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

May 16, 2011

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

UTAH DEPARTMENT OF
ENVIRONMENTAL QUALITY
MAY 18 2011
DIVISION OF AIR QUALITY

RE: 1st QT 2011 Report - Coal Hollow Mine
Project ID: N14047-0002

Dear Mr. Black,

Please find enclosed the Summary of PM_{10} Data Collected at the Coal Hollow Mine, Utah during the First Quarter, 2011 prepare by JBR Environmental Consultants, Inc for Alton Coal Development, LLC.

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

Sincerely,

B. Kirk Nicholes
Environmental Specialist
Alton Coal Development, LLC

Alton Coal Development, LLC.

Summary of PM_{10} Data Collected at Coal Hollow Mine, Utah During the First Quarter, 2011

UTAH DEPARTMENT OF
ENVIRONMENTAL QUALITY
MAY 18 2011
DIVISION OF AIR QUALITY

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

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

Prepared by:
JBR Environmental Consultants, Inc.
7669 West Riverside Dr., Suite 101
Boise, ID 83714
Contact: Dave Strohm
208.853.0883

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1.0 INTRODUCTION

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

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

The data summarized herein covers the data collected during the first quarter of 2011. The air monitoring program at the mine officially started on March 16, 2011. This date falls within the 120 days Alton Coal was allowed from the permit issuance date of November 10, 2011. The 120 days allowed for installation and startup time. The PM_{10} data is summarized in Section 3. Details of data recovery and quality assurance are presented in Section 4.

