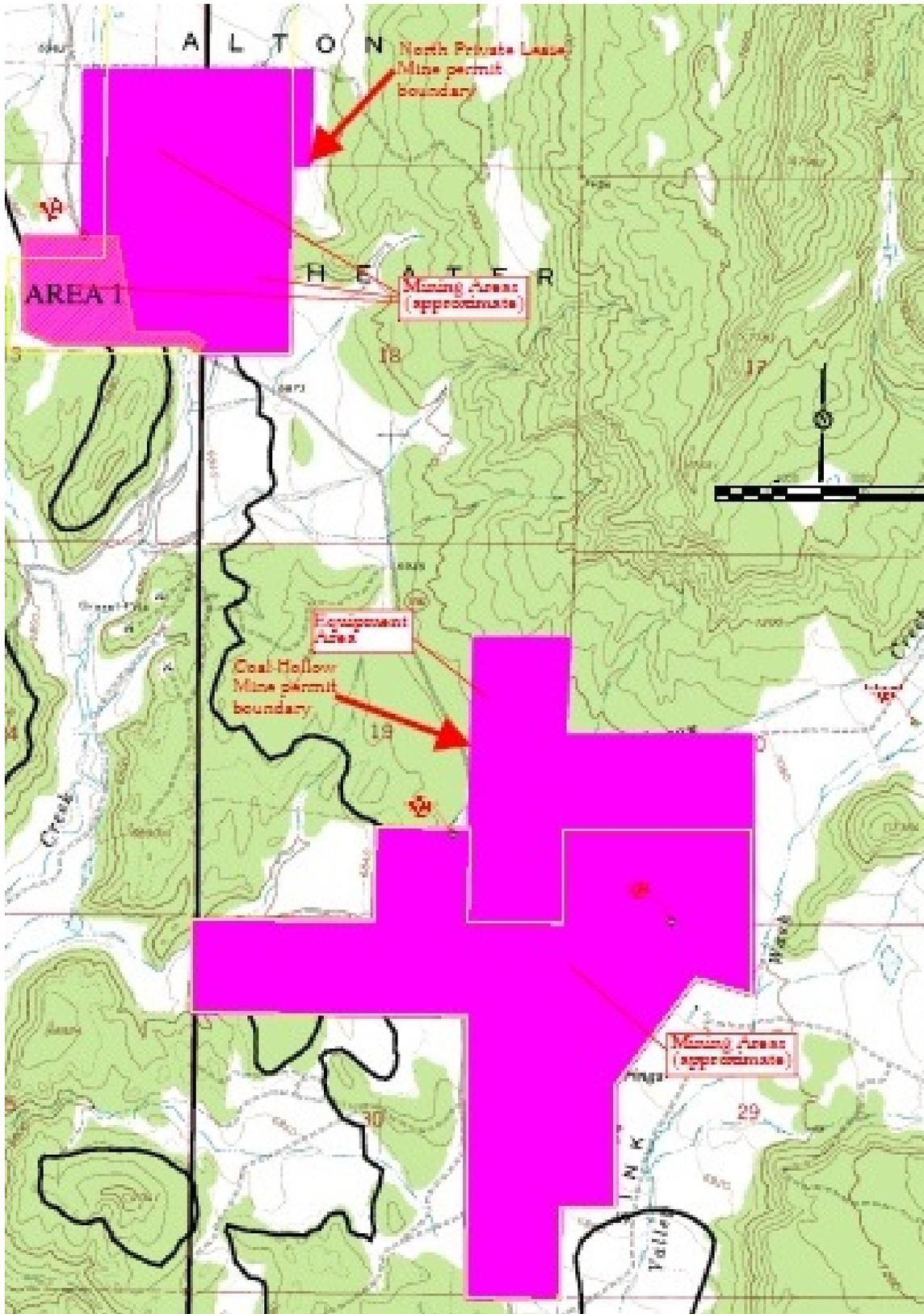
Northing: 41401699 meters

Easting: 371534 meters

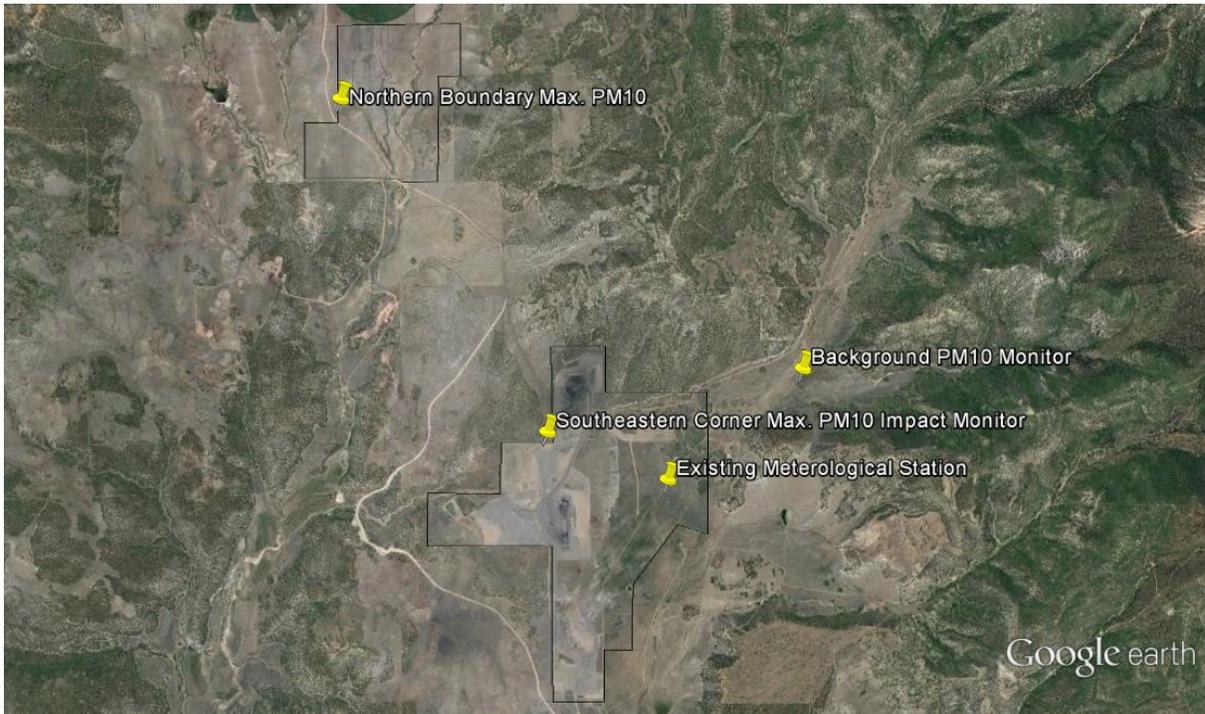
Universal Transverse Mercator (UTM) Datum NAD27, Zone 12

The three monitoring locations as depicted in Figure 2, are located in positions to collect both background and maximum PM<sub>10</sub> 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 compliance monitor for the North Private Lease (NPL) 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.

Figure 1 - Site Location Map



**Figure 2 - Satellite View of Monitoring Locations**



### **3.0 AIR QUALITY DATA SUMMARIES**

A summary of the measured PM<sub>10</sub> concentrations for the year are presented in 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 period and represent the average PM<sub>10</sub> 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 PM<sub>10</sub> 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 PM<sub>10</sub> 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 PM<sub>10</sub> 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

two highest concentrations, # of valid samples, and the arithmetic mean concentrations from each of the sites are listed. No measured PM<sub>10</sub> concentrations exceeded the 24-hour National Ambient Air Quality Standard (NAAQS) of 150 µg/m<sup>3</sup>.

At this time no changes for future monitoring are recommended for the Coal Hollow Mine. The location of the compliance and collocated monitors (962A, 963B and 964 C) are and will remain in the area of highest PM<sub>10</sub> concentrations for the next year of mining. There are no changes for future monitoring recommended for the North Private Lease. The location of the collocated monitors (2366D and 2398E) are and will remain in the area of highest PM<sub>10</sub> concentrations for the next year of mining.

**Table I - Summary of Measured PM<sub>10</sub> Concentrations (µg/m<sup>3</sup>)  
Background Monitor - 962A**

RANK	DATE	PM <sub>10</sub> CONCENTRATION
Highest	9/6/2019	16.2
2 <sup>nd</sup> Highest	11/11/2019	15.3
Annual Mean	1/1/19-12/31/19 (56 valid samples)	5.8

**Table II - Summary of Measured PM<sub>10</sub> Concentrations (µg/m<sup>3</sup>)  
Compliance Monitor - 963B**

RANK	DATE	PM <sub>10</sub> CONCENTRATION
Highest	6/14/2019	69.0
2 <sup>nd</sup> Highest	7/20/2019	67.9
Annual Mean	1/1/19-12/31/19 (52 valid samples)	13.4

**Table III - Summary of Measured PM<sub>10</sub> Concentrations (µg/m<sup>3</sup>)  
Compliance Monitor – 964C**

RANK	DATE	PM <sub>10</sub> CONCENTRATION
Highest	9/6/2019	25.0
2 <sup>nd</sup> Highest	10/18/2019	24.7
Annual Mean	1/1/19-12/31/19 (28 valid samples)	11.7

**Table IV - Summary of Measured PM<sub>10</sub> Concentrations (µg/m<sup>3</sup>)  
Compliance Monitor – 2366D**

RANK	DATE	PM <sub>10</sub> CONCENTRATION
Highest	7/26/2019	73.8
2 <sup>nd</sup> Highest	9/30/2019	73.6
Annual Mean	1/1/19-12/31/19 (26 valid samples)	23.8

**Table V - Summary of Measured PM<sub>10</sub> Concentrations (µg/m<sup>3</sup>)  
Compliance Monitor – 2398E**

RANK	DATE	PM <sub>10</sub> CONCENTRATION
Highest	7/26/2019	71.9
2 <sup>nd</sup> Highest	1/2/2019	56.3
Annual Mean	1/1/19-12/31/19 (53 valid samples)	15.2

**Table VI – Mean Annual Wind Speed**

	Annual 2018
Mean Wind Speed (m/s)	3.10

## 4.0 DATA RECOVERY AND QUALITY ASSURANCE

### 4.1 Data Recovery

#### Monitor 962A

Monitor 962A collected 56 of the 62 samples during the year. The percent recovery for this quarter is 90%. For the sample date of January 3<sup>rd</sup>, the operator incorrectly programed the monitor to run on the wrong day of January 2<sup>nd</sup>. For the sample date of February 14<sup>th</sup> the monitor ran for 13:52 hrs. having power issues due to weather. For the sample date of February 20<sup>th</sup> and 26<sup>th</sup> the monitor was inaccessible due to weather. For the sample date of May 3<sup>rd</sup>, the operator incorrectly programed the monitor resulting in a missed run. For the sample date of Oct. 12<sup>th</sup>, the monitor stop time was programed wrong, running longer than the 24-hour period.

#### Monitor 963B

Monitor 963B collected 52 of the 62 samples during the year. The percent recovery for this quarter is 82%. For the sample date of January 3<sup>rd</sup>, the operator incorrectly programed the monitor to run on the wrong day of January 2<sup>nd</sup>. For the sample date of Jul 2<sup>nd</sup>, the monitor ran for 22:25 hrs. having power issues. For the sample date of Jul.8<sup>th</sup>, the monitor ran for 0:02 hrs. having power issues. For the sample date of Aug. 7<sup>th</sup>, the monitor ran for 13:33 hrs. having power issues. For the sample date of Sep. 12<sup>th</sup>, the monitor ran for 38:45 hrs. overrunning the programed stop time. For the sample date of Sep.18<sup>th</sup>, the monitor ran for 4:373 hrs. having power issues. For the sample date of Oct. 30<sup>th</sup>, the monitor ran for 14:079 hrs. having power issues. For the sample date of Nov. 11<sup>th</sup>; the monitor ran for 13:36 hrs. having power issues. For the sample date of Nov. 29<sup>th</sup>, the monitor ran for 20:55 hrs. having power issues. For the sample date of Dec. 5<sup>th</sup>, the monitor ran for 12:21 hrs. having power issues. Due to the issues with the back-up battery, the monitor was rewired to utilize the external battery of the 962C Monitor.

#### Monitor 964C

Monitor 964C collected 28 of the 62 samples during the year. The percent recovery for this quarter is 45%. For the sample date of January 3<sup>rd</sup>, the operator incorrectly programmed the monitor to run on the wrong day of January 2<sup>nd</sup>. The monitor continued to have issues with incomplete runs and eventually the pump was rebuilt and motherboard was replaced. The monitor continued to have invalid runs and was eventually removed for repairs in July and reinstalled for the Aug. 19<sup>th</sup> run however, this run was invalid because the solar panel had failed to charge batteries sufficient for a complete run. New batteries were installed and the monitor has run without issues since.

#### Monitor 2366D

Monitor 2366D collected 26 of the 62 samples during the year. The percent recovery for this quarter is 42%. For the sample date of January 3<sup>rd</sup>, the operator incorrectly programmed the monitor to run on the wrong day of January 2<sup>nd</sup>. Beginning with the February 8<sup>th</sup> run, issues with weather, the power supply being submerged with water, temperature probe malfunctioning and eventually determining that the motherboard had become damaged, the monitor failed to complete a valid run. The first four runs from April 3<sup>rd</sup> to April 21<sup>st</sup> were affected by a temperature probe malfunction. Also, during the quarter, stray cattle damaged the external supply battery causing additional missed runs. For the sample date of Sep. 12<sup>th</sup>, the monitor ran for 00:02 hrs. having power issues due to weather. For the sample date of Sep. 18<sup>th</sup>, the sample time was incorrectly set for the monitoring period. Initially, a new motherboard was installed. This motherboard would not hold the programmed date and was returned to BGI. BGI replaced the firmware, but was unable to replicate the time issue.

#### Monitor 2398E

Monitor 2398E collected 53 of the 62 samples during the year. The percent recovery for this quarter is 85%. For the sample date of January 3<sup>rd</sup>, the operator incorrectly programmed the monitor to run on the wrong day of January 2<sup>nd</sup>. For the sample date of February 20<sup>th</sup>, the monitor had a temperature error on start-up and the monitor shut down, not continuing to run. For the sample date of Aug. 1<sup>st</sup>, the monitor ran for 03:32 hrs. having power issues. For the sample date of Aug. 7<sup>th</sup>, having power issues. For the sample date of Sep. 30<sup>th</sup>, having power issues. For the sample date of Oct. 12<sup>th</sup>, the monitor ran for 05:18 hrs. having power issues. For the sample dates of Dec. 17<sup>th</sup>, 23<sup>rd</sup> and 29<sup>th</sup>, the monitor was having power issues giving P, T and G errors.

The PM<sub>10</sub> data recoveries for the three monitoring stations are presented below:

**Table VI - Summary of Data Recovery**

SAMPLER	POSSIBLE SAMPLES	VALID SAMPLES	PERCENT DATA RECOVERY
962A	62	56	90%
963B	62	52	82%
964C	62	28	45%
2366D	62	26	42%
2398E	62	53	85%

## **4.2 Quality Assurance**

Quality assurance procedures utilized to verify the integrity of the measured PM<sub>10</sub> data included the following:

1. Review of PM<sub>10</sub> precision measurements based upon duplicate, collocated measurements.
2. Independent quarterly audits of the PM<sub>10</sub> samplers.
3. Monthly zero and single point flow rate checks of the PM<sub>10</sub> samplers.

### **4.2.1 Precision of PM<sub>10</sub> Measurements**

The precision of the PM<sub>10</sub> 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*, PM<sub>10</sub> precision checks are reported for instances when the concentrations for duplicate samples both exceed 3 µg/m<sup>3</sup>. 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 17 valid pairs of co-located monitoring data during the quarter. Single point precision based on *40 CFR, Part 58, Appendix A Equation 2* results were -23.5% to 35.7%. The aggregate coefficient of variability (CV) calculated in accordance with *40 CFR, Part 58, Appendix A Equation 11* is 14.0%. This value is not within the 10% goal for aggregate CV.

Precision calculations at the North Private Lease were developed based on 22 valid pairs of co-located monitoring data during the quarter. Single point precision based on *40 CFR, Part 58, Appendix A Equation 2* results were -29.2% to 47.9%. The aggregate coefficient of variability (CV) calculated in accordance with *40 CFR, Part 58, Appendix A Equation 11* is 19.7%. This value is not within the 10% goal for aggregate CV.

#### 4.2.2 Audit Results

The accuracy of the PM<sub>10</sub> sampler flows for each Quarter was verified by performance audits conducted by Air Resource Specialist on March 21, 2019, May 31, 2019, September 10, 2019 and November 12, 2019. A copy of the audit reports is presented in Appendix E and are summarized in Table VI. The audit results for the primary sampler (2366D) did not pass on the March 21<sup>st</sup> audit, it was determined that the motherboard needed replacement. All other audit results indicate that the five samplers were operating properly throughout the remainder of the year.

**Table VII - Audit Summary**

	SAMPLER	AUDIT % DIFFERENCE	LIMIT*	DESIGN % DIFFERENCE	LIMIT*
<b>1<sup>st</sup> Quarter</b>	962A	-1.1	±4%	1.1	± 5%
	963B	-0.5	±4%	0.5	± 5%
	964C	-1.8	±4%	1.8	± 5%
	2366D	27.3	±4%	-21.4	± 5%
	2398E	-1.0	±4%	1.0	± 5%
<b>2<sup>nd</sup> Quarter</b>	962A	0.0	±4%	0.1	± 5%
	963B	1.0	±4%	-1.0	± 5%

	964C	-0.7	±4%	0.7	± 5%
	2366D	-0.2	±4%	0.2	± 5%
	2398E	-0.5	±4%	0.5	± 5%
<b>3<sup>rd</sup> Quarter</b>	962A	-0.5	±4%	0.5	± 5%
	963B	0.7	±4%	-0.7	± 5%
	964C	-1.0	±4%	1.0	± 5%
	2366D	-0.1	±4%	0.1	± 5%
	2398E	0.0	±4%	0.0	± 5%
<b>4<sup>th</sup> Quarter</b>	962A	3.2	±4%	-3.1	± 5%
	963B	-1.5	±4%	1.6	± 5%
	964C	-1.5	±4%	1.5	± 5%
	2366D	0.1	±4%	-0.1	± 5%
	2398E	-2.9	±4%	3.0	± 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**

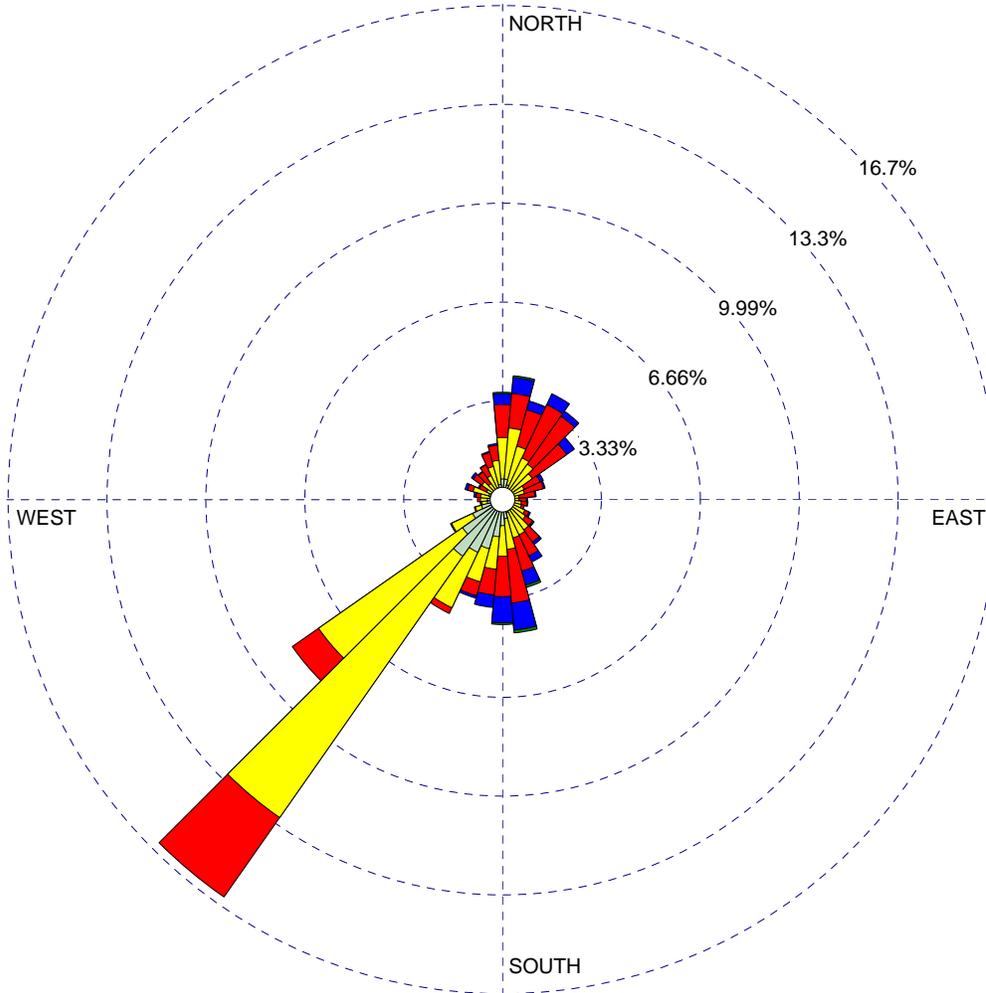
### **Windrose**

WIND ROSE PLOT:

**ACD\_COAL HOLLOW MINE  
2019 Annual**

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: 2.13%

COMMENTS:

DATA PERIOD:

**Start Date: 1/1/2018 - 00:00  
End Date: 12/31/2018 - 23:00**

COMPANY NAME:

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

MODELER:

**B. Kirk Nicholes**



CALM WINDS:

**2.13%**

TOTAL COUNT:

**8760 hrs.**

AVG. WIND SPEED:

**3.10 m/s**

DATE:

**1/21/2020**

PROJECT NO.:

Station ID: 1  
 Start Date: 1/1/2018 - 00:00  
 End Date: 12/31/2018 - 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	61	122	97	32	4	0	316
5-15	61	151	102	47	5	0	366
15-25	45	118	111	26	1	0	301
25-35	35	101	173	35	0	0	344
35-45	32	96	172	18	0	0	318
45-55	31	77	123	28	0	0	259
55-65	26	44	53	10	0	0	133
65-75	26	41	59	4	0	0	130
75-85	23	26	47	4	0	0	100
85-95	23	25	22	4	0	0	74
95-105	28	28	17	3	0	0	76
105-115	33	25	8	1	0	0	67
115-125	35	38	13	5	0	0	91
125-135	36	47	26	4	1	0	114
135-145	38	71	44	9	0	0	162
145-155	33	82	68	20	0	0	203
155-165	40	77	101	43	7	0	268
165-175	57	90	159	80	8	0	394
175-185	77	90	119	77	5	0	368
185-195	110	96	76	37	0	0	319
195-205	150	101	42	8	0	0	301
205-215	172	180	18	0	0	0	370
215-225	204	939	286	0	0	0	1429
225-235	144	517	94	0	0	0	755
235-245	97	68	3	1	0	0	169
245-255	64	19	3	0	0	0	86
255-265	45	16	4	1	0	0	66
265-275	45	20	9	0	0	0	74
275-285	38	27	13	7	0	0	85
285-295	42	48	16	8	0	0	114
295-305	16	36	23	4	0	0	79
305-315	22	52	31	7	0	0	112
315-325	27	31	42	2	0	0	102
325-335	33	45	35	2	0	0	115
335-345	37	64	43	3	0	0	147
345-355	45	71	45	5	0	0	166
Total	2031	3679	2297	535	31	0	8760

Frequency of Calm Winds: 187  
 Average Wind Speed: 3.10 m/s

Station ID: 1  
 Start Date: 1/1/2018 - 00:00  
 End Date: 12/31/2018 - 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	0.006963	0.013927	0.011073	0.003653	0.000457	0.000000	<b>0.036073</b>
5-15	0.006963	0.017237	0.011644	0.005365	0.000571	0.000000	<b>0.041781</b>
15-25	0.005137	0.013470	0.012671	0.002968	0.000114	0.000000	<b>0.034361</b>
25-35	0.003995	0.011530	0.019749	0.003995	0.000000	0.000000	<b>0.039269</b>
35-45	0.003653	0.010959	0.019635	0.002055	0.000000	0.000000	<b>0.036301</b>
45-55	0.003539	0.008790	0.014041	0.003196	0.000000	0.000000	<b>0.029566</b>
55-65	0.002968	0.005023	0.006050	0.001142	0.000000	0.000000	<b>0.015183</b>
65-75	0.002968	0.004680	0.006735	0.000457	0.000000	0.000000	<b>0.014840</b>
75-85	0.002626	0.002968	0.005365	0.000457	0.000000	0.000000	<b>0.011416</b>
85-95	0.002626	0.002854	0.002511	0.000457	0.000000	0.000000	<b>0.008447</b>
95-105	0.003196	0.003196	0.001941	0.000342	0.000000	0.000000	<b>0.008676</b>
105-115	0.003767	0.002854	0.000913	0.000114	0.000000	0.000000	<b>0.007648</b>
115-125	0.003995	0.004338	0.001484	0.000571	0.000000	0.000000	<b>0.010388</b>
125-135	0.004110	0.005365	0.002968	0.000457	0.000114	0.000000	<b>0.013014</b>
135-145	0.004338	0.008105	0.005023	0.001027	0.000000	0.000000	<b>0.018493</b>
145-155	0.003767	0.009361	0.007763	0.002283	0.000000	0.000000	<b>0.023174</b>
155-165	0.004566	0.008790	0.011530	0.004909	0.000799	0.000000	<b>0.030594</b>
165-175	0.006507	0.010274	0.018151	0.009132	0.000913	0.000000	<b>0.044977</b>
175-185	0.008790	0.010274	0.013584	0.008790	0.000571	0.000000	<b>0.042009</b>
185-195	0.012557	0.010959	0.008676	0.004224	0.000000	0.000000	<b>0.036416</b>
195-205	0.017123	0.011530	0.004795	0.000913	0.000000	0.000000	<b>0.034361</b>
205-215	0.019635	0.020548	0.002055	0.000000	0.000000	0.000000	<b>0.042237</b>
215-225	0.023288	0.107192	0.032648	0.000000	0.000000	0.000000	<b>0.163128</b>
225-235	0.016438	0.059018	0.010731	0.000000	0.000000	0.000000	<b>0.086187</b>
235-245	0.011073	0.007763	0.000342	0.000114	0.000000	0.000000	<b>0.019292</b>
245-255	0.007306	0.002169	0.000342	0.000000	0.000000	0.000000	<b>0.009817</b>
255-265	0.005137	0.001826	0.000457	0.000114	0.000000	0.000000	<b>0.007534</b>
265-275	0.005137	0.002283	0.001027	0.000000	0.000000	0.000000	<b>0.008447</b>
275-285	0.004338	0.003082	0.001484	0.000799	0.000000	0.000000	<b>0.009703</b>
285-295	0.004795	0.005479	0.001826	0.000913	0.000000	0.000000	<b>0.013014</b>
295-305	0.001826	0.004110	0.002626	0.000457	0.000000	0.000000	<b>0.009018</b>
305-315	0.002511	0.005936	0.003539	0.000799	0.000000	0.000000	<b>0.012785</b>
315-325	0.003082	0.003539	0.004795	0.000228	0.000000	0.000000	<b>0.011644</b>
325-335	0.003767	0.005137	0.003995	0.000228	0.000000	0.000000	<b>0.013128</b>
335-345	0.004224	0.007306	0.004909	0.000342	0.000000	0.000000	<b>0.016781</b>
345-355	0.005137	0.008105	0.005137	0.000571	0.000000	0.000000	<b>0.018950</b>
Total	0.231849	0.419977	0.262215	0.061073	0.003539	0.000000	0.978653

Frequency of Calm Winds: 2.13%  
 Average Wind Speed: 3.10 m/s

## **APPENDIX B**

### **Listing of PM<sub>10</sub> Concentrations**

## **Background Monitor 962A**

**PM<sub>10</sub> Sampler Summary**

January 1, 2019 - December 31, 2019

**Network:** Alton Coal Development, LLC

**Site:** Coal Hollow

**Sampler ID:** Coal Hollow-A

**AQS ID:**

**Sampler Type:** BGI FRM Single

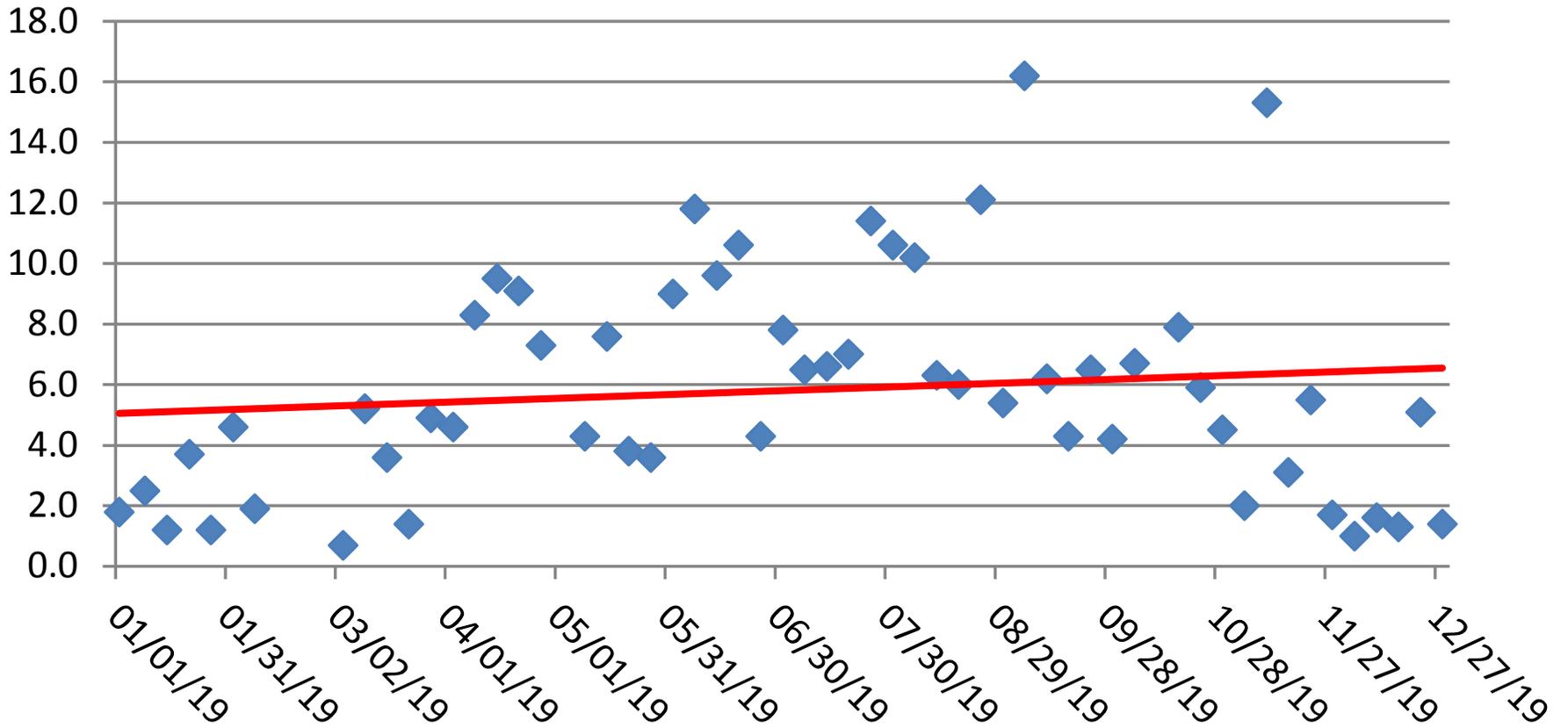
Date	Filter ID	Concentration	Concentration	Sample Period (hr:min)	Sample Volume (m3)	Std Volume (m3)	Mass (mg)			Flag	Comments
		(µg/m3) LTP	(µg/m3) STP				Tare	Gross	Net		
01/02/19	P2952930	1.5	1.8	23:59	24.0	20.8	393.1402	393.1779	0.0377	WD	
01/03/19		Invalid - AF	Invalid - AF								
01/09/19	P2952935	2.1	2.5	23:59	24.0	20.3	419.8661	419.9174	0.0513		
01/15/19	P2953146	1.0	1.2	23:59	24.0	20.1	401.1307	401.1560	0.0253		Holes
01/21/19	P2953151	3.1	3.7	23:59	24.0	20.0	398.1673	398.2432	0.0759		
01/27/19	P2953348	1.0	1.2	23:59	24.0	20.1	395.7998	395.8248	0.0250		
02/02/19	P2953353	3.8	4.6	24:00	24.0	19.8	388.5329	388.6260	0.0931		
02/08/19	P2953358	1.6	1.9	23:59	24.0	20.7	389.8858	389.9266	0.0408		
02/14/19	P2953624	Invalid - AG	Invalid - AG	13:52	13.9	11.6	391.8093	391.8447	0.0354	SP	
02/20/19	P2953629	Invalid - AO	Invalid - AO				399.3062	399.3177	0.0115	SP,MD	Did not run
02/26/19	P2953822	Invalid - AO	Invalid - AO				393.6894	393.6937	0.0043	SP,MD	Did not run
03/04/19	P2953827	0.6	0.7	23:59	24.0	20.0	401.7942	401.8090	0.0148		
03/10/19	P2954146	4.3	5.2	23:59	24.0	20.0	408.0658	408.1715	0.1057		
03/16/19	P2954151	3.0	3.6	23:59	24.0	20.2	391.4268	391.5006	0.0738		
03/22/19	P2954156	1.2	1.4	24:00	24.0	20.2	388.4236	388.4536	0.0300		
03/28/19	P2954486	4.0	4.9	23:59	24.0	19.8	401.2007	401.2985	0.0978		
04/03/19	P2954491	3.8	4.6	23:59	24.0	19.7	402.9855	403.0778	0.0923		
04/09/19	P2954738	6.7	8.3	23:59	24.0	19.3	398.0945	398.2570	0.1625		
04/15/19	P2954743	7.7	9.5	23:59	24.0	19.4	388.4923	388.6779	0.1856		
04/21/19	P2954894	7.3	9.1	24:00	24.0	19.5	395.8391	396.0169	0.1778		
04/27/19	P2954927	5.8	7.3	23:59	24.0	19.2	396.6747	396.8149	0.1402		
05/03/19	P2954932	Invalid - AI	Invalid - AI				392.5473	392.5725	0.0252	SP,MD	No data
05/09/19	P2955335	3.5	4.3	23:59	24.0	19.7	396.4476	396.5332	0.0856		
05/15/19	P2955330	6.1	7.6	24:00	24.0	19.2	401.2974	401.4449	0.1475		
05/21/19	P2955521	3.1	3.8	23:59	24.0	19.7	406.7422	406.8176	0.0754		
05/27/19	P2955526	3.0	3.6	23:59	24.0	19.8	401.5579	401.6305	0.0726		
06/02/19	P2955787	7.2	9.0	23:59	24.0	19.3	400.2920	400.4673	0.1753		
06/08/19	P2955792	9.4	11.8	23:59	24.0	19.3	397.6708	397.8983	0.2275		
06/14/19	P2955797	7.6	9.6	23:59	24.0	19.0	397.1832	397.3673	0.1841	HT	
06/20/19	P2956093	8.3	10.6	23:59	24.0	18.9	398.0492	398.2504	0.2012		
06/26/19	P2956098	3.4	4.3	23:59	24.0	19.2	400.5493	400.6327	0.0834		
07/02/19	P2956418	6.1	7.8	23:59	24.0	19.0	397.2187	397.3674	0.1487		
07/08/19	P2956421	5.1	6.5	23:59	24.0	19.2	391.3580	391.4829	0.1249		
07/14/19	P2956783	5.2	6.6	23:59	24.0	18.9	393.7648	393.8904	0.1256		
07/20/19	P2956788	5.5	7.0	23:59	24.0	18.9	390.8530	390.9869	0.1339		
07/26/19	P2957178	9.0	11.4	23:59	24.0	19.0	400.6301	400.8470	0.2169		
08/01/19	P2957183	8.4	10.6	23:59	24.0	19.1	399.9661	400.1694	0.2033		
08/07/19	P2957669	8.0	10.2	23:59	24.0	19.0	388.0563	388.2510	0.1947		
08/13/19	P2957674	5.0	6.3	23:59	24.0	19.0	391.1744	391.2951	0.1207		
08/19/19	P2957957	4.7	6.0	23:59	24.0	19.0	390.1641	390.2786	0.1145	CI	
08/25/19	P2957962	9.5	12.1	23:59	24.0	18.9	397.2613	397.4908	0.2295		
08/31/19	P2957967	4.2	5.4	23:59	24.0	18.8	387.7723	387.8753	0.1030		
09/06/19	P2958446	12.8	16.2	24:00	24.0	18.9	394.9835	395.2911	0.3076		
09/12/19	P2958451	5.0	6.2	24:00	24.0	19.4	392.5508	392.6712	0.1204		
09/18/19	P2958545	3.4	4.3	24:00	24.0	19.1	401.2334	401.3171	0.0837		
09/24/19	P2958550	5.2	6.5	24:00	24.0	19.1	396.7278	396.8539	0.1261		
09/30/19	P2958976	3.4	4.2	24:00	24.0	19.5	393.7290	393.8114	0.0824		
10/06/19	P2958982	5.5	6.7	24:00	24.0	19.6	401.5796	401.7123	0.1327		
10/12/19	P2958987	Invalid - AG	Invalid - AG	79:57	85.7	70.0	396.5367	396.9078	0.3711	SP	
10/18/19	P2959315	6.4	7.9	24:00	24.0	19.5	387.2473	387.4027	0.1554		
10/24/19	P2959321	4.9	5.9	24:00	24.0	20.0	393.6170	393.7370	0.1200	HT	
10/30/19	P2959747	3.9	4.5	24:00	24.0	20.7	389.6173	389.7122	0.0949	HT	
11/05/19	P2959754	1.6	2.0	24:00	24.0	19.7	403.7699	403.8106	0.0407		
11/11/19	P2959993	12.6	15.3	24:00	24.0	19.8	389.4678	389.7718	0.3040		
11/17/19	P2959998	2.5	3.1	24:00	24.0	19.7	390.3267	390.3887	0.0620		
11/23/19	P2960005	4.7	5.5	24:00	24.0	20.3	401.4477	401.5607	0.1130		
11/29/19	P2961327	1.4	1.7	24:00	24.0	20.0	401.5276	401.5619	0.0343		
12/05/19	P2961332	0.8	1.0	24:00	24.0	20.1	401.7891	401.8107	0.0216		
12/11/19	P2961564	1.3	1.6	24:00	24.0	20.3	396.9810	397.0136	0.0326		
12/17/19	P2961671	1.1	1.3	24:00	24.0	20.9	385.4745	385.5018	0.0273		
12/23/19	P2961749	4.2	5.1	24:00	24.0	19.8	389.5483	389.6496	0.1013		
12/29/19	P2961753	1.2	1.4	24:00	24.0	20.6	393.6717	393.7019	0.0302		
02/21/19	P2953634		Field Blank				397.3211	397.3397	0.0186		
07/10/19	P2956787		Field Blank				392.4207	392.4331	0.0124		
07/29/19	P2957187		Field Blank				404.8625	404.8715	0.0090		
10/08/19	P2958992		Field Blank				396.5565	396.5652	0.0087		
11/01/19	P2959753		Field Blank				391.5903	391.6012	0.0109		

<b># Valid</b>	<b>Recovery</b>	<b>Average</b>	<b>St. Dev.</b>	<b>Max</b>	<b>Min</b>
56	90%	5.8	3.6	16.2	0.7

# 962A Background Data-2018

$$y = 0.0041x - 174.7$$
$$R^2 = 0.0144$$

◆ Series1    — Linear (Series1)