2.0 SITE LOCATION

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

Northing: 41401699 meters

Easting: 371534 meters

Universal Transverse Mercator (UTM) Datum NAD27, Zone 12

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

Figure 1 - Site Location Map

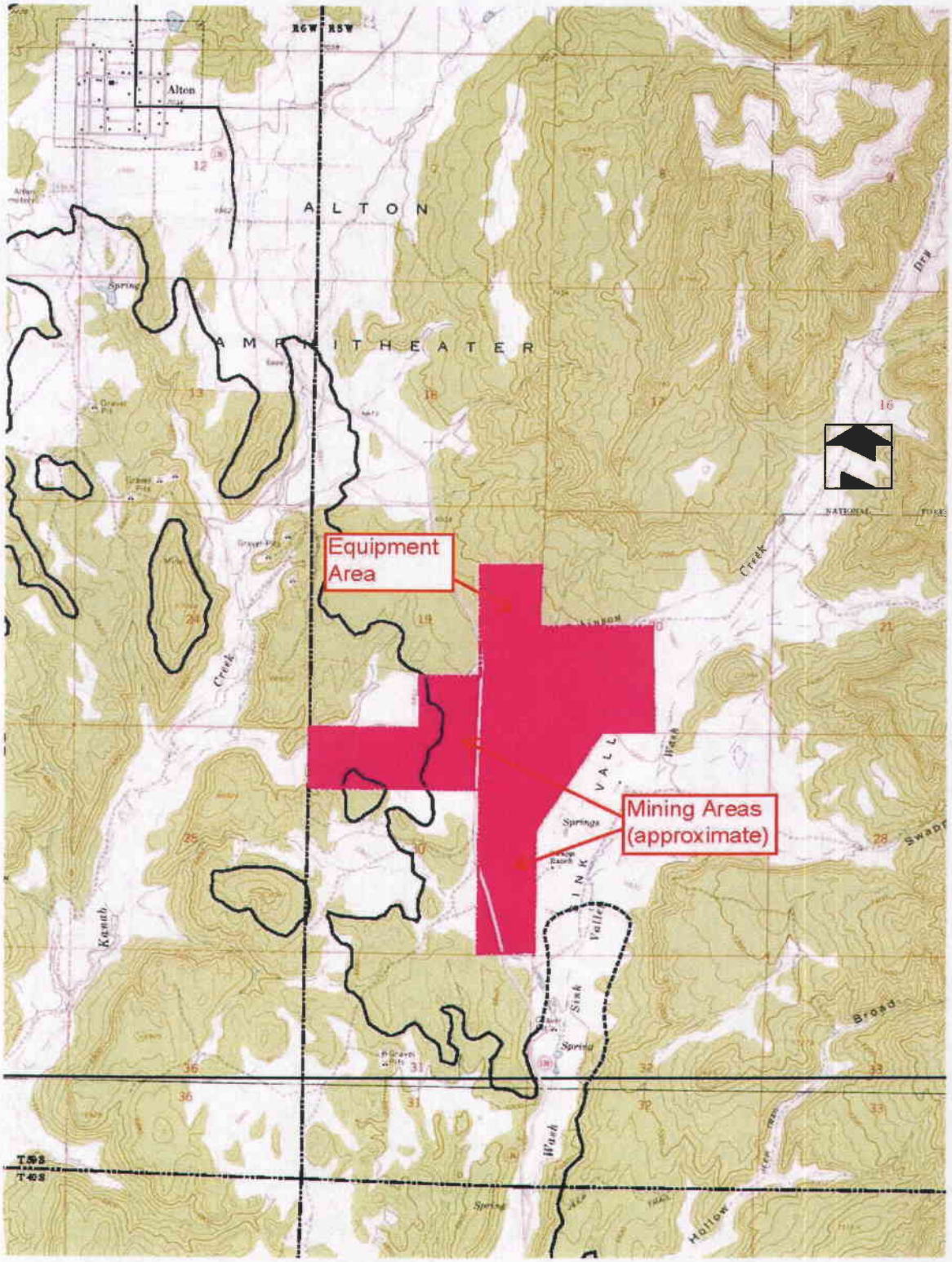
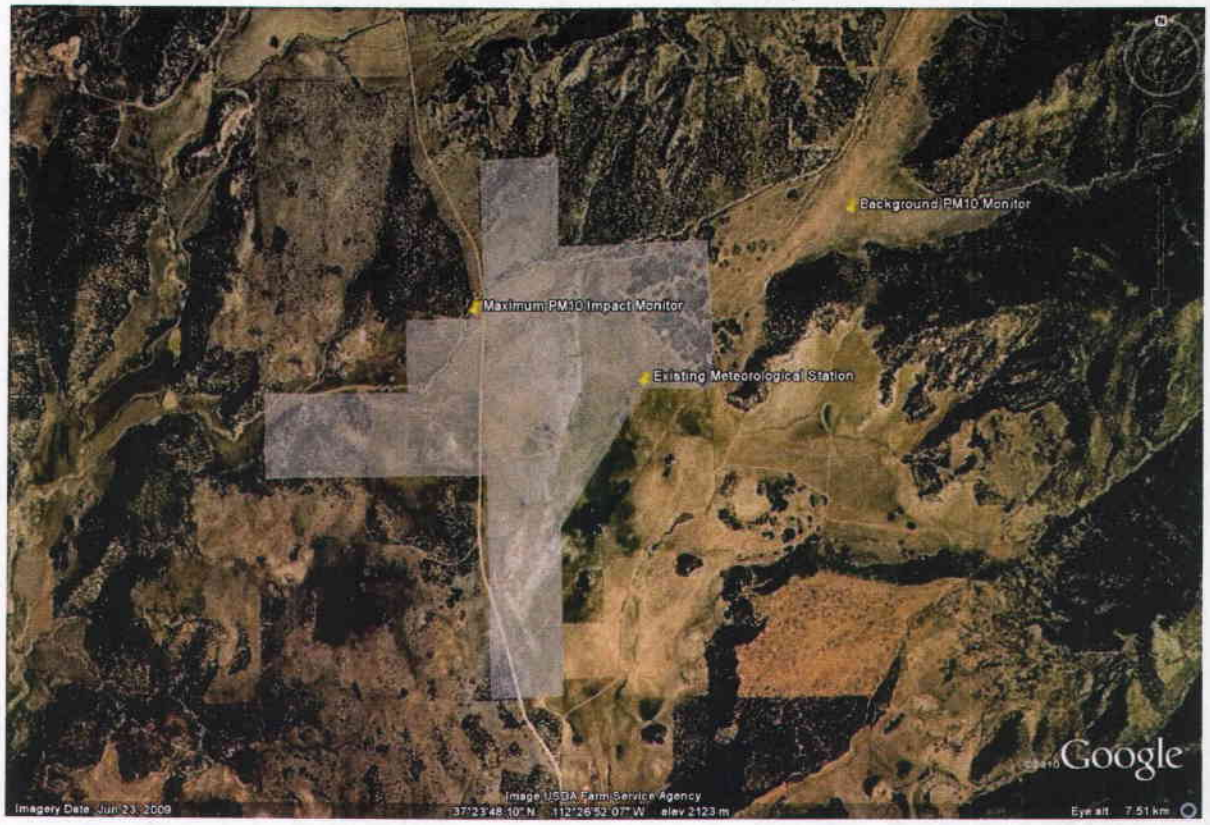


Figure 2 - Satellite View of Monitoring Locations



3.0 AIR QUALITY DATA SUMMARIES

A listing of the measured PM_{10} concentrations for the quarter are presented in Appendix A, and Field Data Sheets generated during the collection of each sample are presented in Appendix C. Measurements were collected during a 24-hour periods and represent the average PM10 concentration during the midnight to midnightdata collection cycle. As required by the operating permit, duplicate measurements were made with Sampler #963B (designated as a compliance monitor) and Sampler #964C (designated as a co-located sampler). The quarterly mean PM_{10} concentration and the comparison of measured concentrations to standards are based on measurements from the primary Sampler #963B. If a measurement from Sampler #963B was missing or invalid, the measurement from the secondary Sampler #964C was used.