## **Compliance Monitor 963B**

**PM<sub>10</sub> Sampler Summary**

January 1, 2019 - December 31, 2019

**Network:** Alton Coal Development, LLC

**Site:** Coal Hollow

**Sampler ID:** Coal Hollow-B

**AQS ID:**

**Sampler Type:** BGI FRM Single

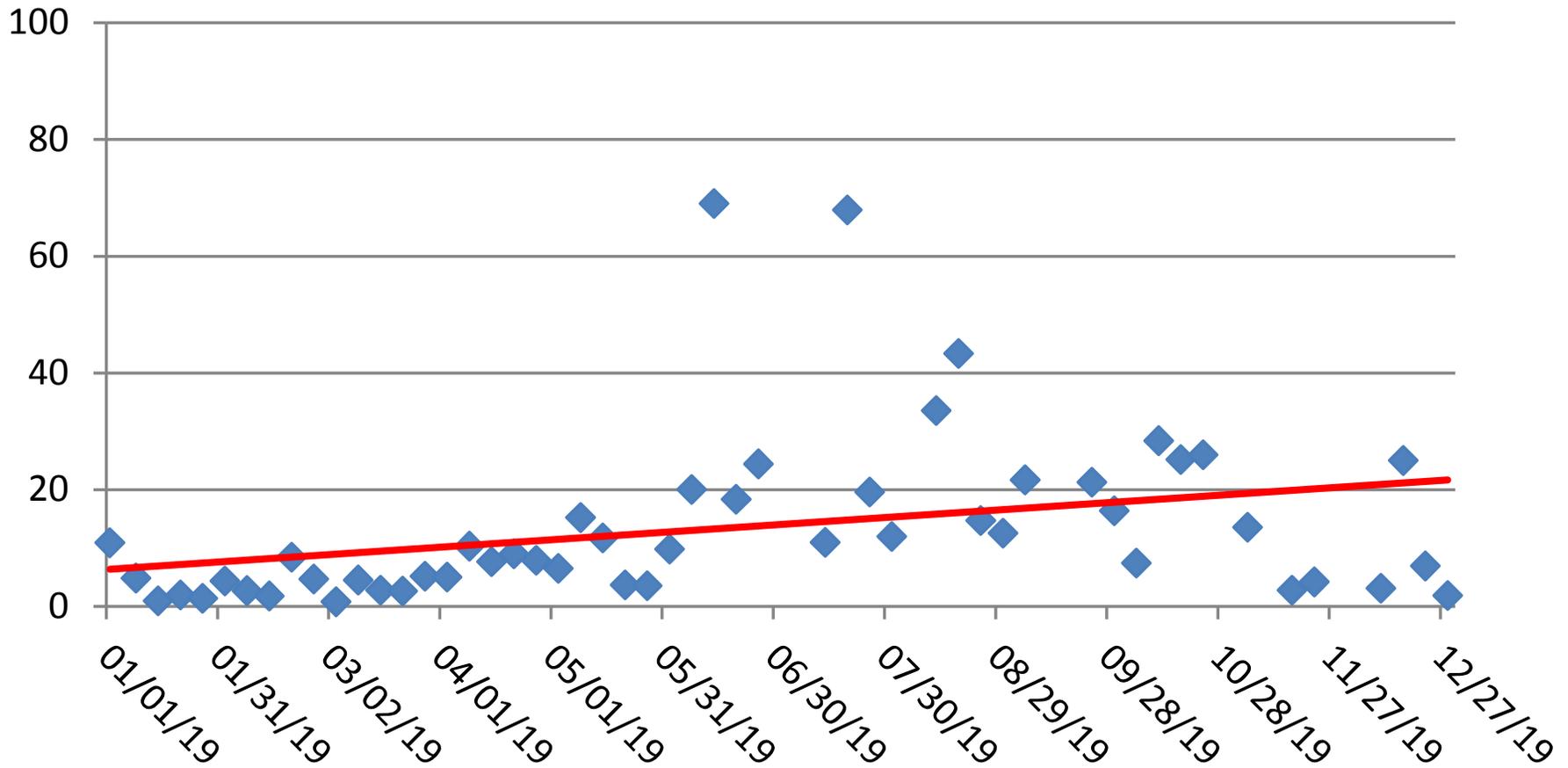
Date	Filter ID	Concentration (µg/m3)		Sample Period (hr:min)	Sample Volume (m3)	Std Volume (m3)	Mass (mg)			Flag	Comments
		LTP	STP				Tare	Gross	Net		
01/02/19	P2952931	9.4	10.9	23:59	24.0	20.9	394.0873	394.3155	0.2282	WD	
01/03/19		Invalid - AF	Invalid - AF								
01/09/19	P2952936	4.2	4.9	23:59	24.0	20.6	409.1350	409.2366	0.1016		
01/15/19	P2953147	0.8	1.0	23:59	24.0	20.3	399.5911	399.6123	0.0212		
01/21/19	P2953152	1.6	2.0	23:59	24.0	20.2	396.8408	396.8816	0.0408		
01/27/19	P2953349	1.2	1.4	23:59	24.0	20.3	393.9782	394.0079	0.0297		
02/02/19	P2953354	3.7	4.4	24:00	24.0	20.0	395.6551	395.7450	0.0899		
02/08/19	P2953359	2.4	2.7	23:59	24.0	21.0	388.9393	388.9974	0.0581		
02/14/19	P2953625	1.5	1.8	23:59	24.0	20.1	399.6835	399.7215	0.0380		
02/20/19	P2953630	7.2	8.4	23:59	24.0	20.9	398.2274	398.4027	0.1753		
02/26/19	P2953823	4.0	4.7	23:59	24.0	20.4	392.8127	392.9097	0.0970		
03/04/19	P2953828	0.6	0.8	23:59	24.0	20.2	405.0157	405.0323	0.0166		
03/10/19	P2954147	3.8	4.5	23:59	24.0	20.2	398.0583	398.1499	0.0916		
03/16/19	P2954152	2.4	2.8	23:59	24.0	20.3	385.3833	385.4415	0.0582		
03/22/19	P2954157	2.2	2.6	24:00	24.0	20.3	387.1944	387.2491	0.0547		
03/28/19	P2954487	4.3	5.2	23:59	24.0	19.9	398.8266	398.9303	0.1037		
04/03/19	P2954492	4.1	5.0	23:59	24.0	19.9	400.3274	400.4276	0.1002		
04/09/19	P2954739	8.4	10.3	23:59	24.0	19.5	399.6339	399.8362	0.2023		
04/15/19	P2954744	6.3	7.7	23:59	24.0	19.6	390.6476	390.8000	0.1524		
04/21/19	P2954895	7.3	9.0	23:59	24.0	19.6	401.1326	401.3100	0.1774		
04/27/19	P2954928	6.4	7.9	23:59	24.0	19.4	391.1499	391.3041	0.1542		
05/03/19	P2954933	5.3	6.5	23:59	24.0	19.7	398.2599	398.3886	0.1287		
05/09/19	P2955336	12.5	15.2	23:59	24.0	19.9	393.3756	393.6779	0.3023		
05/15/19	P2955331	9.4	11.7	23:59	24.0	19.4	393.8052	394.0323	0.2271		
05/21/19	P2955522	3.0	3.7	23:59	24.0	19.8	407.6967	407.7706	0.0739		
05/27/19	P2955527	2.9	3.5	23:59	24.0	19.9	399.8733	399.9439	0.0706		
06/02/19	P2955788	7.9	9.8	23:59	24.0	19.4	401.6846	401.8764	0.1918		
06/08/19	P2955793	16.1	20.0	23:59	24.0	19.4	402.6441	403.0333	0.3892		
06/14/19	P2955798	55.0	69.0	23:59	24.0	19.2	405.4812	406.8040	1.3228		
06/20/19	P2956094	14.5	18.4	23:59	24.0	19.0	399.6304	399.9807	0.3503		
06/26/19	P2956099	19.5	24.4	23:59	24.0	19.2	400.7186	401.1883	0.4697		
07/02/19	P2956419	Invalid - AG	Invalid - AG	22:25	22.5	17.8	395.8201	396.4641	0.6440	SP	
07/08/19	P2956422	Invalid - AG	Invalid - AG	0:02	0.0	0.0	392.0738	392.0862	0.0124	SP	
07/14/19	P2956784	8.7	11.0	23:59	24.0	19.0	394.2554	394.4650	0.2096		
07/20/19	P2956789	53.8	67.9	23:59	24.0	19.1	394.1353	395.4293	1.2940		
07/26/19	P2957179	15.5	19.6	23:59	24.0	19.1	398.2753	398.6500	0.3747		
08/01/19	P2957184	9.6	12.0	23:59	24.0	19.2	392.4948	392.7272	0.2324		
08/07/19	P2957671	Invalid - AG	Invalid - AG	13:33	13.6	10.9	386.5072	386.6413	0.1341	SP	
08/13/19	P2957675	26.7	33.5	23:59	24.0	19.2	392.9424	393.5861	0.6437		
08/19/19	P2957958	34.5	43.3	23:59	24.0	19.2	393.4547	394.2852	0.8305		
08/25/19	P2957963	11.6	14.7	24:00	24.0	19.1	389.0229	389.3035	0.2806		
08/31/19	P2957968	9.9	12.6	23:59	24.0	19.0	396.1069	396.3471	0.2402		
09/06/19	P2958447	17.2	21.7	23:59	24.0	19.1	397.2944	397.7095	0.4151		
09/12/19	P2958452	Invalid - AG	Invalid - AG	38:45	38.8	31.6	394.1346	394.5819	0.4473	SP,CI	
09/18/19	P2958546	Invalid - AG	Invalid - AG	4:37	4.6	3.8	395.6052	395.6401	0.0349	SP	
09/24/19	P2958551	17.1	21.3	23:59	24.0	19.3	396.9512	397.3639	0.4127		
09/30/19	P2958977	13.4	16.4	23:59	24.0	19.7	388.9984	389.3213	0.3229		
10/06/19	P2958983	6.1	7.4	23:59	24.0	19.8	397.7205	397.8676	0.1471		
10/12/19	P2958988	23.7	28.4	24:00	24.0	20.1	397.9148	398.4852	0.5704	HT	
10/18/19	P2959317	20.7	25.2	23:59	24.0	19.7	393.0215	393.5204	0.4989		
10/24/19	P2959322	21.8	26.0	23:59	24.0	20.2	392.2129	392.7380	0.5251	HT	
10/30/19	P2959748	Invalid - AG	Invalid - AG	14:03	14.1	12.3	390.0902	390.2408	0.1506	SP,CI,HT	
11/05/19	P2959755	11.3	13.6	23:59	24.0	19.9	399.6572	399.9294	0.2722		
11/11/19	P2959994	Invalid - AG	Invalid - AG	13:36	13.6	11.3	391.5563	391.8053	0.2490	SP	
11/17/19	P2959999	2.3	2.8	23:59	24.0	19.8	382.0829	382.1392	0.0563		
11/23/19	P2960006	3.6	4.2	23:59	24.0	20.5	398.1351	398.2218	0.0867		
11/29/19	P2961328	Invalid - AG	Invalid - AG	20:55	21.0	17.6	400.5551	400.5783	0.0232	SP	
12/05/19	P2961333	Invalid - AG	Invalid - AG	12:21	12.4	10.4	402.1502	402.1633	0.0131	SP	
12/11/19	P2961568	2.6	3.1	24:00	24.0	20.6	392.3806	392.4454	0.0648		
12/17/19	P2961570	21.9	25.0	23:59	24.0	21.1	388.5287	389.0574	0.5287		
12/23/19	P2961750	5.8	6.9	23:59	24.0	20.2	399.0733	399.2138	0.1405		
12/29/19	P2961754	1.6	1.9	23:59	24.0	20.9	399.9628	400.0031	0.0403		
02/21/19	P2953635		Field Blank				395.8358	395.8569	0.0211		
07/17/19	P2956425		Field Blank				401.1410	401.1503	0.0093		
08/02/19	P2957670		Field Blank				395.8323	395.8403	0.0080		
10/15/19	P2959316		Field Blank				394.9190	394.9224	0.0034		
11/01/19	P2959758		Field Blank				392.1006	392.1165	0.0159		

<b># Valid</b>	<b>Recovery</b>	<b>Average</b>	<b>St. Dev.</b>	<b>Max</b>	<b>Min</b>
52	82%	13.4	14.6	69.0	0.8

# 963B Compliance Data-2018

$$y = 0.0423x - 1834.2$$
$$R^2 = 0.0961$$

◆ Series1      — Linear (Series1)



## **Collocated Monitor 964C**

**PM<sub>10</sub> Sampler Summary**

January 1, 2019 - December 31, 2019

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

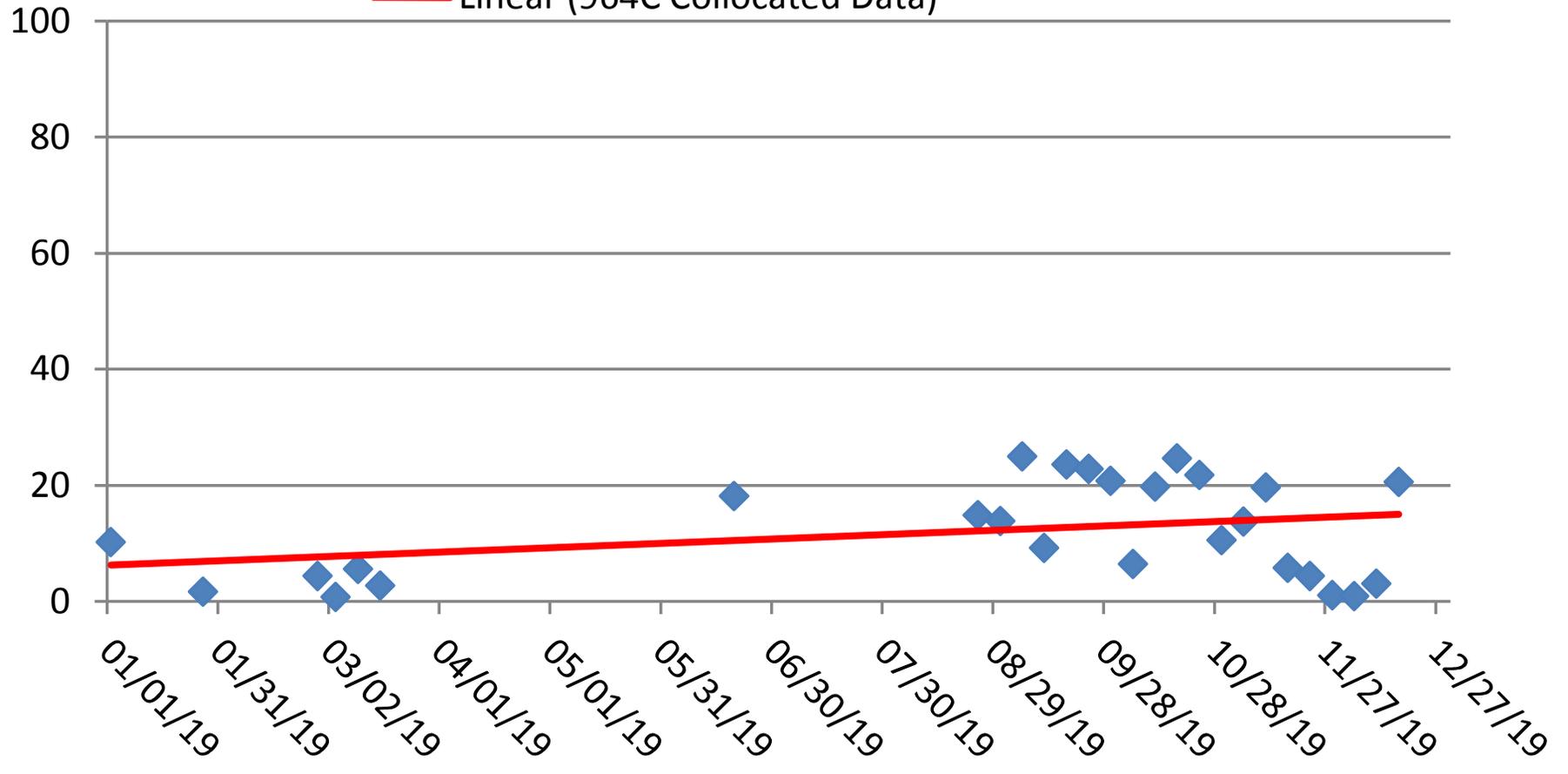
Date	Filter ID	Concentration (µg/m <sup>3</sup> )		Sample Period (hr:min)	Sample Volume (m <sup>3</sup> )	Std Volume (m <sup>3</sup> )	Mass (mg)			Flag	Comments
		LTP	STP				Tare	Gross	Net		
01/02/19	P2952932	9.0	10.3	23:59	24.0	21.0	412.8614	413.0791	0.2177	WD	
01/03/19		Invalid - AF	Invalid - AF								
01/09/19	P2952937	Invalid - AN	Invalid - AN	8:39	8.7	7.6	411.1442	411.2002	0.0560	SP	
01/15/19	P2953148	Invalid - AN	Invalid - AN	12:34	12.6	10.7	398.0245	398.0461	0.0216	SP,CV	
01/21/19	P2953153	Invalid - AN	Invalid - AN				393.0944	393.1067	0.0123	SP	Ran 01/23/19
01/27/19	P2953350	1.4	1.7	23:59	24.0	20.4	392.7941	392.8291	0.0350		
02/02/19	P2953355	Invalid - AN	Invalid - AN	20:36	20.6	17.3	393.6077	393.6982	0.0905	SP	
02/08/19	P2953360	Invalid - AN	Invalid - AN	0:31	0.5	0.4	391.5491	391.5686	0.0195	SP	
02/14/19	P2953626	Invalid - AN	Invalid - AN	0:09	0.1	0.1	398.9959	399.0316	0.0357	SP	
02/20/19	P2953631	Invalid - AN	Invalid - AN	0:03			398.6061	398.6798	0.0737	SP	Did not run
02/26/19		Invalid - AN	Invalid - AN								
02/27/19	P2953824	3.7	4.4	23:02	23.1	19.5	388.1352	388.2216	0.0864	CI,WD	
03/04/19	P2953829	0.7	0.8	23:59	24.0	20.2	401.3473	401.3643	0.0170		
03/10/19	P2954148	4.8	5.7	23:59	24.0	20.3	400.0846	400.2010	0.1164		
03/16/19	P2954153	2.4	2.8	23:59	24.0	20.4	389.6191	389.6778	0.0587		
03/22/19	P2954158	Invalid - AN	Invalid - AN	14:24	14.4	11.9	396.0093	396.0892	0.0799	SP,CI	
03/28/19	P2954488	Invalid - AN	Invalid - AN	2:49	2.8	2.4	404.6907	404.8234	0.1327	SP,CI	
04/03/19	P2954493	Invalid - AN	Invalid - AN	0:03			399.1187	399.1235	0.0048	SP	
04/09/19	P2954740	Invalid - AN	Invalid - AN	0:03			389.4222	389.4282	0.0060	SP	
04/15/19	P2954745	Invalid - AN	Invalid - AN	0:03			383.3603	383.3719	0.0116	SP	
04/21/19	P2954896	Invalid - AN	Invalid - AN				402.0930	402.0982	0.0052	SP,MD	No data
04/27/19	P2954929	Invalid - AN	Invalid - AN				388.2432	388.2554	0.0122	SP,MD	No data
05/03/19	P2954934	Invalid - AN	Invalid - AN				391.8674	391.8766	0.0092	SP,MD	No data
05/09/19	P2955337	Invalid - AN	Invalid - AN				395.4379	395.6535	0.2156	SP,CV	
05/15/19	P2955332	Invalid - AN	Invalid - AN	5:36	5.6	4.6	397.7580	397.8936	0.1356	SP	
05/21/19	P2955523	Invalid - AN	Invalid - AN				401.9272	401.9376	0.0104	SP,MD	No data
05/27/19	P2955528	Invalid - AN	Invalid - AN				398.7002	398.7153	0.0151	SP,MD	No data
06/02/19	P2955789	Invalid - AN	Invalid - AN	0:02			398.1404	398.2130	0.0726	SP	
06/08/19		Invalid - AF	Invalid - AF								
06/14/19		Invalid - AF	Invalid - AF								
06/20/19	P2956095	14.4	18.2	24:00	24.0	19.0	404.2736	404.6206	0.3470		
06/26/19	P2956100	Invalid - AN	Invalid - AN				393.2543	393.3687	0.1144	SP,MD	Did not run
07/02/19	P2956420	Invalid - AG	Invalid - AG				392.5099	392.6010	0.0911	SP,MD	Incomplete run
07/08/19		Invalid - AF	Invalid - AF								
07/14/19		Invalid - AF	Invalid - AF								
07/20/19		Invalid - AF	Invalid - AF								
07/26/19		Invalid - AF	Invalid - AF								
08/01/19		Invalid - AF	Invalid - AF								
08/07/19		Invalid - AF	Invalid - AF								
08/13/19		Invalid - AF	Invalid - AF								
08/19/19	P2957959	Invalid - AG	Invalid - AG	4:10	4.2	3.4	398.5205	398.5621	0.0416	SP	
08/25/19	P2957964	11.8	14.9	24:00	24.0	19.1	389.7372	390.0226	0.2854		
08/31/19	P2957969	11.0	13.9	23:59	24.0	19.1	395.3393	395.6055	0.2662		
09/06/19	P2958448	19.8	25.0	23:59	24.0	19.1	402.4755	402.9537	0.4782		
09/12/19	P2958453	7.6	9.3	23:59	24.0	19.6	391.9785	392.1619	0.1834		
09/18/19	P2958547	19.0	23.6	23:59	24.0	19.4	398.5073	398.9657	0.4584		
09/24/19	P2958552	18.4	22.9	23:59	24.0	19.4	395.5076	395.9516	0.4440		
09/30/19	P2958978	17.1	20.8	23:59	24.0	19.7	396.7788	397.1899	0.4111		
10/06/19	P2958984	5.3	6.5	23:59	24.0	19.9	396.3652	396.4949	0.1297		
10/12/19	P2958989	16.6	19.8	24:00	24.0	20.1	390.0841	390.4847	0.4006	HT	
10/18/19	P2959318	20.3	24.7	23:59	24.0	19.8	394.7095	395.1998	0.4903		
10/24/19	P2959323	18.4	21.8	23:59	24.0	20.2	400.9118	401.3546	0.4428	HT	
10/30/19	P2959749	9.3	10.6	23:59	24.0	21.1	394.6198	394.8439	0.2241	HT	
11/05/19	P2959756	11.5	13.8	24:00	24.0	20.0	395.5478	395.8245	0.2767		
11/11/19	P2959996	16.3	19.7	23:59	24.0	20.0	386.7444	387.1386	0.3942		
11/17/19	P2960000	4.8	5.8	23:59	24.0	19.9	395.7754	395.8914	0.1160		
11/23/19	P2960007	3.8	4.4	23:59	24.0	20.5	384.5532	384.6450	0.0918		
11/29/19	P2961329	0.9	1.1	23:59	24.0	20.3	399.3509	399.3746	0.0237		
12/05/19	P2961334	0.8	1.0	23:59	24.0	20.4	403.8321	403.8535	0.0214		
12/11/19	P2961567	2.6	3.1	23:59	24.0	20.7	397.2156	397.2803	0.0647		
12/17/19	P2961571	18.2	20.7	23:59	24.0	21.2	398.2975	398.7366	0.4391		
12/23/19	P2961751	6.1	7.3	23:59	24.0	20.2	394.7686	394.9168	0.1482		
12/29/19	P2961755	1.8	2.1	23:59	24.0	21.0	402.9820	403.0270	0.0450		
02/21/19	P2953832		Field Blank				399.9774	399.9886	0.0112		
09/26/19	P2958981		Field Blank				399.5272	399.5357	0.0085		
10/21/19	P2959326		Field Blank				392.4054	392.4097	0.0043		
11/07/19	P2959995		Field Blank				392.6032	392.6182	0.0150		

# Valid	Recovery	Average	St. Dev.	Max	Min
28	45%	11.7	8.6	25.0	0.8

# 964C Collocated Data-2018

$$y = 0.0251x - 1085.9$$
$$R^2 = 0.104$$

- ◆ 964C Collocated Data
- Linear (964C Collocated Data)



**Compliance Monitor 2366D**

PM<sub>10</sub> Sampler Summary

January 1, 2019 - December 31, 2019

Network: Alton Coal Development, LLC  
 Site: Coal Hollow  
 Sampler ID: Coal Hollow-D AQS ID:  
 Sampler Type: BGI FRM Single

Date	Filter ID	Concentration	Concentration	Sample Period (hr:min)	Sample Volume (m3)	Std Volume (m3)	Mass (mg)			Flag	Comments
		(µg/m3) LTP	(µg/m3) STP				Tare	Gross	Net		
01/02/19	P2952933	56.5	64.7	23:59	24.0	21.0	406.6201	407.9781	1.3580	WD	
01/03/19		Invalid - AF	Invalid - AF								
01/09/19	P2952938	5.7	6.7	23:59	24.0	20.6	406.0854	406.2247	0.1393		
01/15/19	P2953149	8.5	10.1	23:59	24.0	20.3	393.5750	393.7816	0.2066		
01/21/19	P2953154	5.6	6.7	23:59	24.0	20.2	389.8802	390.0172	0.1370		
01/27/19	P2953351	1.4	1.7	23:59	24.0	20.4	381.2620	381.2970	0.0350		
02/02/19	P2953356	6.2	7.5	24:00	24.0	20.0	395.3235	395.4744	0.1509		
02/08/19	P2953361	Invalid - AG	Invalid - AG	8:48	8.8	7.9	394.9056	394.9404	0.0348	SP	
02/14/19	P2953627	Invalid - AN	Invalid - AN	0:04	0.1	0.1	395.2588	395.2820	0.0232	SP	
02/20/19	P2953632	Invalid - AN	Invalid - AN	0:04			398.1740	398.1954	0.0214	SP,MD	Did not run
02/26/19	P2953825	Invalid - AN	Invalid - AN	23:59	24.0	17.1	391.4849	391.6127	0.1278		Temp probe malfunction
03/04/19	P2953830	Invalid - AN	Invalid - AN	23:59	24.0	17.1	398.1349	398.1534	0.0185		Temp probe malfunction
03/10/19	P2954149	Invalid - AN	Invalid - AN	23:59	24.0	17.0	400.1920	400.2899	0.0979		Temp probe malfunction
03/16/19	P2954154	Invalid - AN	Invalid - AN	23:59	24.0	17.2	391.3823	391.4446	0.0623		Temp probe malfunction
03/22/19	P2954159	Invalid - AN	Invalid - AN	23:59	24.0	17.1	384.6346	384.6888	0.0542		Temp probe malfunction
03/28/19	P2954489	Invalid - AN	Invalid - AN	23:59	24.0	17.1	400.2840	400.3879	0.1039		Temp probe malfunction
04/03/19	P2954494	Invalid - AN	Invalid - AN	23:59	24.0	17.0	398.7383	398.8162	0.0779		Temp probe malfunction
04/09/19	P2954741	Invalid - AN	Invalid - AN	23:59	24.0	17.0	389.0788	389.2915	0.2127		Temp probe malfunction
04/15/19	P2954746	Invalid - AN	Invalid - AN	23:59	24.0	17.0	397.0885	397.2932	0.2047		Temp probe malfunction
04/21/19	P2954897	Invalid - AN	Invalid - AN	23:59	24.0	17.0	402.2122	402.3693	0.1571		Temp probe malfunction
04/27/19	P2954930	9.4	11.7	24:00	24.0	19.3	388.9070	389.1333	0.2263		
05/03/19	P2954935	Invalid - AN	Invalid - AN				385.7367	387.0747	1.3380	SP,MD	No data
05/09/19	P2955429	9.9	12.0	24:00	24.0	19.8	399.1839	399.4223	0.2384		
05/15/19	P2955333	12.7	15.8	24:00	24.0	19.3	401.2919	401.5978	0.3059		
05/21/19	P2955524	Invalid - AN	Invalid - AN				406.1273	406.2119	0.0846		No data
05/27/19	P2955529	Invalid - AN	Invalid - AN				405.6264	405.6635	0.0371		No data
06/02/19	P2955790	9.3	11.5	24:00	24.0	19.4	400.7404	400.9644	0.2240		
06/08/19	P2955795	Invalid - AN	Invalid - AN				399.6423	400.0743	0.4320	SP,MD	No data
06/14/19	P2955800	25.5	32.1	24:00	24.0	19.1	397.4513	398.0651	0.6138		
06/20/19	P2956096	Invalid - AN	Invalid - AN				403.4620	403.4755	0.0135	SP,CI,HT	
06/26/19	P2956101	17.5	22.0	24:00	24.0	19.2	390.3476	390.7703	0.4227		
07/02/19	P2956103	29.3	37.0	24:00	24.0	19.0	392.7466	393.4523	0.7057		
07/08/19	P2956423	28.6	35.8	24:00	24.0	19.2	389.2755	389.9634	0.6879		
07/14/19	P2956785	6.5	8.2	24:00	24.0	18.9	397.5454	397.7024	0.1570		
07/20/19	P2956791	26.9	34.1	24:00	24.0	19.0	392.2344	392.8825	0.6481		
07/26/19	P2957180	58.4	73.8	24:00	24.0	19.0	398.8029	400.2076	1.4047		
08/01/19	P2957185	12.7	16.0	24:00	24.0	19.1	392.4418	392.7490	0.3072		
08/07/19	P2957672	14.1	17.8	24:00	24.0	19.1	393.1193	393.4599	0.3406		
08/13/19	P2957677	7.4	9.4	24:00	24.0	19.1	386.3894	386.5696	0.1802		
08/19/19	P2957960	16.5	20.8	24:00	24.0	19.1	390.1333	390.5306	0.3973		
08/25/19	P2957965	15.4	19.6	24:00	24.0	19.0	388.6630	389.0353	0.3723		
08/31/19	P2957970	12.4	15.7	24:00	24.0	18.9	393.4867	393.7854	0.2987		
09/06/19	P2958449	19.5	24.7	24:00	24.0	19.0	403.9439	404.4148	0.4709		
09/12/19	P2958454	Invalid - AG	Invalid - AG	0:02			389.9447	389.9690	0.0243	SP	
09/18/19	P2958548	Invalid - AQ	Invalid - AQ	24:00	24.0	19.4	403.7568	405.2015	1.4447	CI	
09/24/19	P2958553	23.1	28.8	24:00	24.0	19.3	406.2504	406.8068	0.5564		
09/30/19	P2958979	59.0	73.6	24:00	24.0	19.3	393.9218	395.3407	1.4189		
10/06/19	P2958985	Invalid - AN	Invalid - AN	0:01			391.8201	391.9932	0.1731	SP	
10/12/19	P2958990	Invalid - AN	Invalid - AN	0:01			389.5422	390.8842	1.3420	SP	Still running
10/18/19	P2959319	Invalid - AN	Invalid - AN	0:01			392.1973	393.0289	0.8316	SP	
10/24/19	P2959324	Invalid - AN	Invalid - AN	0:01			401.8514	402.5264	0.6750	SP,HT	
10/30/19	P2959750	Invalid - AN	Invalid - AN				395.3035	395.3140	0.0105	SP,MD	
11/05/19		Invalid - AN	Invalid - AN								
11/11/19	P2960001	Invalid - AN	Invalid - AN				391.4889	394.1441	2.6552	SP,MD	Test run 11/12/19
11/17/19	P2960004	Invalid - AN	Invalid - AN				392.1651	392.2099	0.0448	SP,MD	
11/23/19	P2960008	Invalid - AN	Invalid - AN				397.1576	397.1673	0.0097	SP,MD	
11/29/19	P2961330	Invalid - AN	Invalid - AN				394.3451	394.3544	0.0093	SP,MD	
12/05/19		Invalid - AN	Invalid - AN								
12/11/19		Invalid - AN	Invalid - AN								
12/17/19		Invalid - AN	Invalid - AN								
12/23/19		Invalid - AN	Invalid - AN								
12/29/19		Invalid - AN	Invalid - AN								
07/17/19	P2956790		Field Blank				395.3674	395.3739	0.0065		
08/08/19	P2957676		Field Blank				389.0834	389.0928	0.0094		
10/21/19	P2959327		Field Blank				391.7095	391.7222	0.0127		
11/12/19	P2960003		Field Blank				397.8967	397.9140	0.0173		

# Valid 26  
 Recovery 42%  
 Average 23.8  
 St. Dev. 19.8  
 Max 73.8  
 Min 1.7

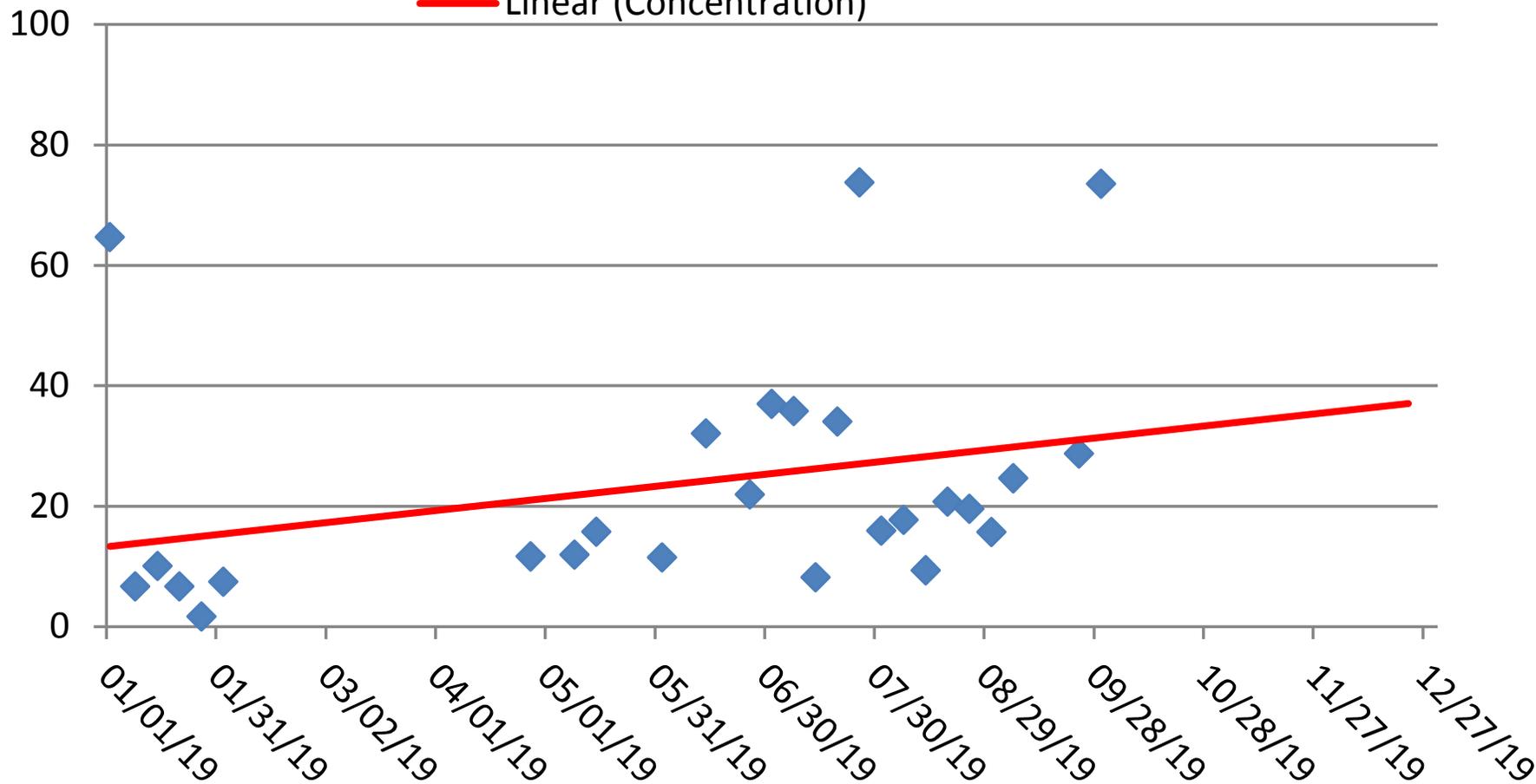
# 2366D Collocated Data-2018

$$y = 0.0669x - 2893.3$$

$$R^2 = 0.0875$$

◆ Concentration

— Linear (Concentration)



## **Collocated Monitor 2398E**

**PM<sub>10</sub> Sampler Summary**

January 1, 2019 - December 31, 2019

**Network:** Alton Coal Development, LLC  
**Site:** Coal Hollow  
**Sampler ID:** Coal Hollow-E  
**Sampler Type:** BGI FRM Single  
**AQS ID:**

Date	Filter ID	Concentration	Concentration	Sample Period (hr:min)	Sample Volume (m3)	Std Volume (m3)	Mass (mg)			Flag	Comments
		(µg/m3) LTP	(µg/m3) STP				Tare	Gross	Net		
01/02/19	P2952934	49.1	56.3	23:59	24.0	21.0	410.7498	411.9311	1.1813	WD	
01/03/19		Invalid - AF	Invalid - AF								
01/09/19	P2952939	4.7	5.6	23:59	24.0	20.5	409.6145	409.7296	0.1151		
01/15/19	P2953150	9.3	11.1	23:59	24.0	20.3	391.4023	391.6278	0.2255		
01/21/19	P2953155	6.1	7.3	23:59	24.0	20.2	401.5199	401.6689	0.1490		
01/27/19	P2953352	1.3	1.6	23:59	24.0	20.4	385.1648	385.1982	0.0334		
02/02/19	P2953357	6.4	7.7	24:00	24.0	20.0	398.7387	398.8944	0.1557		
02/08/19	P2953362	3.3	3.8	23:59	24.0	21.0	386.6640	386.7453	0.0813		
02/14/19	P2953628	3.9	4.7	23:59	24.0	20.1	394.8082	394.9033	0.0951		
02/20/19	P2953633	Invalid - AN	Invalid - AN	0:02			392.6791	392.6981	0.0190	SP	Did not run
02/26/19	P2953826	6.1	7.1	23:59	24.0	20.5	399.8858	400.0331	0.1473		
03/04/19	P2953831	0.7	0.8	23:59	24.0	20.2	403.1218	403.1396	0.0178		
03/10/19	P2954150	4.5	5.4	23:59	24.0	20.2	389.0243	389.1337	0.1094		
03/16/19	P2954155	3.3	3.9	23:59	24.0	20.4	391.1581	391.2396	0.0815		
03/22/19	P2954160	1.8	2.2	23:59	24.0	20.3	391.4923	391.5374	0.0451		
03/28/19	P2954490	4.7	5.7	23:59	24.0	20.0	393.3959	393.5111	0.1152		
04/03/19	P2954495	3.5	4.2	23:59	24.0	19.9	396.9341	397.0184	0.0843		
04/09/19	P2954742	6.0	7.3	23:59	24.0	19.6	393.7330	393.8776	0.1446		
04/15/19	P2954747	11.3	13.9	23:59	24.0	19.6	400.8131	401.0859	0.2728		
04/21/19	P2954898	6.7	8.2	24:00	24.0	19.6	397.5891	397.7513	0.1622		
04/27/19	P2954931	9.2	11.4	23:59	24.0	19.3	390.2643	390.4863	0.2220		
05/03/19	P2954936	14.6	17.9	23:59	24.0	19.7	386.2456	386.5984	0.3528		
05/09/19	P2955339	10.6	12.8	23:59	24.0	19.9	400.6184	400.8745	0.2561		
05/15/19	P2955334	7.9	9.9	23:59	24.0	19.4	399.7329	399.9246	0.1917		
05/21/19	P2955525	3.6	4.4	23:59	24.0	19.8	404.9655	405.0531	0.0876		
05/27/19	P2955530	3.0	3.6	23:59	24.0	19.9	399.1409	399.2142	0.0733		
06/02/19	P2955791	13.1	16.3	23:59	24.0	19.4	400.8629	401.1790	0.3161		
06/08/19	P2955796	16.4	20.3	23:59	24.0	19.4	402.1189	402.5150	0.3961		
06/14/19	P2955801	25.2	31.7	23:59	24.0	19.1	397.8068	398.4131	0.6063		
06/20/19	P2956097	14.3	18.1	23:59	24.0	19.0	400.8081	401.1539	0.3458		
06/26/19	P2956102	10.8	13.5	23:59	24.0	19.2	387.3895	387.6501	0.2606		
07/02/19	P2956104	28.7	36.3	23:59	24.0	19.1	393.9567	394.6486	0.6919		
07/08/19	P2956424	21.2	26.5	23:59	24.0	19.2	391.6448	392.1552	0.5104		
07/14/19	P2956786	8.7	11.0	23:59	24.0	19.0	393.3382	393.5480	0.2098		
07/20/19	P2956792	20.1	25.4	23:59	24.0	19.0	392.2423	392.7264	0.4841		
07/26/19	P2957182	57.0	71.9	23:59	24.0	19.1	398.7326	400.1040	1.3714		
08/01/19	P2957186	Invalid - AG	Invalid - AG	3:32	3.5	2.9	406.8064	406.8670	0.0606	SP	
08/07/19	P2957673	Invalid - AG	Invalid - AG	21:20	21.4	17.0	389.6452	389.9937	0.3485	SP	
08/13/19	P2957678	5.0	6.4	23:59	24.0	19.1	396.4373	396.5598	0.1225		
08/19/19	P2957961	14.6	18.4	23:59	24.0	19.1	394.9034	395.2553	0.3519		
08/25/19	P2957966	14.7	18.6	23:59	24.0	19.0	389.0949	389.4505	0.3556		
08/31/19	P2957971	12.8	16.2	23:59	24.0	19.0	396.7270	397.0355	0.3085		
09/06/19	P2958450	17.7	22.4	23:59	24.0	19.0	397.8651	398.2922	0.4271		
09/12/19	P2958455	10.2	12.5	23:59	24.0	19.6	393.3768	393.6226	0.2458		
09/18/19	P2958549	38.4	47.6	23:59	24.0	19.4	398.8502	399.7750	0.9248		
09/24/19	P2958554	28.9	36.1	23:59	24.0	19.3	398.6667	399.3635	0.6968		
09/30/19	P2958980	Invalid - AG	Invalid - AG	16:24	16.4	13.5	393.2556	393.3522	0.0966	SP	
10/06/19	P2958986	6.5	7.9	23:59	24.0	19.8	400.3264	400.4828	0.1564		
10/12/19	P2958991	Invalid - AG	Invalid - AG	5:18	5.3	4.5	397.4472	397.5699	0.1227	SP,HT	
10/18/19	P2959320	21.9	26.8	23:59	24.0	19.7	390.8654	391.3941	0.5287		
10/24/19	P2959325	29.9	35.5	24:00	24.0	20.3	392.0075	392.7277	0.7202	HT	
10/30/19	P2959751	21.2	24.2	24:00	24.0	21.1	404.1125	404.6235	0.5110	HT	
11/05/19	P2959757	7.8	9.3	24:00	24.0	20.0	387.1141	387.3019	0.1878		
11/11/19	P2959997	9.5	11.4	24:00	24.0	20.0	394.7000	394.9284	0.2284		
11/17/19	P2960002	6.3	7.6	24:00	24.0	19.9	392.0403	392.1922	0.1519		
11/23/19	P2960009	3.7	4.4	24:00	24.0	20.5	387.3425	387.4336	0.0911		
11/29/19	P2961331	1.3	1.6	24:00	24.0	20.3	405.3217	405.3547	0.0330		
12/05/19	P2961336	1.3	1.5	24:00	24.0	20.4	401.6118	401.6433	0.0315		
12/11/19	P2961573	7.1	8.3	24:00	24.0	20.6	395.6644	395.8373	0.1729		
12/17/19	P2961565	Invalid - AN	Invalid - AN				405.8105	405.8569	0.0464	SP,MD	
12/23/19	P2961752	Invalid - AN	Invalid - AN				396.7300	396.9482	0.2182	SP,MD	
12/29/19	P2961756	Invalid - AN	Invalid - AN	0:01			399.7973	399.7911	-0.0062	SP,NM	
07/22/19	P2957181		Field Blank				399.4365	399.4472	0.0107		
10/28/19	P2959752		Field Blank				395.1408	395.1515	0.0107		
12/12/19	P2961572		Field Blank				400.4153	400.4209	0.0056		

# Valid	Recovery	Average	St. Dev.	Max	Min
53	85%	15.2	14.4	71.9	0.8

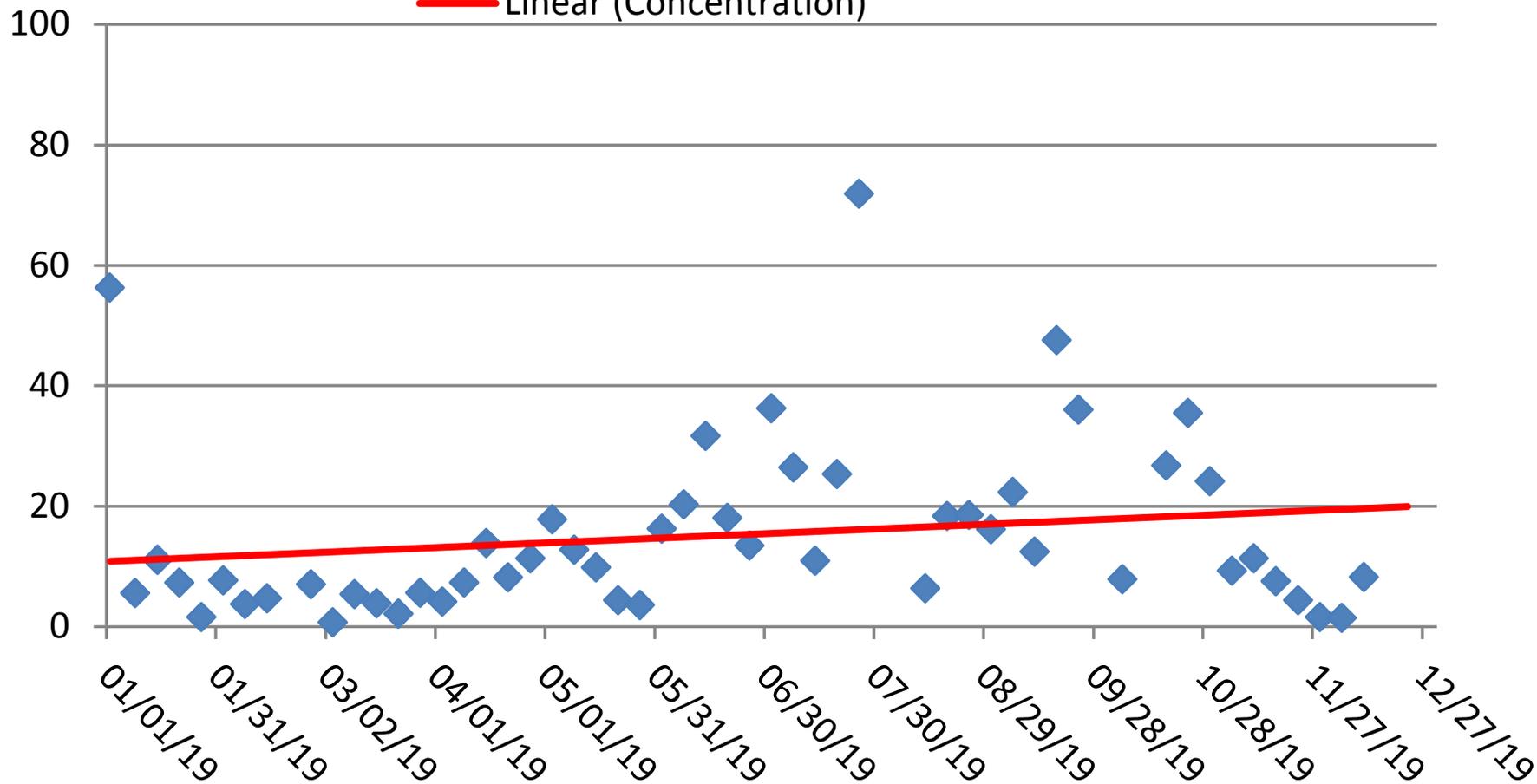
# 2398E Collocated Data-2018

$$y = 0.0256x - 1101.8$$

$$R^2 = 0.0329$$

◆ Concentration

— Linear (Concentration)



## **APPENDIX C**

### **Precision and Single-Point Flow Rate Checks**

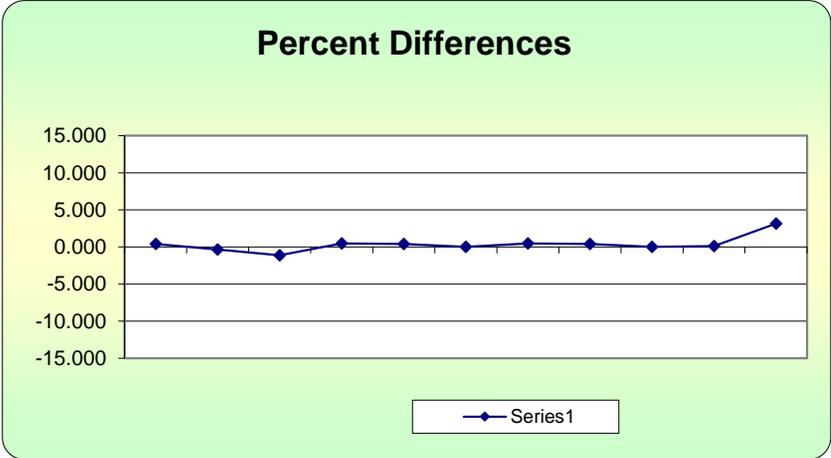


**Alton Coal Development, LLC - Coal Hollow Mine  
One-Point Flow Rate Bias Estimate**

Site ID: Monitor 962A		Pollutant type:					Bias (%)	
Meas Val (Y)	Audit Val (X)	d (Eqn. 1)	25th Percentile	d <sup>2</sup>	d	d  <sup>2</sup>		
16.7	16.63	0.421	0.000	0.177	0.421	0.177		
16.7	16.76	-0.358	<b>75th Percentile</b>	0.128	0.358	0.128		
16.7	16.89	-1.125	0.451	1.265	1.125	1.265		
16.7	16.62	0.481		0.232	0.481	0.232		
16.7	16.63	0.421		0.177	0.421	0.177		
16.72	16.72	0.000		0.000	0.000	0.000		
16.7	16.62	0.481		0.232	0.481	0.232		
16.7	16.63	0.421		0.177	0.421	0.177		
16.72	16.72	0.000		0.000	0.000	0.000		
16.7	16.68	0.120		0.014	0.120	0.014		
16.7	16.19	3.150		9.923	3.150	9.923		

<b>n</b>	$\sum d $	<b>"AB" (Eqn 4)</b>
11	6.978	0.634
<b>n-1</b>	$\sum d ^2$	<b>"AS" (Eqn 5)</b>
10	12.326	0.889

<b>Bias (%) (Eqn 3)</b>	Both Signs Positive
1.12	TRUE
<b>Signed Bias (%)</b>	Both Signs Negative
+1.12	FALSE



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

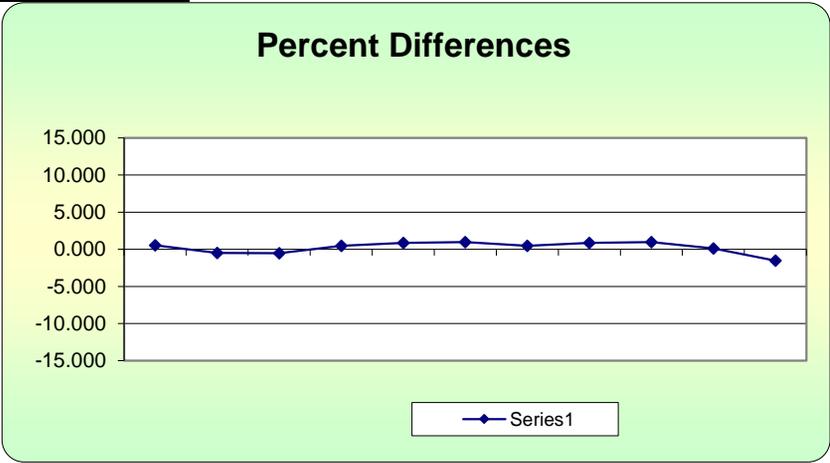
Site ID: Monitor 963B		Pollutant type:					Bias (%)	
Meas Val (Y)	Audit Val (X)	d (Eqn. 1)	25th Percentile	d <sup>2</sup>	d	d  <sup>2</sup>		
16.7	16.61	0.542	-0.178	0.294	0.542	0.294		
16.7	16.78	-0.477	<b>75th Percentile</b>	0.227	0.477	0.227		
16.7	16.79	-0.536	0.845	0.287	0.536	0.287		
16.7	16.62	0.481		0.232	0.481	0.232		
16.7	16.56	0.845		0.715	0.845	0.715		
16.7	16.54	0.967		0.936	0.967	0.936		
16.7	16.62	0.481		0.232	0.481	0.232		
16.7	16.56	0.845		0.715	0.845	0.715		
16.7	16.54	0.967		0.936	0.967	0.936		
16.7	16.68	0.120		0.014	0.120	0.014		
16.7	16.96	-1.533		2.350	1.533	2.350		

<b>n</b>	$\sum d $	<b>"AB" (Eqn 4)</b>
11	7.796	0.709
<b>n-1</b>	$\sum d ^2$	<b>"AS" (Eqn 5)</b>
10	6.937	0.376

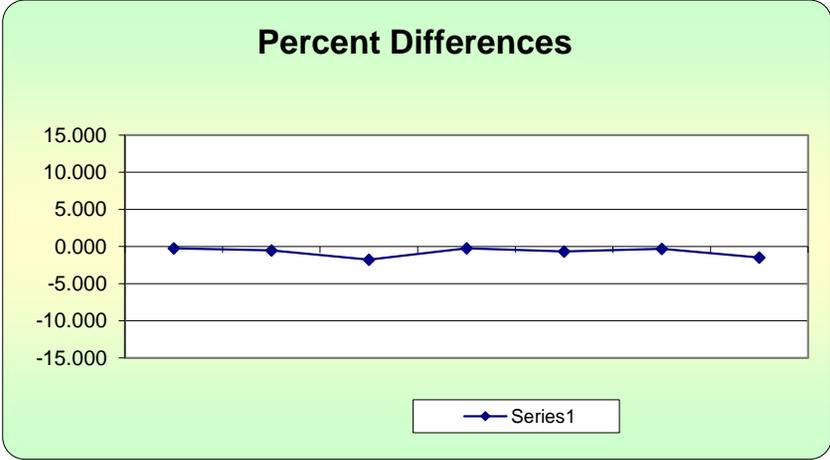
<b>Bias (%) (Eqn 3)</b>	Both Signs Positive
0.91	FALSE
<b>Signed Bias (%)</b>	Both Signs Negative
+/-0.91	FALSE



**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 <sup>2</sup>	d	d  <sup>2</sup>	n	Σ d	"AB" (Eqn 4)
16.7	16.74	-0.239	-1.065	0.057	0.239	0.057	7	5.206	0.744
16.7	16.79	-0.536	75th Percentile	0.287	0.536	0.287	n-1	Σ d  <sup>2</sup>	"AS" (Eqn 5)
16.7	17	-1.765	-0.269	3.114	1.765	3.114	6	6.208	0.624
16.7	16.74	-0.239		0.057	0.239	0.057			
16.7	16.81	-0.654		0.428	0.654	0.428			
16.7	16.75	-0.299		0.089	0.299	0.089			
16.7	16.95	-1.475		2.175	1.475	2.175			

<b>Bias (%) (Eqn 3)</b>	Both Signs Positive
1.2	FALSE
<b>Signed Bias (%)</b>	Both Signs Negative
-1.2	TRUE





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

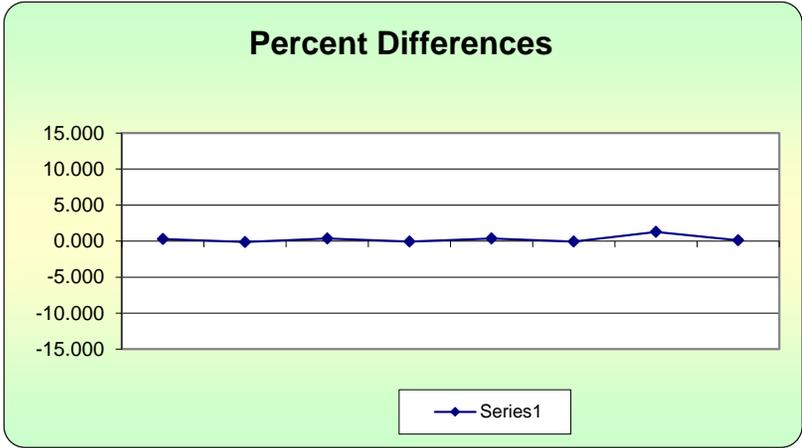
Site ID: Monitor 2366D		Pollutant type:		Bias (%)			
Meas Val (Y)	Audit Val (X)	d (Eqn. 1)	25th Percentile	d <sup>2</sup>	d	d  <sup>2</sup>	
16.7	16.65	0.300	-0.060	0.090	0.300	0.090	
16.7	16.72	-0.120	75th Percentile	0.014	0.120	0.014	
16.7	16.64	0.361	0.361	0.130	0.361	0.130	
16.72	16.73	-0.060		0.004	0.060	0.004	
16.7	16.64	0.361		0.130	0.361	0.130	
16.72	16.73	-0.060		0.004	0.060	0.004	
16.7	16.49	1.273		1.622	1.273	1.622	
16.7	16.68	0.120		0.014	0.120	0.014	

n	Σ d	"AB" (Eqn 4)
8	2.654	0.332
n-1	Σ d  <sup>2</sup>	"AS" (Eqn 5)
7	2.008	0.401

Bias (%) (Eqn 3)	Both Signs Positive
0.6	FALSE
Signed Bias (%)	Both Signs Negative
+/-0.6	FALSE

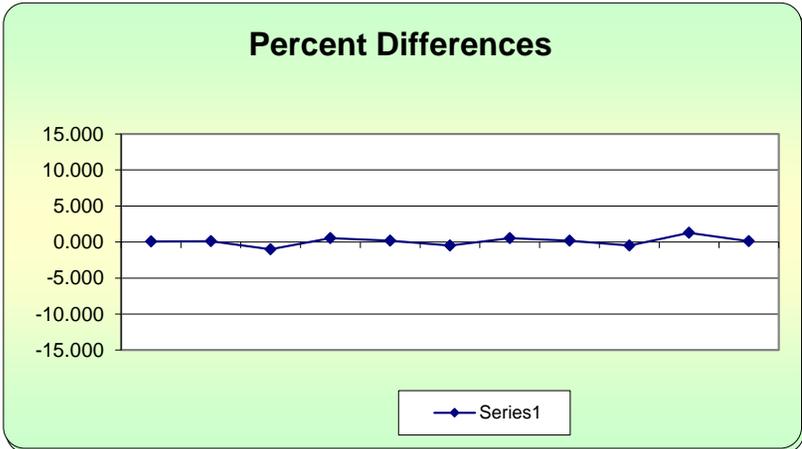


Alton Coal Development, LLC - Coal Hollow Mine

One-Point Flow Rate Bias Estimate

Site ID: Monitor 2398E		Pollutant type:		Bias (%)			
Meas Val (Y)	Audit Val (X)	d (Eqn. 1)	25th Percentile	d <sup>2</sup>	d	d  <sup>2</sup>	
16.7	16.69	0.060	-0.208	0.004	0.060	0.004	
16.7	16.68	0.120	75th Percentile	0.014	0.120	0.014	
16.7	16.87	-1.008	0.361	1.015	1.008	1.015	n
16.7	16.61	0.542		0.294	0.542	0.294	Σ d
16.7	16.67	0.180		0.032	0.180	0.032	11
16.7	16.78	-0.477		0.227	0.477	0.227	n-1
16.7	16.61	0.542		0.294	0.542	0.294	Σ d  <sup>2</sup>
16.7	16.67	0.180		0.032	0.180	0.032	10
16.7	16.78	-0.477		0.227	0.477	0.227	"AB" (Eqn 4)
16.7	16.61	0.542		0.294	0.542	0.294	0.453
16.7	16.67	0.180		0.032	0.180	0.032	"AS" (Eqn 5)
16.7	16.78	-0.477		0.227	0.477	0.227	0.390
16.7	16.49	1.273		1.622	1.273	1.622	Bias (%) (Eqn 3)
16.7	16.68	0.120		0.014	0.120	0.014	Both Signs Positive
							0.67
							FALSE
							Signed Bias (%)
							Both Signs Negative
							+/-0.67
							FALSE

Bias (%) (Eqn 3)	Both Signs Positive
0.67	FALSE
Signed Bias (%)	Both Signs Negative
+/-0.67	FALSE



## **APPENDIX D**

### **Field Data Sheets**

## **Background Monitor 962A**

## 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
1/3/19	935	1/3/18	932	4	29	m-m	1/9/19	BA
1/10/19	859	1/10/18	855	29	9	M-M	1/15/19	BA
1/17/19	819	1/17/19	815	9	24	M-M	1/21/19	BA
1/23/19	1504	1/23/19	1500	24	10	M-M	1/27/19	BA
1/29/19	934	1/29/19	930	10	16	M-M	2/2/19	BA
2/4/19	841	2/4/19	836	16	26	M-M	2/9/19	BA
2/11/19	1424	2/11/19	1420	26	4	M-M	2/14/19	BA
2/15/19	1002	2/15/19	957	4	9	M-M	2/20/19	BA
				4				
				9	10	m-m	2/26/19	BA
2/27/19	1445	2/27/19	1440	10	24	M-M	3/4/19	BA
3/7/19	947	3/7/19	942	24	16	M-M	3/10/19	BA
3/11/19	821	3/11/19	715	16	26	M-M	3/16/19	BA
3/18/19	1232	3/18/19	1338	26	36	M-M	3/22/19	BA
3/25/19	834	3/25/19	834	36	4	M-M	3/28/19	BA
3/29/19	900	3/29/19	900	4	9	M-M	4/2/19	BA

T ERROR  
BLANK  
Unable to sample due to weather

### Table II - Monthly Leak Test

Date	Time	Initial SP Value	Final SP Value	Pass/Fail	Initials	Maintenance
1/30/19	1328	132	131	P	BA	Cleaned
2/19/19	1051	129	128	P	BA	Cleaned Manifold
3/21/19		128	124	Pass	KN	Cleaned

### Table III - Monthly Flow Rate Verification

Date	Time	Monitor Flow (Q Lpm)	Monitor Baro Pressure (mmHg)	Delta Cal Baro Pressure (mmHg)	Monitor Temp (A)	Delta Cal Temp (Ta)	Delta Cal Flow (Qs)	Delta Cal Flow (Qa)	Accuracy	Initials
1/30/19	1331	16.7	583	582	6.0	7.4	13.59	16.63	0.42	BA
2/19/19	1055	16.7	583	582	6.0	7.3	14.01	16.76	-0.36	BA
3/21/19		16.7	580	580				16.89	-1.13	KN







## **Compliance Monitor 963B**

## 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
1/3/19	954	1/3/19	954	<del>35</del> 5	36	M-M	1/9/19	BA
1/10/19	919	1/10/19	916	36	12	M-M	1/15/19	BA
1/18/19	1020	1/18/19	1017	12	25	M-M	1/21/19	BA
1/23/19	1528	1/23/19	1525	25	11	M-M	1/27/19	BA
1/29/19	950	1/29/19	947	11	17	M-M	2/2/19	BA
2/4/19	902	2/4/19	859	17	27	M-M	2/8/19	BA
2/11/19	1546	2/11/19	1543	27	5	M-M	2/14/19	BA
2/14/19	1036	2/14/19	1035	5	12	M-M	2/20/19	BA
					29			BA
<del>1/28/19</del>	<del>1431</del>	<del>2/25/19</del>	<del>1427</del>	12	N	M-M	2/26/19	BA
2/28/19	904	2/28/19	900	11	25	M-M	3/4/19	BA
3/7/19	1016	3/7/19	1013	25	17	M-M	3/10/19	BA
3/11/19	819	3/11/19	745	17	27	M-M	3/16/19	BA
3/18/19	1021	3/18/19	917	27	37	M-M	3/22/19	BA
3/25/19	1115	3/25/19	1115	37	5	M-M	3/28/19	BA
3/29/19	903	3/29/19	903	5	10	M-M	4/3/19	BA

BLANK  
LATE DUE TO SNOW  
P ERROR

**Table II - Monthly Leak Test**

Date	Time	Initial SP Value	Final SP Value	Pass/Fail	Initials	Maintenance
1/20/19	1356	<del>106</del> 113	109	P	BA	Cleaned
2/19/19	1145	116	115	P	BA	Cleaned
3/21/19		110	108	Pass	KN	Cleaned

**Table III - Monthly Flow Rate Verification**

Date	Time	Monitor Flow (Q Lpm)	Monitor Baro Pressure (mmHg)	Delta Cal Baro Pressure (mmHg)	Monitor Temp (A)	Delta Cal Temp (Ta)	Delta Cal Flow (Qs)	Delta Cal Flow (Qa)	Accuracy	Initials
1/30/19	1404	16.7	588	589	6.7	7.2	13.76	16.61	0.54	BA
2/19/19	1157	16.7	588	589	6.7	7.0	13.68	16.78	-0.48	BA
3/21/19		16.7	587.0	586				16.79	-0.54	KN







## **Collocated Monitor 964C**

## 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
1/3/19	1000	1/3/19	956	6	37	M-m	1/9/19	BA
1/10/19	921	1/10/19	917	37	21	M-m	1/15/19	BA
1/19/19	1044	1/19/19	1043	21	28	M-m	1/21/19	BA
				<del>28</del>	<del>13</del>	<del>M-m</del>	<del>1/13/19</del>	<del>BA</del>
1/29/19	953	1/29/19	948	13	<del>31</del>	M-m	2/2/19	BA
2/4/19	905	2/4/19	900	18	31	M-m	2/8/19	BA
2/11/19	1549	2/11/19	1544	31	6	M-m	2/14/19	BA
2/14/19	1039	2/14/19	1033	6	21	M-m	2/20/19	BA
2/25/19	1434	2/25/19	1427	21	13	M-m	2/26/19	BA
					35	M-m	3/4/19	BA
2/28/19	907	2/28/19	901	13	28	M-m	3/4/19	BA
3/7/19	1019	3/7/19	1012	28	18	M-m	3/10/19	BA
3/11/19	852	3/11/19	745	18	31	M-m	3/16/19	BA
3/18/19	1024	3/18/19	916	31	38	M-m	3/22/19	BA
3/25/19	1117	3/25/19	1117	38	6	M-m	3/28/19	BA
3/29/19	931	3/29/19	931	6	11	M-m	4/3/19	BA

QT ERROR  
 QTP Error  
 DID NOT RUN  
 QT ERROR  
 CORRUPTED DATA  
 BLANK  
 QT Max Load  
 Did not run full time  
 System Freeze

### Table II - Monthly Leak Test

Date	Time	Initial SP Value	Final SP Value	Pass/Fail	Initials	Maintenance
1/4/19	144					Replaced motor
1/30/19	1409	96	96	P	BA	Cleaned
2/19/19	1202	97	97	P	BA	Cleaned
3/21/19		98	96	Pass	KN	Cleaned

### Table III - Monthly Flow Rate Verification

Date	Time	Monitor Flow (Q Lpm)	Monitor Baro Pressure (mmHg)	Delta Cal Baro Pressure (mmHg)	Monitor Temp (A)	Delta Cal Temp (Ta)	Delta Cal Flow (Qs)	Delta Cal Flow (Qa)	Accuracy	Initials
1/30/19	1414	16.7	590	588	8.01	7.8	13.73	16.74	-0.24	BA
2/19/19	1208	16.7	589	588	7.2	7.6	13.75	16.79	-0.54	BA
3/21/19		16.70	589	580				17.00	-1.77	KN







## **Compliance Monitor 2366D**









## **Collocated Monitor 2398E**









## **APPENDIX E**

### **Independent PM<sub>10</sub> Sampler Performance Audit Report**

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**AUDIT REPORT  
FOR  
ALTON COAL DEVELOPMENT, LLC  
COAL HOLLOW MINE  
ALTON, UTAH  
FIRST QUARTER 2019**

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: March 21, 2019



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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 March 21, 2019. The monitoring sites are located at the Coal Hollow Mine near Alton, Utah.

Table 1-1

Site Location Information

	Primary CHM	Background	Primary NPL
Latitude	37° 24' 5.0" N	37° 24' 20.9" N	37° 25' 18.6" N
Longitude	112° 27' 21.0" W	112° 26' 1.1" W	112° 28' 12.8" W
UTM	12S 371147 4140396	12S 373119 4140856	12S 369909 4142684
Elevation	6,890 feet MSL	7,158 feet MSL	6,892 feet MSL

Audit results for the particulate samplers are summarized in Table 1-2. 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 <sub>10</sub>	BGI PQ200S	Yes
	PM <sub>10</sub> (collocated)	BGI PQ200S	Yes
Background	PM <sub>10</sub>	BGI PQ200S	Yes
Primary NPL	PM <sub>10</sub>	BGI PQ200	No
	PM <sub>10</sub> (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  
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E-mail: [ckirk@air-resource.com](mailto: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 Part 58, Appendix A. *Quality Assurance Requirements for Monitors Used In Evaluations of National Ambient Air Quality Standards*
- 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*

### 2.1 PARTICULATE SAMPLERS (FRM PM<sub>10</sub>)

The filter-based FRM PM<sub>10</sub> 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 <sub>10</sub>	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

<b>References</b>	<b>Manufacturer</b>	<b>Model Number</b>	<b>Serial Number</b>	<b>Expiration Date</b>
FRM Flow	BGI	DeltaCal	1237	1/3/2020

### 3.0 AUDIT RESULTS

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

#### Performance Audit Results

- The primary BGI PQ200 at the NPL failed the performance audit. The audit flow measured was 13.12 LPM, while the instrument display showed 16.70 LPM. The ambient temperature and filter temperature were at full scale (51°C). This indicated a possible motherboard problem.
- Although the collocated BGI PQ200S at the Primary site passed the performance audit, the pump sounded loud when running. This could indicate a problem, or the pump may not be mounted tightly enough.
- The clocks on the instruments were slightly off, from 5 minutes to 9 minutes slow.

**APPENDIX A**  
**AUDIT DATA FORMS**



# FRM AUDIT (PM<sub>10</sub>)

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	3/21/2019
SITE NAME		Coal Hollow Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	1237	1/3/2020
PM Temperature Standard #1	BGI	deltaCal	1237	1/3/2020
PM Barometric Pressure Standard #1	BGI	deltaCal	1237	1/3/2020

MANUFACTURER	BGI
MODEL	PQ200S
SERIAL NUMBER	N963B

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

<b>SETTINGS</b>	
Total Flow	16.70

<b>Automated LEAK CHECK</b>	
Vacuum Loss Rate	Pass/Fail
2 cm	<b>PASS</b>

<b>FLOW VERIFICATION</b>					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	16.79	16.70	-0.5%	0.5%	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Actual Flow % Diff	10%
Design Flow % Diff	10%

<b>AMBIENT TEMPERATURE SENSOR (°C)</b>			
Reference	Instrument	Difference	
0.2	0.2	0.0	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>FILTER TEMPERATURE SENSOR (°C)</b>			
Reference	Instrument	Difference	
0.3	0.1	-0.2	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>PRESSURE SENSOR (mmHg)</b>			
Reference	Instrument	Difference	
586.0	587.0	1.0	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Pressure Difference (mmHg)	10

**NOTES:**



# FRM AUDIT (PM<sub>10</sub>)

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	3/21/2019
SITE NAME		Coal Hollow Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	1237	1/3/2020
PM Temperature Standard #1	BGI	deltaCal	1237	1/3/2020
PM Barometric Pressure Standard #1	BGI	deltaCal	1237	1/3/2020

MANUFACTURER	BGI
MODEL	PQ200S
SERIAL NUMBER	N964C

<b>Date and Time correct?</b>
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>If no, time off by:</b>
-7 min

SETTINGS	
Total Flow	16.70

Automated LEAK CHECK	
Vacuum Loss Rate	Pass/Fail
2 cm	<b>PASS</b>

FLOW VERIFICATION					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	17.00	16.70	-1.8%	1.8%	<b>PASS</b>

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

AMBIENT TEMPERATURE SENSOR (°C)			
Reference	Instrument	Difference	
0.5	0.4	-0.1	<b>PASS</b>

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

FILTER TEMPERATURE SENSOR (°C)			
Reference	Instrument	Difference	
1.0	0.9	-0.1	<b>PASS</b>

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

PRESSURE SENSOR (mmHg)			
Reference	Instrument	Difference	
586.0	589.0	3.0	<b>PASS</b>

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

**NOTES:** pump sounds rough, could be mount



# FRM AUDIT (PM<sub>10</sub>)

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	3/21/2019
SITE NAME		Coal Hollow Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	1237	1/3/2020
PM Temperature Standard #1	BGI	deltaCal	1237	1/3/2020
PM Barometric Pressure Standard #1	BGI	deltaCal	1237	1/3/2020

MANUFACTURER	BGI
MODEL	PQ200S
SERIAL NUMBER	N962

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

<b>SETTINGS</b>	
Total Flow	16.70

<b>Automated LEAK CHECK</b>	
Vacuum Loss Rate	Pass/Fail
4 cm	<b>PASS</b>

<b>FLOW VERIFICATION</b>					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	16.89	16.70	-1.1%	1.1%	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Actual Flow % Diff	10%
Design Flow % Diff	10%

<b>AMBIENT TEMPERATURE SENSOR (°C)</b>			
Reference	Instrument	Difference	
0.8	0.0	-0.8	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>FILTER TEMPERATURE SENSOR (°C)</b>			
Reference	Instrument	Difference	
0.7	0.4	-0.3	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>PRESSURE SENSOR (mmHg)</b>			
Reference	Instrument	Difference	
580.0	580.0	0.0	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Pressure Difference (mmHg)	10

**NOTES:**



# FRM AUDIT (PM<sub>10</sub>)

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	3/21/2019
SITE NAME		Coal Hollow Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	1237	1/3/2020
PM Temperature Standard #1	BGI	deltaCal	1237	1/3/2020
PM Barometric Pressure Standard #1	BGI	deltaCal	1237	1/3/2020

MANUFACTURER	BGI
MODEL	PQ200
SERIAL NUMBER	2366D

<b>Date and Time correct?</b>
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>If no, time off by:</b>
-9 min

<b>SETTINGS</b>	
Total Flow	16.70

<b>Automated LEAK CHECK</b>	
Vacuum Loss Rate	Pass/Fail
2 cm	<b>PASS</b>

<b>FLOW VERIFICATION</b>					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	13.12	16.70	27.3%	-21.4%	<b>FAIL</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Actual Flow % Diff	10%
Design Flow % Diff	10%

<b>AMBIENT TEMPERATURE SENSOR (°C)</b>				
	Reference	Instrument	Difference	
	0.5	51.0	50.5	<b>FAIL</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>FILTER TEMPERATURE SENSOR (°C)</b>				
	Reference	Instrument	Difference	
	0.5	51.0	50.5	<b>FAIL</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>PRESSURE SENSOR (mmHg)</b>				
	Reference	Instrument	Difference	
	585.5	587.0	1.5	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Pressure Difference (mmHg)	10

**NOTES:**



# FRM AUDIT (PM<sub>10</sub>)

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	3/21/2019
SITE NAME		Coal Hollow Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	1237	1/3/2020
PM Temperature Standard #1	BGI	deltaCal	1237	1/3/2020
PM Barometric Pressure Standard #1	BGI	deltaCal	1237	1/3/2020

MANUFACTURER	BGI
MODEL	PQ200
SERIAL NUMBER	2398E

<b>Date and Time correct?</b>
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>If no, time off by:</b>
-7 min

<b>SETTINGS</b>	
Total Flow	16.70

<b>Automated LEAK CHECK</b>	
Vacuum Loss Rate	Pass/Fail
2 cm	<b>PASS</b>

<b>FLOW VERIFICATION</b>					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	16.87	16.70	-1.0%	1.0%	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Actual Flow % Diff	10%
Design Flow % Diff	10%

<b>AMBIENT TEMPERATURE SENSOR (°C)</b>			
	Reference	Instrument	Difference
	0.3	0.5	0.2 <b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>FILTER TEMPERATURE SENSOR (°C)</b>			
	Reference	Instrument	Difference
	0.6	0.9	0.3 <b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>PRESSURE SENSOR (mmHg)</b>			
	Reference	Instrument	Difference
	585.5	589.0	3.5 <b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Pressure Difference (mmHg)	10

**NOTES:**



**SITE INFORMATION**

<b>ABBR.</b>	n/a	<b>CLIENT</b>	Alton Coal	<b>AUDITOR</b>	C.Kirk	<b>DATE</b>	3/21/2019
<b>SITE NAME</b>		Coal Hollow Mine					
<b>NETWORK TYPE</b>		Alton Coal- Coal Hollow					

		Deg	Min	Sec		Decimal
<b>LATITUDE</b>	North				--CALCULATE-->	
<b>LONGITUDE</b>	West					

Decimal		--CALCULATE-->	Deg	Min	Sec

	Meters	--CALCULATE-->	Feet
<b>ELEVATION</b>			

Feet	--CALCULATE-->	Meters

Please verify site standards used by the site operator

SITE STANDARDS	MANUFACTURER	MODEL	SERIAL #	Calibration Expiration Date
PM Flow Reference				

**NOTES:**



ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	3/21/2019
SITE NAME		Coal Hollow Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL #	Calibration Expiration Date
Ozone Transfer Standard				
Gas Dilution Transfer Standard				
MFC High Flow Reference				
MFC Low Flow Reference				
Temperature Reference	Eutechnics	4600	99F101610	12/19/2019
AT/RH Sensor Reference				
Barometric Pressure Reference	Druck	DPI705	70569540	12/19/2019
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/m2 / mV		
UV Radiation Reference				
Multiplier		W/m2 / mV		
Precipitation Reference				
Volume	946	mL		

PM Flow Standard #1	BGI	deltaCal	1237	1/3/2020
PM Flow Standard #2				
PM Flow Standard #3				
PM Flow Standard #4				

PM Temperature Standard #1	BGI	deltaCal	1237	1/3/2020
PM Temperature Standard #2				
PM Temperature Standard #3				
PM Temperature Standard #4				

PM Barometric Pressure Standard #1	BGI	deltaCal	1237	1/3/2020
PM Barometric Pressure Standard #2				
PM Barometric Pressure Standard #3				
PM Barometric Pressure Standard #4				

TEOM MTV Standard				
-------------------	--	--	--	--

HiVol Direct Flow Reference				
Orifice				
ΔP orifice manometer				

**APPENDIX B**

**AUDIT STANDARDS CERTIFICATIONS**



MICRO PRECISION CALIBRATION ,INC  
 22835 INDUSTRIAL PLACE  
 GRASS VALLEY CA 95949  
 530-268-1860

## Certificate of Calibration

Date: Dec 19, 2018

Cert No. 551220082727718

**Customer:**

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

MPC Control #: AX8944  
 Asset ID: N/A  
 Gage Type: DIGITAL THERMOMETER  
 Manufacturer: EUTECHNICS  
 Model Number: 4600  
 Size: N/A  
 Temp/RH: 70.0°F / 45.0%  
 Location: Calibration performed at MPC facility

Work Order #: SAC-70099166  
 Purchase Order #: A32855  
 Serial Number: 99F101610  
 Department: N/A  
 Performed By: TREVOR GOLD  
 Received Condition: IN TOLERANCE  
 Returned Condition: IN TOLERANCE  
 Cal. Date: December 19, 2018  
 Cal. Interval: 12 MONTHS  
 Cal. Due Date: December 19, 2019

**Calibration Notes:**

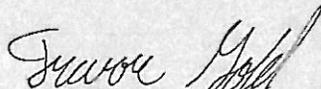
**Standards Used to Calibrate Equipment**

I.D.	Description.	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
CR6700	DOUBLE WELL BATH	7013	79006	HART SCIENTIFIC	Oct 31, 2019	551220081617831
DA8367	PRECISION PLATINUM RESISTANCE THERMOMETER SPRT W/ CASE	8167-25	180322	LEEDS & NORTHRUP CO.	Aug 31, 2019	551220081559793

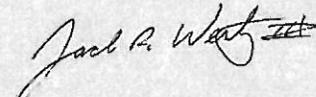
**Procedures Used in this Event**

Procedure Name	Description
MPC-00074	Temperature Devices, Sept-27-2016 rev02

Calibrating Technician:

  
 TREVOR GOLD

QC Approval:

  
 JACK WERTZ III

**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 Z540.3-2008.

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

PASS - Compliant with specification; .

FAIL - Not compliant with specification.

Fail<sup>F</sup> - The measured value is not within the acceptance limits. However, a portion of the expanded uncertainty of measurement at 95% is within the specified tolerance.

Pass<sup>F</sup> - The measured value is within acceptance limits. However, a portion of the expanded uncertainty of measurement at 95% exceeds the specified tolerance.

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 Method 6-Guard Bands based on Test Uncertainty Ratio. 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 ninety (90) 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.



MICRO PRECISION CALIBRATION ,INC  
 22835 INDUSTRIAL PLACE  
 GRASS VALLEY CA 95949  
 530-268-1860

## Certificate of Calibration

Date: Dec 19, 2018

Cert No. 551220082727711

**Customer:**

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

MPC Control #: DB6199  
 Asset ID: N/A  
 Gage Type: DIGITAL PRESSURE INDICATOR  
 Manufacturer: DRUCK INC  
 Model Number: DPI 705  
 Size: 30 PSIA  
 Temp/RH: 70.0°F / 45.0%  
 Location: Calibration performed at MPC facility

Work Order #: SAC-70099166  
 Purchase Order #: A32855  
 Serial Number: 70569540  
 Department: N/A  
 Performed By: TREVOR GOLD  
 Received Condition: IN TOLERANCE  
 Returned Condition: IN TOLERANCE  
 Cal. Date: December 19, 2018  
 Cal. Interval: 12 MONTHS  
 Cal. Due Date: December 19, 2019

**Calibration Notes:**

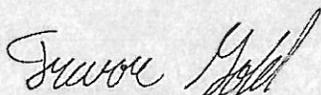
**Standards Used to Calibrate Equipment**

I.D.	Description.	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
CS1000	PRIMARY PRESSURE STANDARD	2465A-754	47761	RUSKA	Jul 25, 2021	1500202276,1500 202538,150

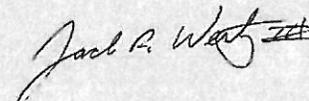
**Procedures Used in this Event**

Procedure Name	Description
MPC-00033	Digital Pressure Gages, General, Mar-2-2016 rev02

Calibrating Technician:

  
 TREVOR GOLD

QC Approval:

  
 JACK WERTZ III

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.

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

PASS - Compliant with specification.

FAIL - Not compliant with specification.

FailF - The measured value is not within the acceptance limits. However, a portion of the expanded uncertainty of measurement at 95% is within the specified tolerance.

PassF - The measured value is within acceptance limits. However, a portion of the expanded uncertainty of measurement at 95% exceeds the specified tolerance.

The expanded uncertainty of measurement is stated as the standard uncertainty 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 Method 6-Guard Bands based on Test Uncertainty Ratio. 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.



**CERTIFICATE OF CALIBRATION - NIST TRACEABILITY**

(Refer to instruction manual for further details of calibration)

deltaCal Serial Number: 1237 DATE: 19-Dec-2018

Calibration Operator: E. Albuja

**Critical Venturi Flow Meter:** Max Uncertainty = 0.346%

- Serial Number: 1 CEESI NVLAP NIST Data File 04BGI151
- Serial Number: 2 CEESI NVLAP NIST Data File 04BGI152
- Serial Number: 3 CEESI NVLAP NIST Data File 04BGI153
- Serial Number: 4 CEESI NVLAP NIST Data File 02BGI004

**Room Temperature:** +- 0.03°C from -5°C - 70°C Room Temperature 23.5 °C

Brand: Telatemp Serial Number: 358654  
Std Cal Date 30-Oct-18 Std Cal Due Date 30-Oct-19

deltaCal:

Ambient Temperature (set): 23.5 °C  
Aux (filter) Temperature (set): 23.5 °C

**Barometric Pressure and Absolute Pressure**

Vaisala Model PTB330(50-1100) Digital Accuracy: 0.03371%

Serial Number C4310002  
Std Cal Date 26-Mar-18 Std Cal Due Date 26-Mar-19

deltaCal:

Barometric pressure (set): 751 mm of Hg

**Results of Venturi Calibration**

Flow Rate (Q) vs. Pressure Drop ( $\Delta P$ ). Where: Q=Lpm,  $\Delta P$ = Cm of H2O

Q= 3.81710  $\Delta P$  ^ 0.54299 Overall Uncertainty: 0.35%  
Q= 3.85960  $\Delta P$  ^ 0.52616 Overall Uncertainty: 0.35%

Date Placed In Service 1/3/19

(To be filled in by operator upon receipt)

Recommended Recalibration Date 1/3/20

(12 months from date placed in service)

To Check a deltaCal

E. Albuja

Date

19-Dec-2018 Pre recert

1.5-19.5 **VER 4.00**

BP= 753 mm of Hg

Maximum allowable error at any flow rate is .75%.

Serial No. 1237

	Reading		CV		
	Abs. P		Qa	Qa	
	Crit. Vent.	Room	Flow	deltaCal	% Error
	mm of Hg	Temp	Lpm	Indicated	
# 2	142.63	22.20	1.583	1.786	12.84
	252.28	22.20	2.836	2.983	5.18
	267.88	22.20	3.015	3.112	3.23
	380.79	22.20	4.305	4.570	6.15
	524.08	22.20	5.943	5.958	0.25
# 1	163.56	22.20	6.358	6.973	9.67
	270.34	22.20	10.639	10.635	-0.04
	320.97	22.20	12.669	12.904	1.86
	404.79	22.20	16.029	15.954	-0.47
	465.05	22.20	18.445	18.365	-0.43
				<b>Average %</b>	<b>3.82</b>

To Check a deltaCal

E. Albuja

Date 19-Dec-2018

1.5-19.5 VER 4.00

BP= 751 mm of Hg

Maximum allowable error at any flow rate is .75%.

Serial No. 1237

	Reading		CV		
	Abs. P		Qa	Qa	
	Crit. Vent.	Room	Flow	deltaCal	% Error
	mm of Hg	Temp	Lpm	Indicated	
# 2	138.36	23.50	1.545	1.554	0.59
	237.18	23.50	2.682	2.672	-0.39
	314.18	23.50	3.569	3.546	-0.64
	377.54	23.50	4.298	4.320	0.51
	480.24	23.50	5.481	5.509	0.52
# 1	164.79	23.80	6.460	6.479	0.30
	271.58	23.80	10.775	10.744	-0.29
	321.36	23.80	12.787	12.760	-0.21
	416.89	23.80	16.648	16.685	0.22
	483.06	23.80	19.322	19.425	0.53
				Average %	0.11

---

**AUDIT REPORT  
FOR  
ALTON COAL DEVELOPMENT, LLC  
COAL HOLLOW MINE  
ALTON, UTAH  
SECOND QUARTER 2019**

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: May 31, 2019



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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 May 31, 2019. The monitoring sites are located at the Coal Hollow Mine near Alton, Utah.

Table 1-1

Site Location Information

	Primary CHM	Background	Primary NPL
Latitude	37° 24' 5.0" N	37° 24' 20.9" N	37° 25' 18.6" N
Longitude	112° 27' 21.0" W	112° 26' 1.1" W	112° 28' 12.8" W
UTM	12S 371147 4140396	12S 373119 4140856	12S 369909 4142684
Elevation	6,890 feet MSL	7,158 feet MSL	6,892 feet MSL

Audit results for the particulate samplers are summarized in Table 1-2. 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 <sub>10</sub>	BGI PQ200S	Yes
	PM <sub>10</sub> (collocated)	BGI PQ200S	Yes
Background	PM <sub>10</sub>	BGI PQ200S	Yes
Primary NPL	PM <sub>10</sub>	BGI PQ200	Yes
	PM <sub>10</sub> (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](mailto: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 Part 58, Appendix A. *Quality Assurance Requirements for Monitors Used In Evaluations of National Ambient Air Quality Standards*
- 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*

### 2.1 PARTICULATE SAMPLERS (FRM PM<sub>10</sub>)

The filter-based FRM PM<sub>10</sub> 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 <sub>10</sub>	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

<b>References</b>	<b>Manufacturer</b>	<b>Model Number</b>	<b>Serial Number</b>	<b>Expiration Date</b>
FRM Flow	BGI	DeltaCal	1237	1/3/2020

### **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. The only finding is that all the instrument clocks are set to MDT and should be set to MST.

**APPENDIX A**  
**AUDIT DATA FORMS**



# FRM AUDIT (PM<sub>10</sub>)

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	5/31/2019
SITE NAME		Coal Hoal Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	1237	1/3/2020
PM Temperature Standard #1	BGI	deltaCal	1237	1/3/2020
PM Barometric Pressure Standard #1	BGI	deltaCal	1237	1/3/2020

MANUFACTURER	BGI
MODEL	PQ200S
SERIAL NUMBER	N963B

<b>Date and Time correct?</b>
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>If no, time off by:</b>
+60 min

<b>SETTINGS</b>	
Total Flow	16.70

<b>Automated LEAK CHECK</b>	
Vacuum Loss Rate	Pass/Fail
2 cm	<b>PASS</b>

<b>FLOW VERIFICATION</b>					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	16.54	16.70	1.0%	-1.0%	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Actual Flow % Diff	10%
Design Flow % Diff	10%

<b>AMBIENT TEMPERATURE SENSOR (°C)</b>			
	Reference	Instrument	Difference
	16.6	16.4	-0.2
			<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>FILTER TEMPERATURE SENSOR (°C)</b>			
	Reference	Instrument	Difference
	18.4	17.6	-0.8
			<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>PRESSURE SENSOR (mmHg)</b>			
	Reference	Instrument	Difference
	590.5	591.0	0.5
			<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Pressure Difference (mmHg)	10

**NOTES:**



# FRM AUDIT (PM<sub>10</sub>)

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	5/31/2019
SITE NAME		Coal Hoal Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	1237	1/3/2020
PM Temperature Standard #1	BGI	deltaCal	1237	1/3/2020
PM Barometric Pressure Standard #1	BGI	deltaCal	1237	1/3/2020

MANUFACTURER	BGI
MODEL	PQ200S
SERIAL NUMBER	N964C

<b>Date and Time correct?</b>
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>If no, time off by:</b>
+59 min

<b>SETTINGS</b>	
Total Flow	16.70

<b>Automated LEAK CHECK</b>	
Vacuum Loss Rate	Pass/Fail
1 cm	<b>PASS</b>

<b>FLOW VERIFICATION</b>					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	16.81	16.70	-0.7%	0.7%	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Actual Flow % Diff	10%
Design Flow % Diff	10%

<b>AMBIENT TEMPERATURE SENSOR (°C)</b>			
	Reference	Instrument	Difference
	18.1	18.2	0.1
			<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>FILTER TEMPERATURE SENSOR (°C)</b>			
	Reference	Instrument	Difference
	17.6	16.6	-1.0
			<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>PRESSURE SENSOR (mmHg)</b>			
	Reference	Instrument	Difference
	590.5	592.0	1.5
			<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Pressure Difference (mmHg)	10

**NOTES:**



# FRM AUDIT (PM<sub>10</sub>)

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	5/31/2019
SITE NAME		Coal Hoal Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	1237	1/3/2020
PM Temperature Standard #1	BGI	deltaCal	1237	1/3/2020
PM Barometric Pressure Standard #1	BGI	deltaCal	1237	1/3/2020

MANUFACTURER	BGI
MODEL	PQ200S
SERIAL NUMBER	N962

<b>Date and Time correct?</b>
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>If no, time off by:</b>
+60 min

<b>SETTINGS</b>	
Total Flow	16.70

<b>Automated LEAK CHECK</b>	
Vacuum Loss Rate	Pass/Fail
1 cm	<b>PASS</b>

<b>FLOW VERIFICATION</b>					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	16.72	16.72	0.0%	0.1%	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Actual Flow % Diff	10%
Design Flow % Diff	10%

<b>AMBIENT TEMPERATURE SENSOR (°C)</b>			
Reference	Instrument	Difference	
16.7	16.3	-0.4	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>FILTER TEMPERATURE SENSOR (°C)</b>			
Reference	Instrument	Difference	
18.1	18.0	-0.1	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>PRESSURE SENSOR (mmHg)</b>			
Reference	Instrument	Difference	
585.0	585.0	0.0	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Pressure Difference (mmHg)	10

**NOTES:**



# FRM AUDIT (PM<sub>10</sub>)

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	5/31/2019
SITE NAME		Coal Hoal Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	1237	1/3/2020
PM Temperature Standard #1	BGI	deltaCal	1237	1/3/2020
PM Barometric Pressure Standard #1	BGI	deltaCal	1237	1/3/2020

MANUFACTURER	BGI
MODEL	PQ200
SERIAL NUMBER	2366D

<b>Date and Time correct?</b>
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>If no, time off by:</b>
+58 min

SETTINGS	
Total Flow	16.70

Automated LEAK CHECK	
Vacuum Loss Rate	Pass/Fail
8 cm	<b>PASS</b>

FLOW VERIFICATION					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	16.73	16.70	-0.2%	0.2%	<b>PASS</b>

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

AMBIENT TEMPERATURE SENSOR (°C)			
Reference	Instrument	Difference	
15.1	15.6	0.5	<b>PASS</b>

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

FILTER TEMPERATURE SENSOR (°C)			
Reference	Instrument	Difference	
14.2	13.7	-0.5	<b>PASS</b>

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

PRESSURE SENSOR (mmHg)			
Reference	Instrument	Difference	
590.0	590.0	0.0	<b>PASS</b>

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

**NOTES:**



# FRM AUDIT (PM<sub>10</sub>)

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	5/31/2019
SITE NAME		Coal Hoal Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	1237	1/3/2020
PM Temperature Standard #1	BGI	deltaCal	1237	1/3/2020
PM Barometric Pressure Standard #1	BGI	deltaCal	1237	1/3/2020

MANUFACTURER	BGI
MODEL	PQ200
SERIAL NUMBER	2398E

<b>Date and Time correct?</b>
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>If no, time off by:</b>
+60min

SETTINGS	
Total Flow	16.70

Automated LEAK CHECK	
Vacuum Loss Rate	Pass/Fail
0 cm	<b>PASS</b>

FLOW VERIFICATION					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	16.78	16.70	-0.5%	0.5%	<b>PASS</b>

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

AMBIENT TEMPERATURE SENSOR (°C)			
Reference	Instrument	Difference	
15.4	15.4	0.0	<b>PASS</b>

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

FILTER TEMPERATURE SENSOR (°C)			
Reference	Instrument	Difference	
14.9	14.6	-0.3	<b>PASS</b>

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

PRESSURE SENSOR (mmHg)			
Reference	Instrument	Difference	
590.0	592.0	2.0	<b>PASS</b>

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

**NOTES:**



**SITE INFORMATION**

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	5/31/2019
SITE NAME		Coal Hoal Mine					
NETWORK TYPE		Alton Coal- Coal Hollow					

		Deg	Min	Sec		Decimal
LATITUDE	North				--CALCULATE-->	
LONGITUDE	West					

	Decimal		--CALCULATE-->	Deg	Min	Sec

	Meters		--CALCULATE-->	Feet
ELEVATION				

	Feet		--CALCULATE-->	Meters

Please verify site standards used by the site operator

SITE STANDARDS	MANUFACTURER	MODEL	SERIAL #	Calibration Expiration Date
PM Flow Reference				

**NOTES:**



ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	5/31/2019
SITE NAME		Coal Hoal Mine					
Network type		Alton Coal- Coal Hollow					

	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/m2 / mV		
UV Radiation Reference				
Multiplier		W/m2 / mV		
Precipitation Reference				
Volume		mL		

PM Flow Standard #1	BGI	deltaCal	1237	1/3/2020
PM Flow Standard #2				
PM Flow Standard #3				
PM Flow Standard #4				

PM Temperature Standard #1	BGI	deltaCal	1237	1/3/2020
PM Temperature Standard #2				
PM Temperature Standard #3				
PM Temperature Standard #4				

PM Barometric Pressure Standard #1	BGI	deltaCal	1237	1/3/2020
PM Barometric Pressure Standard #2				
PM Barometric Pressure Standard #3				
PM Barometric Pressure Standard #4				

TEOM MTV Standard				
-------------------	--	--	--	--

HiVol Direct Flow Reference				
Orifice				
ΔP orifice manometer				

**APPENDIX B**

**AUDIT STANDARDS CERTIFICATIONS**



**CERTIFICATE OF CALIBRATION - NIST TRACEABILITY**

(Refer to instruction manual for further details of calibration)

deltaCal Serial Number: 1237 DATE: 19-Dec-2018

Calibration Operator: E. Albuja

**Critical Venturi Flow Meter:** Max Uncertainty = 0.346%

- Serial Number: 1 CEESI NVLAP NIST Data File 04BGI151
- Serial Number: 2 CEESI NVLAP NIST Data File 04BGI152
- Serial Number: 3 CEESI NVLAP NIST Data File 04BGI153
- Serial Number: 4 CEESI NVLAP NIST Data File 02BGI004

**Room Temperature:** +- 0.03°C from -5°C - 70°C Room Temperature 23.5 °C

Brand: Telatemp Serial Number: 358654  
Std Cal Date 30-Oct-18 Std Cal Due Date 30-Oct-19

deltaCal:

Ambient Temperature (set): 23.5 °C  
Aux (filter) Temperature (set): 23.5 °C

**Barometric Pressure and Absolute Pressure**

Vaisala Model PTB330(50-1100) Digital Accuracy: 0.03371%

Serial Number C4310002  
Std Cal Date 26-Mar-18 Std Cal Due Date 26-Mar-19

deltaCal:

Barometric pressure (set): 751 mm of Hg

**Results of Venturi Calibration**

Flow Rate (Q) vs. Pressure Drop ( $\Delta P$ ). Where: Q=Lpm,  $\Delta P$ = Cm of H2O

Q= 3.81710  $\Delta P$  ^ 0.54299 Overall Uncertainty: 0.35%  
Q= 3.85960  $\Delta P$  ^ 0.52616 Overall Uncertainty: 0.35%

Date Placed In Service 1/3/19

(To be filled in by operator upon receipt)

Recommended Recalibration Date 1/3/20

(12 months from date placed in service)

To Check a deltaCal

E. Albuja

Date

19-Dec-2018 Pre recert

1.5-19.5 **VER 4.00**

BP= 753 mm of Hg

Maximum allowable error at any flow rate is .75%.

Serial No. 1237

	Reading		CV	Qa	Qa	
	Abs. P	Room	Flow	Flow	deltaCal	% Error
	Crit. Vent.	Temp	Lpm	Lpm	Indicated	
	mm of Hg					
# 2	142.63	22.20	1.583	1.583	1.786	12.84
	252.28	22.20	2.836	2.836	2.983	5.18
	267.88	22.20	3.015	3.015	3.112	3.23
	380.79	22.20	4.305	4.305	4.570	6.15
	524.08	22.20	5.943	5.943	5.958	0.25
# 1	163.56	22.20	6.358	6.358	6.973	9.67
	270.34	22.20	10.639	10.639	10.635	-0.04
	320.97	22.20	12.669	12.669	12.904	1.86
	404.79	22.20	16.029	16.029	15.954	-0.47
	465.05	22.20	18.445	18.445	18.365	-0.43
					<b>Average %</b>	<b>3.82</b>

To Check a deltaCal

E. Albuja

Date 19-Dec-2018

1.5-19.5 VER 4.00

BP= 751 mm of Hg

Maximum allowable error at any flow rate is .75%.

Serial No. 1237

	Reading		CV		
	Abs. P		Qa	Qa	
	Crit. Vent.	Room	Flow	deltaCal	% Error
	mm of Hg	Temp	Lpm	Indicated	
# 2	138.36	23.50	1.545	1.554	0.59
	237.18	23.50	2.682	2.672	-0.39
	314.18	23.50	3.569	3.546	-0.64
	377.54	23.50	4.298	4.320	0.51
	480.24	23.50	5.481	5.509	0.52
# 1	164.79	23.80	6.460	6.479	0.30
	271.58	23.80	10.775	10.744	-0.29
	321.36	23.80	12.787	12.760	-0.21
	416.89	23.80	16.648	16.685	0.22
	483.06	23.80	19.322	19.425	0.53
				Average %	0.11

---

**AUDIT REPORT  
FOR  
ALTON COAL DEVELOPMENT, LLC  
COAL HOLLOW MINE  
ALTON, UTAH  
THIRD QUARTER 2019**

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: September 10, 2019



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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 September 10, 2019. 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 <sub>10</sub>	BGI PQ200S	Yes
	PM <sub>10</sub> (collocated)	BGI PQ200S	Yes
Background #1	PM <sub>10</sub>	BGI PQ200S	Yes
Primary NPL	PM <sub>10</sub>	BGI PQ200	Yes
	PM <sub>10</sub> (collocated)	BGI PQ200	Yes

Table 1-3

Summary of Meteorological Audit Results

Parameter	Sensor	Within Accuracy Goal
Wind Speed	Met-One 34B	Yes
Wind Direction	Met-One 34B	Yes
Temperature	Campbell Scientific 107	Not audited
Precipitation	Hydrological Services TB4	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:

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Fax: 970-484-3423  
E-mail: [ckirk@air-resource.com](mailto: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 PM<sub>10</sub>)

The filter-based FRM PM<sub>10</sub> 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 <sub>10</sub>	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	1237	1/3/2020

## 2.2 METEOROLOGICAL PARAMETERS

Meteorological measurement systems are audited in accordance with (and accuracy goals were obtained from) the EPA’s *Quality Assurance Handbook for Air Pollution Measurement Systems: Volume IV – Meteorological Measurements*, (March 2008). ARS uses National Institute of Standards and Technologies (NIST) traceable test equipment for all meteorological parameters. All equipment is recertified annually. Audit ranges and acceptable criteria for each parameter are summarized in Table 2-3.

### 2.2.1 Wind Speed

Wind speed sensors are audited using an R.M. Young model 18802 (high RPM) or 18811 (low RPM) pulsed motor wind speed calibrator. Each sensor is tested at zero and five shaft revolution speeds. The equivalent wind speed is calculated corresponding to the sensor manufacturer's specified values for shaft speed versus wind velocity and compared to readings obtained from the on-site datalogger.

### 2.2.2 Wind Direction

Wind direction sensor audits include the verification of sensor orientation, linearity, and starting threshold (bearing integrity). The sensor orientation accuracy is verified by a reference. The reference can be an internal reference (a tower-mounted alignment vane) or external (pointing at landmarks from the sensor). Accuracy of the references is verified by the solar azimuth method for the determination of true north. Using a compass and the site latitude and longitude, a computer model outputs the sun’s azimuth for that exact time of day. The compass is adjusted to that azimuth, effectively correcting for the compass to the local magnetic declination (which may include local magnetic field disturbances). The sensor orientation accuracy is checked by aligning the wind direction vane to and from each landmark reference, recording sensor responses from the on-site datalogger.

Potentiometer linearity is tested by verifying the change in response between two successive orientations across eight points on a calibrated disc mounted atop the sensor. For example, any two adjacent orientations on the eight-point disc are separated by 45 degrees. The difference in the datalogger response for these two adjacent orientations is compared to this value.

### 2.2.3 Ambient Temperature

Temperature sensors that are non-immersible are audited by collocation of the audit sensor under ambient conditions utilizing similar methods of sensor aspiration. Collocated comparisons are typically carried out using hourly averages. Audit data are collected by a datalogger provided by the auditor. Temperature sensors that are immersible are audited by comparison to the audit sensor in water baths. The test baths are typically at 0°C, near ambient conditions (or approximately 25°C), and near the full scale of the sensor (typically near 50°C). Data observed on the on-site datalogger are used to assess the accuracy of sensors. Sensor aspirators are inspected for proper function, including fan function and flow direction.

### 2.2.4 Precipitation

The tipping bucket style precipitation gauges are audited with a volumetric precipitation gauge calibrator by transferring a known amount of water through the gauge orifice at a maximum rate equivalent to 2.0 inches/hour of precipitation. The total values from the on-site datalogger values are compared to the actual introduced volume. The level and cleanliness of the sensor is observed where possible.

Table 2-3

Meteorological Sensors  
Audit Ranges and Acceptance Criteria

Parameter	Audit Method	Acceptance Criteria
Wind Speed	Accuracy at five speeds with anemometer drive	$\leq \pm 0.2$ m/s
	Starting threshold with torque gauge	Manufacturer specs
Wind Direction	Accuracy with compass	$\leq \pm 5^\circ$
	Linearity	$\leq \pm 5^\circ$
	Starting threshold with torque gauge	Manufacturer specs
Ambient Temperature (non-immersible sensor)	Accuracy via collocation in ambient conditions	$\leq \pm 0.5^\circ$
Ambient Temperature (immersible sensor)	Accuracy via collocation in three water baths	$\leq \pm 0.5^\circ$
Precipitation	Accuracy via known volume of water	$\leq \pm 10\%$

Table 2-4

Meteorological Audit Equipment

<b>References</b>	<b>Manufacturer</b>	<b>Model Number</b>	<b>Serial Number</b>	<b>Expiration Date</b>
Wind Speed (high rpm)	R.M. Young	18811	CA03912	12/12/2019
Wind Direction Orientation	Brunton	Transit	5103212072	N/A
Temperature (immersible)	Eutechnics	4400	307635	3/9/2020
Precipitation	Novalynx	260-2595	N/A	N/A

### **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. The temperature sensor could not be audited because the audit standard was not functioning correctly.

**APPENDIX A**  
**AUDIT DATA FORMS**



**WIND SPEED SENSOR AUDIT**

ABBR.	n/a	CLIENT	Alton Coal	FIELD SPECIALIST	C.Kirk	DATE	9/10/2019
SITE NAME		Coal Hollow Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
Wind Speed Reference	RM Young	18811	CA03912	12/12/2019
Wind Speed Torque Gauge				

Manufacturer and Model	Met One - 034B
Sensor Serial #	E2281
Cups Serial #	

AUDIT CRITERIA (<=)	
Wind Speed Difference (m/s)	0.20
Wind Speed Difference (%)	N/A

Select UNITS	m/s
--------------	-----

Motor Speed (rpm)	Target Speed	Wind Speed			
		DAS	Difference		
0	0.000	0.000	N/A	N/A	N/A
100	2.943	2.920	-0.02		PASS
200	5.607	5.630	0.02		PASS
300	8.270	8.270	0.00		PASS
600	16.260	16.260	0.00		PASS
1800	48.220				

Starting Threshold	TORQUE
Torque <= 0.2 g-cm	

Heater sleeve functional?  Yes  No  N/A

NOTES:



## WIND DIRECTION AUDIT

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	9/10/2019
SITE NAME		Coal Hollow Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
Direction Alignment Reference	Brunton	Transit	5103212072	
Direction Linearity Reference				
Direction Torque Gauge				

Manufacturer & Model	Met One - 034B
Sensor Serial #	E2281
Vane Serial #	

Local Magnetic Declination (degrees)	0.0
Method	n/a

Mag. Dec. from NOAA (deg/min/sec)				0.00
<small><a href="http://www.ngdc.noaa.gov/geomag-web/#declination">http://www.ngdc.noaa.gov/geomag-web/#declination</a></small>				

AUDIT CRITERIA (<=)	
Cross-arm Alignment Error (degrees)	2
Total Align. Diff (degrees)	5
Sensor Linearity (degrees)	5

Landmarks	Degrees
To left most building/barn to the east	338
From left most building/barn to the east	158
From center of right rock outcrop, saddle	73
To center of right rock outcrop, saddle	253

Reference Alignment Error (degrees)	0.0	PASS
-------------------------------------	-----	------

SENSOR ALIGNMENT			
Reference	Degrees	DAS	Difference
From the North	0		
From the South	180		
From the East	90		
From the West	270		
Total Alignment		MAX ABS Diff	

OR

SENSOR ALIGNMENT			
Landmark	Degrees	DAS	Difference
most building/barn to	338	337.6	-0.4
most building/barn t	158	157.5	-0.5
er of right rock outcro	73	71.9	-1.1
r of right rock outcro	253	252.0	-1.0
Total Alignment		MAX ABS Diff	1.1 <span style="color: green;">PASS</span>

SENSOR LINEARITY		
Point	DAS	Difference
1		N/A
2		
3		
4		
5		
6		
7		
8		
1		
MAX Difference		

Starting Threshold	TORQUE
Torque <=	6.5 g-cm

Heater sleeve functional?  Yes  No  N/A

NOTES:



# PRECIPITATION SENSOR AUDIT

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	9/10/2019
SITE NAME		Coal Hollow Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
Precipitation Reference	Novalynx	260-2595	n/a	

Manufacturer	Hydrological Services
Model	TB4
Serial Number	05-94

AUDIT CRITERIA (<=)	
Difference from Input Volume (%)	10%

Reference Chart			Input Volume (mL)		946
Manufacturer	Model	Diameter (in.)	mm/tip	mL/tip	DAS target
Met One	385	12	0.254	18.53	12.96
RM Young	52202	6.2825	0.100	2.00	47.30
Climatronics	100097-1-G0-H0	8	0.254	8.24	29.17
Climatronics	100508	9.66	0.100	4.73	20.01
X Hydrological Serv.	TB4	8	0.254	8.24	29.17

Conversions			
Value	Units	Value	Units
1.000	inch	25.40	mm
25.40	mm	1.000	inch

		Precipitation		
Reference (mL)	Target (mm)	DAS (mm)	Difference	
946	29.17	29.21	0.1%	<b>PASS</b>

Heater functional?  Yes  No  N/A

NOTES:



# FRM AUDIT (PM<sub>10</sub>)

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	9/10/2019
SITE NAME		Coal Hollow Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	1237	1/3/2020
PM Temperature Standard #1	BGI	deltaCal	1237	1/3/2020
PM Barometric Pressure Standard #1	BGI	deltaCal	1237	1/3/2020

MANUFACTURER	BGI
MODEL	PQ200S
SERIAL NUMBER	N963B

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

<b>SETTINGS</b>	
Total Flow	16.70

<b>Automated LEAK CHECK</b>	
Vacuum Loss Rate	Pass/Fail
3cm	<b>PASS</b>

<b>FLOW VERIFICATION</b>					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	16.58	16.70	0.7%	-0.7%	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Actual Flow % Diff	10%
Design Flow % Diff	10%

<b>AMBIENT TEMPERATURE SENSOR (°C)</b>			
	Reference	Instrument	Difference
	20.5	20.3	-0.2
			<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>FILTER TEMPERATURE SENSOR (°C)</b>			
	Reference	Instrument	Difference
	20.8	20.1	-0.7
			<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>PRESSURE SENSOR (mmHg)</b>			
	Reference	Instrument	Difference
	588.5	589.0	0.5
			<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Pressure Difference (mmHg)	10

**NOTES:**



# FRM AUDIT (PM<sub>10</sub>)

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	9/10/2019
SITE NAME		Coal Hollow Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	1237	1/3/2020
PM Temperature Standard #1	BGI	deltaCal	1237	1/3/2020
PM Barometric Pressure Standard #1	BGI	deltaCal	1237	1/3/2020

MANUFACTURER	BGI
MODEL	PQ200S
SERIAL NUMBER	N964C

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

<b>SETTINGS</b>	
Total Flow	16.70

<b>Automated LEAK CHECK</b>	
Vacuum Loss Rate	Pass/Fail
2cm	<b>PASS</b>

<b>FLOW VERIFICATION</b>					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	16.87	16.70	-1.0%	1.0%	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Actual Flow % Diff	10%
Design Flow % Diff	10%

<b>AMBIENT TEMPERATURE SENSOR (°C)</b>			
	Reference	Instrument	Difference
	20.0	19.9	-0.1 <b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>FILTER TEMPERATURE SENSOR (°C)</b>			
	Reference	Instrument	Difference
	20.3	20.4	0.1 <b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>PRESSURE SENSOR (mmHg)</b>			
	Reference	Instrument	Difference
	588.5	591.0	2.5 <b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Pressure Difference (mmHg)	10

**NOTES:**



# FRM AUDIT (PM<sub>10</sub>)

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	9/10/2019
SITE NAME		Coal Hollow Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	1237	1/3/2020
PM Temperature Standard #1	BGI	deltaCal	1237	1/3/2020
PM Barometric Pressure Standard #1	BGI	deltaCal	1237	1/3/2020

MANUFACTURER	BGI
MODEL	PQ200S
SERIAL NUMBER	N962

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

<b>SETTINGS</b>	
Total Flow	16.70

<b>Automated LEAK CHECK</b>	
Vacuum Loss Rate	Pass/Fail
3cm	<b>PASS</b>

<b>FLOW VERIFICATION</b>					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	16.79	16.70	-0.5%	0.5%	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Actual Flow % Diff	10%
Design Flow % Diff	10%

<b>AMBIENT TEMPERATURE SENSOR (°C)</b>			
	Reference	Instrument	Difference
	17.3	17.2	-0.1 <b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>FILTER TEMPERATURE SENSOR (°C)</b>			
	Reference	Instrument	Difference
	17.6	18.0	0.4 <b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>PRESSURE SENSOR (mmHg)</b>			
	Reference	Instrument	Difference
	582.5	582.0	-0.5 <b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Pressure Difference (mmHg)	10

**NOTES:**



# FRM AUDIT (PM<sub>10</sub>)

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	9/10/2019
SITE NAME		Coal Hollow Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	1237	1/3/2020
PM Temperature Standard #1	BGI	deltaCal	1237	1/3/2020
PM Barometric Pressure Standard #1	BGI	deltaCal	1237	1/3/2020

MANUFACTURER	BGI
MODEL	PQ200
SERIAL NUMBER	2366D

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

<b>SETTINGS</b>	
Total Flow	16.70

<b>Automated LEAK CHECK</b>	
Vacuum Loss Rate	Pass/Fail
4cm	<b>PASS</b>

<b>FLOW VERIFICATION</b>					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	16.72	16.70	-0.1%	0.1%	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Actual Flow % Diff	10%
Design Flow % Diff	10%

<b>AMBIENT TEMPERATURE SENSOR (°C)</b>			
	Reference	Instrument	Difference
	21.3	20.9	-0.4
			<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>FILTER TEMPERATURE SENSOR (°C)</b>			
	Reference	Instrument	Difference
	21.9	22.2	0.3
			<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>PRESSURE SENSOR (mmHg)</b>			
	Reference	Instrument	Difference
	587.5	587.0	-0.5
			<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Pressure Difference (mmHg)	10

**NOTES:** initial leak check failed- mechanism was tightened for better seal. Vacuum grease may be needed.



# FRM AUDIT (PM<sub>10</sub>)

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	9/10/2019
SITE NAME		Coal Hollow Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	1237	1/3/2020
PM Temperature Standard #1	BGI	deltaCal	1237	1/3/2020
PM Barometric Pressure Standard #1	BGI	deltaCal	1237	1/3/2020

MANUFACTURER	BGI
MODEL	PQ200
SERIAL NUMBER	2398E

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

SETTINGS	
Total Flow	16.70

Automated LEAK CHECK	
Vacuum Loss Rate	Pass/Fail
3 cm	<b>PASS</b>

FLOW VERIFICATION					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	16.70	16.70	0.0%	0.0%	<b>PASS</b>

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

AMBIENT TEMPERATURE SENSOR (°C)			
Reference	Instrument	Difference	
21.6	21.9	0.3	<b>PASS</b>

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

FILTER TEMPERATURE SENSOR (°C)			
Reference	Instrument	Difference	
21.3	21.4	0.1	<b>PASS</b>

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

PRESSURE SENSOR (mmHg)			
Reference	Instrument	Difference	
587.5	590.0	2.5	<b>PASS</b>

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

**NOTES:**



**SITE INFORMATION**

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	9/10/2019
SITE NAME		Coal Hollow Mine					
NETWORK TYPE		Alton Coal- Coal Hollow					

		Deg	Min	Sec		Decimal
LATITUDE	North	37	23	53	--CALCULATE-->	37.3981
LONGITUDE	West	112	23	43		112.3953

Decimal		--CALCULATE-->	Deg	Min	Sec

	Meters	--CALCULATE-->	Feet
ELEVATION			

Feet	--CALCULATE-->	Meters

Please verify site standards used by the site operator

SITE STANDARDS	MANUFACTURER	MODEL	SERIAL #	Calibration Expiration Date
PM Flow Reference				

**NOTES:** Lat/Long for met station



ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	9/10/2019
SITE NAME		Coal Hollow Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL #	Calibration Expiration Date	
Ozone Transfer Standard					
Gas Dilution Transfer Standard					
MFC High Flow Reference					
MFC Low Flow Reference					
Temperature Reference	Eutechnics	4400	307635	3/9/2020	
AT/RH Sensor Reference					
Barometric Pressure Reference					
Wind Speed Reference (high rpm)	RM Young	18811	CA03912	12/12/2019	
Wind Speed Reference (low rpm)					
Wind Speed Torque Gauge					
Wind Direction Alignment Reference	Brunton	Transit	5103212072		
Wind Direction Linearity Reference					
Wind Direction Torque Gauge					
Solar Radiation Reference					
Multiplier		W/m2 / mV			
UV Radiation Reference					
Multiplier		W/m2 / mV			
Precipitation Reference					
Volume	946	mL	Novalynx	260-2595	n/a

PM Flow Standard #1	BGI	deltaCal	1237	1/3/2020
PM Flow Standard #2				
PM Flow Standard #3				
PM Flow Standard #4				

PM Temperature Standard #1	BGI	deltaCal	1237	1/3/2020
PM Temperature Standard #2				
PM Temperature Standard #3				
PM Temperature Standard #4				

PM Barometric Pressure Standard #1	BGI	deltaCal	1237	1/3/2020
PM Barometric Pressure Standard #2				
PM Barometric Pressure Standard #3				
PM Barometric Pressure Standard #4				

TEOM MTV Standard				
-------------------	--	--	--	--

HiVol Direct Flow Reference				
Orifice				
ΔP orifice manometer				

**APPENDIX B**

**AUDIT STANDARDS CERTIFICATIONS**



**R.M. Young Company**  
 2801 Aero Park Drive  
 Traverse City, Michigan 49686 USA

CERTIFICATE OF CALIBRATION AND TESTING

Model: 18811  
 Serial Number: CA03912

Description: Anemometer Drive - 20 to 990 RPM  
 (Comprised of 18820A Control Unit and 18831A Motor Assembly)

R. M. Young Company certifies that the above equipment was inspected and calibrated prior to shipment in accordance with established manufacturing and testing procedures. Standards established by R.M. Young Company for calibrating the measuring and test equipment used in controlling product quality are traceable to the National Institute of Standards and Technology.

Nominal Motor RPM	27106D Output Frequency Hz (1)	Calculated RPM (2)	Indicated RPM (3)
30.0	5	30.0	30.0
150.0	25	150.0	150.0
300.0	50	300.0	300.0
450.0	75	450.0	450.0
600.0	100	600.0	600.0
750.0	125	750.0	750.0
990.0	165	990.0	990.0
<input checked="" type="checkbox"/> Clockwise and Counterclockwise rotation verified.			

- (1) Measured output frequency of YOUNG model 27106D standard anemometer attached to motor shaft.
- (2) YOUNG model 27106D produces 10 pulsed per revolution of the anemometer shaft.
- (3) Indicated on the Control Unit LCD.

\* Indicates out of tolerance.

- New Unit
- Service / Repair Unit
- As found
- No calibration adjustments required
- As left

Traceable frequency meter used for calibration:  
 Model: 34405A

Serial Number: 53020093

Date: 12 December 2018  
 Calibration Interval: One year

Tested By :           *EC*



To Check a deltaCal

E. Albuja

Date

19-Dec-2018 Pre recert

1.5-19.5 **VER 4.00**

BP= 753 mm of Hg

Maximum allowable error at any flow rate is .75%.

Serial No. 1237

	Reading		CV		
	Abs. P		Qa	Qa	
	Crit. Vent.	Room	Flow	deltaCal	% Error
	mm of Hg	Temp	Lpm	Indicated	
# 2	142.63	22.20	1.583	1.786	12.84
	252.28	22.20	2.836	2.983	5.18
	267.88	22.20	3.015	3.112	3.23
	380.79	22.20	4.305	4.570	6.15
	524.08	22.20	5.943	5.958	0.25
# 1	163.56	22.20	6.358	6.973	9.67
	270.34	22.20	10.639	10.635	-0.04
	320.97	22.20	12.669	12.904	1.86
	404.79	22.20	16.029	15.954	-0.47
	465.05	22.20	18.445	18.365	-0.43
				<b>Average %</b>	<b>3.82</b>

To Check a deltaCal

E. Albuja

Date 19-Dec-2018

1.5-19.5 VER 4.00

BP= 751 mm of Hg

Maximum allowable error at any flow rate is .75%.

Serial No. 1237

	Reading		CV		
	Abs. P		Qa	Qa	
	Crit. Vent.	Room	Flow	deltaCal	% Error
	mm of Hg	Temp	Lpm	Indicated	
# 2	138.36	23.50	1.545	1.554	0.59
	237.18	23.50	2.682	2.672	-0.39
	314.18	23.50	3.569	3.546	-0.64
	377.54	23.50	4.298	4.320	0.51
	480.24	23.50	5.481	5.509	0.52
# 1	164.79	23.80	6.460	6.479	0.30
	271.58	23.80	10.775	10.744	-0.29
	321.36	23.80	12.787	12.760	-0.21
	416.89	23.80	16.648	16.685	0.22
	483.06	23.80	19.322	19.425	0.53
				Average %	0.11

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**AUDIT REPORT  
FOR  
ALTON COAL DEVELOPMENT, LLC  
COAL HOLLOW MINE  
ALTON, UTAH  
FOURTH QUARTER 2019**

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: November 12, 2019



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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 November 12, 2019. 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 <sub>10</sub>	BGI PQ200S	Yes
	PM <sub>10</sub> (collocated)	BGI PQ200S	Yes
Background #1	PM <sub>10</sub>	BGI PQ200S	Yes
Primary NPL	PM <sub>10</sub>	BGI PQ200	Yes
	PM <sub>10</sub> (collocated)	BGI PQ200	Yes

Table 1-3

Summary of Meteorological Audit Results

Parameter	Sensor	Within Accuracy Goal
Temperature	Campbell Scientific 107	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](mailto: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 PM<sub>10</sub>)

The filter-based FRM PM<sub>10</sub> 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 <sub>10</sub>	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	141170	6/26/2020

## 2.2 METEOROLOGICAL PARAMETERS

Meteorological measurement systems are audited in accordance with (and accuracy goals were obtained from) the EPA’s *Quality Assurance Handbook for Air Pollution Measurement Systems: Volume IV – Meteorological Measurements*, (March 2008). ARS uses National Institute of Standards and Technologies (NIST) traceable test equipment for all meteorological parameters. All equipment is recertified annually. Audit ranges and acceptable criteria for each parameter are summarized in Table 2-3.

### 2.2.3 Ambient Temperature

Temperature sensors that are non-immersible are audited by collocation of the audit sensor under ambient conditions utilizing similar methods of sensor aspiration. Collocated comparisons are typically carried out using hourly averages. Audit data are collected by a datalogger provided by the auditor. Temperature sensors that are immersible are audited by comparison to the audit sensor in water baths. The test baths are typically at 0°C, near ambient conditions (or approximately 25°C), and near the full scale of the sensor (typically near 50°C). Data observed on the on-site datalogger are used to assess the accuracy of sensors. Sensor aspirators are inspected for proper function, including fan function and flow direction.

Table 2-3  
Meteorological Sensors  
Audit Ranges and Acceptance Criteria

Parameter	Audit Method	Acceptance Criteria
Ambient Temperature (immersible sensor)	Accuracy via collocation in three water baths	$\leq \pm 0.5^\circ$

Table 2-4

Meteorological Audit Equipment

<b>References</b>	<b>Manufacturer</b>	<b>Model Number</b>	<b>Serial Number</b>	<b>Expiration Date</b>
Temperature (immersible)	Eutechnics	4600	99F101610	12/19/2019

### **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**



## TEMPERATURE / DELTA-TEMPERATURE SYSTEM AUDIT

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	11/12/2019
SITE NAME		Coal Hollow Mine					
Network type		Alton Coal- Coal Hollow					

Temperature Reference	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
	Eutechnics	4600	99F101610	12/19/2019

2m Temperature Sensor	
Manufacturer	Campbell Scientific
Model	CS107
Serial Number	n/a

List sensors according to height on tower, from highest to lowest.


Temp. Deltas	



CALIBRATION ACCEPTANCE CRITERIA (<=)	
Ambient Temperature Difference (°C)	0.5
Vertical Temperature Difference (°C)	0.1

AS FOUND	2m Temperature							
Bath Temp (°C)	DAS	Difference						
0.04	0.18	0.14	PASS					
21.33	21.51	0.18	PASS					
43.46	43.64	0.18	PASS					
<b>MAX ABS Difference</b>		<b>0.18</b>	<b>PASS</b>					

<b>MAX ABS Difference</b>				

Aspirator fan functional 2m?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A

Each sensor was verified against its data channel ?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Each Temperature Difference = Upper - Lower ?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A

**NOTES:**



# FRM AUDIT (PM<sub>10</sub>)

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	11/12/2019
SITE NAME		Coal Hollow Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	141170	6/26/2020
PM Temperature Standard #1	BGI	deltaCal	141170	6/26/2020
PM Barometric Pressure Standard #1	BGI	deltaCal	141170	6/26/2020

MANUFACTURER	BGI
MODEL	PQ200S
SERIAL NUMBER	N963B

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

<b>SETTINGS</b>	
Total Flow	16.70

<b>Automated LEAK CHECK</b>	
Vacuum Loss Rate	Pass/Fail
4 cm H2O	<b>PASS</b>

<b>FLOW VERIFICATION</b>					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	16.96	16.70	-1.5%	1.6%	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Actual Flow % Diff	10%
Design Flow % Diff	10%

<b>AMBIENT TEMPERATURE SENSOR (°C)</b>			
	Reference	Instrument	Difference
	8.5	8.5	0.0
			<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>FILTER TEMPERATURE SENSOR (°C)</b>			
	Reference	Instrument	Difference
	7.4	6.4	-1.0
			<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>PRESSURE SENSOR (mmHg)</b>			
	Reference	Instrument	Difference
	594.0	595.0	1.0
			<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Pressure Difference (mmHg)	10

**NOTES:**



# FRM AUDIT (PM<sub>10</sub>)

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	11/12/2019
SITE NAME		Coal Hollow Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	141170	6/26/2020
PM Temperature Standard #1	BGI	deltaCal	141170	6/26/2020
PM Barometric Pressure Standard #1	BGI	deltaCal	141170	6/26/2020

MANUFACTURER	BGI
MODEL	PQ200S
SERIAL NUMBER	N964C

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

<b>SETTINGS</b>	
Total Flow	16.70

<b>Automated LEAK CHECK</b>	
Vacuum Loss Rate	Pass/Fail
1 cm H2O	<b>PASS</b>

<b>FLOW VERIFICATION</b>					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	16.95	16.70	-1.5%	1.5%	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Actual Flow % Diff	10%
Design Flow % Diff	10%

<b>AMBIENT TEMPERATURE SENSOR (°C)</b>			
	Reference	Instrument	Difference
	8.7	8.5	-0.2 <b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>FILTER TEMPERATURE SENSOR (°C)</b>			
	Reference	Instrument	Difference
	7.0	6.1	-0.9 <b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>PRESSURE SENSOR (mmHg)</b>			
	Reference	Instrument	Difference
	594.0	597.0	3.0 <b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Pressure Difference (mmHg)	10

**NOTES:**



# FRM AUDIT (PM<sub>10</sub>)

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	11/12/2019
SITE NAME		Coal Hollow Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	141170	6/26/2020
PM Temperature Standard #1	BGI	deltaCal	141170	6/26/2020
PM Barometric Pressure Standard #1	BGI	deltaCal	141170	6/26/2020

MANUFACTURER	BGI
MODEL	PQ200S
SERIAL NUMBER	N962

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

<b>SETTINGS</b>	
Total Flow	16.70

<b>Automated LEAK CHECK</b>	
Vacuum Loss Rate	Pass/Fail
2 cm H2O	<b>PASS</b>

<b>FLOW VERIFICATION</b>					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	16.19	16.70	3.2%	-3.1%	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Actual Flow % Diff	10%
Design Flow % Diff	10%

<b>AMBIENT TEMPERATURE SENSOR (°C)</b>			
	Reference	Instrument	Difference
	5.9	6.5	0.6 <b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>FILTER TEMPERATURE SENSOR (°C)</b>			
	Reference	Instrument	Difference
	588.0	588.0	0.0 <b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>PRESSURE SENSOR (mmHg)</b>			
	Reference	Instrument	Difference
	4.5	4.0	-0.5 <b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Pressure Difference (mmHg)	10

**NOTES:**



# FRM AUDIT (PM<sub>10</sub>)

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	11/12/2019
SITE NAME		Coal Hollow Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	141170	6/26/2020
PM Temperature Standard #1	BGI	deltaCal	141170	6/26/2020
PM Barometric Pressure Standard #1	BGI	deltaCal	141170	6/26/2020

MANUFACTURER	BGI
MODEL	PQ200
SERIAL NUMBER	2366D

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

<b>SETTINGS</b>	
Total Flow	16.70

<b>Automated LEAK CHECK</b>	
Vacuum Loss Rate	Pass/Fail
1 cm H2O	<b>PASS</b>

<b>FLOW VERIFICATION</b>					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	16.68	16.70	0.1%	-0.1%	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Actual Flow % Diff	10%
Design Flow % Diff	10%

<b>AMBIENT TEMPERATURE SENSOR (°C)</b>			
	Reference	Instrument	Difference
	10.0	9.8	-0.2 <b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>FILTER TEMPERATURE SENSOR (°C)</b>			
	Reference	Instrument	Difference
	9.2	8.9	-0.3 <b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>PRESSURE SENSOR (mmHg)</b>			
	Reference	Instrument	Difference
	593.5	593.0	-0.5 <b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Pressure Difference (mmHg)	10

**NOTES:**



# FRM AUDIT (PM<sub>10</sub>)

ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	11/12/2019
SITE NAME		Coal Hollow Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
PM Flow Standard #1	BGI	deltaCal	141170	6/26/2020
PM Temperature Standard #1	BGI	deltaCal	141170	6/26/2020
PM Barometric Pressure Standard #1	BGI	deltaCal	141170	6/26/2020

MANUFACTURER	BGI
MODEL	PQ200
SERIAL NUMBER	2398E

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

<b>SETTINGS</b>	
Total Flow	16.70

<b>Automated LEAK CHECK</b>	
Vacuum Loss Rate	Pass/Fail
1 cm H2O	<b>PASS</b>

<b>FLOW VERIFICATION</b>					
	Reference	Instrument	Actual Diff	Design Diff	
Total Flow	17.20	16.70	-2.9%	3.0%	<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Actual Flow % Diff	10%
Design Flow % Diff	10%

<b>AMBIENT TEMPERATURE SENSOR (°C)</b>			
	Reference	Instrument	Difference
	10.2	9.8	-0.4
			<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>FILTER TEMPERATURE SENSOR (°C)</b>			
	Reference	Instrument	Difference
	10.0	9.4	-0.6
			<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Temperature Difference (°C)	2

<b>PRESSURE SENSOR (mmHg)</b>			
	Reference	Instrument	Difference
	593.5	596.0	2.5
			<b>PASS</b>

<b>AUDIT CRITERIA (&lt;=)</b>	
Pressure Difference (mmHg)	10

**NOTES:**



**SITE INFORMATION**

<b>ABBR.</b>	n/a	<b>CLIENT</b>	Alton Coal	<b>AUDITOR</b>	C.Kirk	<b>DATE</b>	11/12/2019
<b>SITE NAME</b>		Coal Hollow Mine					
<b>NETWORK TYPE</b>		Alton Coal- Coal Hollow					

		Deg	Min	Sec		Decimal
<b>LATITUDE</b>	North				--CALCULATE-->	
<b>LONGITUDE</b>	West					

	Decimal		--CALCULATE-->	Deg	Min	Sec

	Meters		--CALCULATE-->	Feet
<b>ELEVATION</b>				

	Feet		--CALCULATE-->	Meters

Please verify site standards used by the site operator

<b>SITE STANDARDS</b>	<b>MANUFACTURER</b>	<b>MODEL</b>	<b>SERIAL #</b>	<b>Calibration Expiration Date</b>
PM Flow Reference				

**NOTES:**



ABBR.	n/a	CLIENT	Alton Coal	AUDITOR	C.Kirk	DATE	11/12/2019
SITE NAME		Coal Hollow Mine					
Network type		Alton Coal- Coal Hollow					

	MANUFACTURER	MODEL	SERIAL #	Calibration Expiration Date
Ozone Transfer Standard				
Gas Dilution Transfer Standard				
MFC High Flow Reference				
MFC Low Flow Reference				
Temperature Reference	Eutechnics	4600	99F101610	12/19/2019
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/m2 / mV		
UV Radiation Reference				
Multiplier		W/m2 / mV		
Precipitation Reference				
Volume		mL		

PM Flow Standard #1	BGI	deltaCal	141170	6/26/2020
PM Flow Standard #2				
PM Flow Standard #3				
PM Flow Standard #4				

PM Temperature Standard #1	BGI	deltaCal	141170	6/26/2020
PM Temperature Standard #2				
PM Temperature Standard #3				
PM Temperature Standard #4				

PM Barometric Pressure Standard #1	BGI	deltaCal	141170	6/26/2020
PM Barometric Pressure Standard #2				
PM Barometric Pressure Standard #3				
PM Barometric Pressure Standard #4				

TEOM MTV Standard				
-------------------	--	--	--	--

HiVol Direct Flow Reference				
Orifice				
ΔP orifice manometer				

**APPENDIX B**

**AUDIT STANDARDS CERTIFICATIONS**



MICRO PRECISION CALIBRATION ,INC  
 22835 INDUSTRIAL PLACE  
 GRASS VALLEY CA 95949  
 530-268-1860

## Certificate of Calibration

Date: Dec 19, 2018

Cert No. 551220082727718

**Customer:**

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

MPC Control #: AX8944  
 Asset ID: N/A  
 Gage Type: DIGITAL THERMOMETER  
 Manufacturer: EUTECHNICS  
 Model Number: 4600  
 Size: N/A  
 Temp/RH: 70.0°F / 45.0%  
 Location: Calibration performed at MPC facility

Work Order #: SAC-70099166  
 Purchase Order #: A32855  
 Serial Number: 99F101610  
 Department: N/A  
 Performed By: TREVOR GOLD  
 Received Condition: IN TOLERANCE  
 Returned Condition: IN TOLERANCE  
 Cal. Date: December 19, 2018  
 Cal. Interval: 12 MONTHS  
 Cal. Due Date: December 19, 2019

**Calibration Notes:**

**Standards Used to Calibrate Equipment**

I.D.	Description.	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
CR6700	DOUBLE WELL BATH	7013	79006	HART SCIENTIFIC	Oct 31, 2019	551220081617831
DA8367	PRECISION PLATINUM RESISTANCE THERMOMETER SPRT W/ CASE	8167-25	180322	LEEDS & NORTHRUP CO.	Aug 31, 2019	551220081559793

**Procedures Used in this Event**

Procedure Name	Description
MPC-00074	Temperature Devices, Sept-27-2016 rev02

Calibrating Technician:

TREVOR GOLD

QC Approval:

JACK WERTZ III

**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 Z540.3-2008.

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

PASS - Compliant with specification; .

FAIL - Not compliant with specification.

Fail<sup>F</sup> - The measured value is not within the acceptance limits. However, a portion of the expanded uncertainty of measurement at 95% is within the specified tolerance.

Pass<sup>F</sup> - The measured value is within acceptance limits. However, a portion of the expanded uncertainty of measurement at 95% exceeds the specified tolerance.

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 Method 6-Guard Bands based on Test Uncertainty Ratio. 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 ninety (90) 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.



**CERTIFICATE OF CALIBRATION - NIST TRACEABILITY**

*(Refer to instruction manual for further details of calibration)*

deltaCal Serial Number: 141170                      DATE: 6-Jun-2019

Calibration Operator: E. Albuja

**Critical Venturi Flow Meter:** Max Uncertainty = 0.346%

- Serial Number: 1 CEESI NVLAP NIST Data File 04BGI151
- Serial Number: 2 CEESI NVLAP NIST Data File 04BGI152
- Serial Number: 3 CEESI NVLAP NIST Data File 04BGI153
- Serial Number: 4 CEESI NVLAP NIST Data File 02BGI004

**Room Temperature:** +/- 0.03°C from -5°C - 70°C      Room Temp                      23.9 °C

Brand: Telatemp                      Serial Number: 358654  
Std Cal Date                      30-Oct-18                      Std Cal Due Date                      30-Oct-19

deltaCal:  
Ambient Temperature (set): 23.9 °C  
Aux (filter) Temperature (set): 23.9 °C

**Barometric Pressure and Absolute Pressure**

Vaisala Model PTB330(50-1100) Digital Accuracy: 0.03371%  
Serial Number                      C4310002  
Std Cal Date                      13-Mar-19                      Std Cal Due Date                      12-Mar-20

deltaCal:  
Barometric pressure (set): 744 mm of Hg

**Results of Venturi Calibration**

Flow Rate (Q) vs. Pressure Drop (ΔP).                      Where: Q=Lpm, ΔP= Cm of H2O

Q= 3.78580 ΔP ^ 0.54422                      Overall Uncertainty: 0.35%  
Q= 3.84500 ΔP ^ 0.52352                      Overall Uncertainty: 0.35%

Date Placed In Service 6/26/19  
(To be filled in by operator upon receipt)

Recommended Recalibration Date 6/26/20  
(12 months from date placed in service)

To Check a deltaCal E. Albuja

Date 6-Jun-2019 Pre recert

1.5-19.5 VER 4.00

BP= 744 mm of Hg

Maximum allowable error at any flow rate is .75%.

Serial No. 141170

	Reading		CV		
	Abs. P		Qa	Qa	
	Crit. Vent.	Room	Flow	deltaCal	% Error
	mm of Hg	Temp	Lpm	Indicated	
# 2	153.52	24.60	1.742	1.808	3.79
	241.56	24.60	2.769	2.805	1.31
	318.11	24.60	3.662	3.691	0.80
	390.73	24.60	4.509	4.589	1.78
	440.61	24.60	5.090	5.140	0.97
# 1	176.14	24.60	7.002	7.032	0.43
	286.00	24.60	11.496	11.485	-0.09
	356.32	24.60	14.372	14.357	-0.11
	416.28	24.60	16.825	16.807	-0.11
	471.98	24.60	19.103	19.114	0.06
				Average %	0.88

To Check a deltaCal **E. Albuja**

Date **6-Jun-2019**

1.5-19.5 **VER 4.00**

BP= **744** mm of Hg

Maximum allowable error at any flow rate is .75%.

Serial No. **141170**

	Reading		CV		
	Abs. P		Qa	Qa	
	Crit. Vent.	Room	Flow	deltaCal	% Error
	mm of Hg	Temp	Lpm	Indicated	
<b># 2</b>	<b>136.18</b>	<b>23.90</b>	1.536	<b>1.545</b>	<b>0.58</b>
	<b>181.24</b>	<b>23.90</b>	2.060	<b>2.072</b>	<b>0.56</b>
	<b>279.85</b>	<b>23.90</b>	3.208	<b>3.222</b>	<b>0.44</b>
	<b>393.25</b>	<b>23.90</b>	4.527	<b>4.553</b>	<b>0.57</b>
	<b>452.81</b>	<b>23.90</b>	5.220	<b>5.240</b>	<b>0.37</b>
<b># 1</b>	<b>156.93</b>	<b>23.90</b>	6.202	<b>6.242</b>	<b>0.65</b>
	<b>276.86</b>	<b>23.90</b>	11.096	<b>11.089</b>	<b>-0.06</b>
	<b>334.96</b>	<b>23.90</b>	13.467	<b>13.482</b>	<b>0.11</b>
	<b>411.26</b>	<b>23.90</b>	16.580	<b>16.612</b>	<b>0.19</b>
	<b>480.55</b>	<b>23.90</b>	19.408	<b>19.482</b>	<b>0.38</b>
				<b>Average %</b>	<b>0.38</b>