The highest 24-hour mean PM_{10} concentrations measured during the quarter from the two monitoring locations are summarized in Table I, Table II, and Table III. The three highest concentrations, # of valid samples, and the arithmetic mean concentrations from each of the sites are listed. All measured PM_{10} concentration was below the 24-hour National Ambient Air Quality Standard (NAAQS) of 150 $\mu g/m^3$. Note that only one valid sample was collected from the background monitor due to equipment malfunction during this first quarter. The equipment malfunction has been rectified through consultation with the manufacturer and the monitor is currently running in compliance with ambient monitoring guidelines.

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

RANK	DATE	PM_{10} CONCENTRATION
Highest	3/22/11	3.5
Quarterly/Monthly Mean	3/16/11-3/31/11 (1valid samples)	3.5

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

RANK	DATE	PM_{10} CONCENTRATION
Highest	3/16/11	12.7
2nd Highest	3/28/11	9.7
Quarterly/Monthly Mean	3/16/11-3/31/11 (3valid samples)	8.53

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

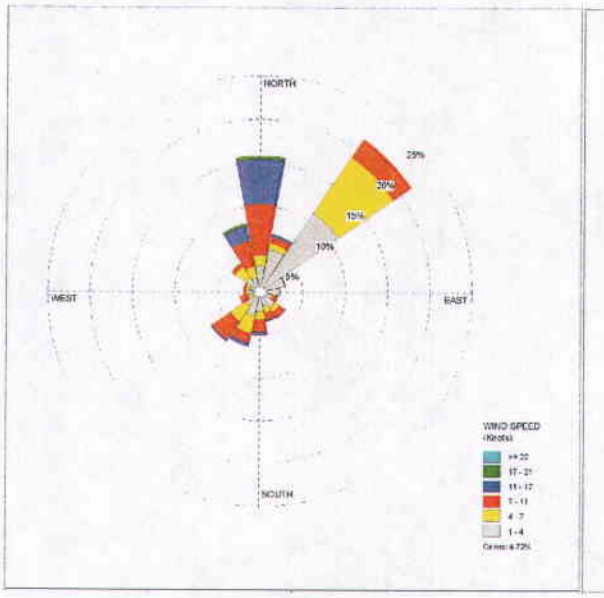
RANK	DATE	PM_{10} CONCENTRATION
Highest	3/16/11	11.7
2nd Highest	3/22/11	4.0
Quarterly Mean/Monthly	3/16/11-3/31/11 (2 valid samples)	7.85

Table IV – Mean Quarterly and Monthly Wind Speed

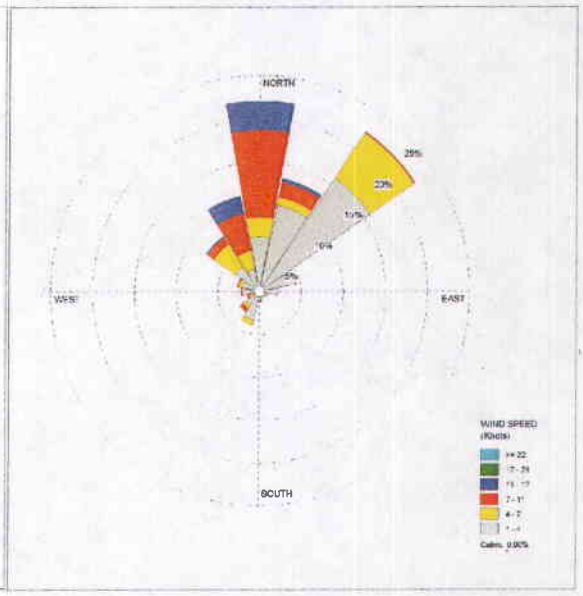
	1st Quarter 2011	Jan	Feb	March
Mean Wind Speed (m/s)	2.93	2.69	3.23	2.90

Figure 3 - Windroses for Onsite Met Station

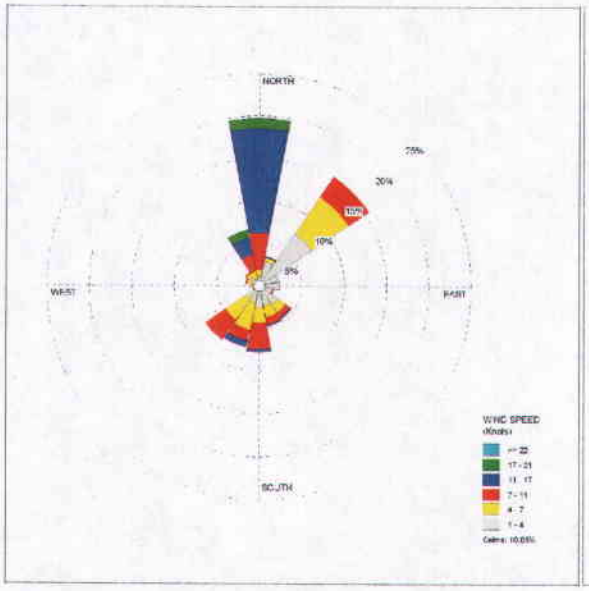
1st Quarter (Jan-March)



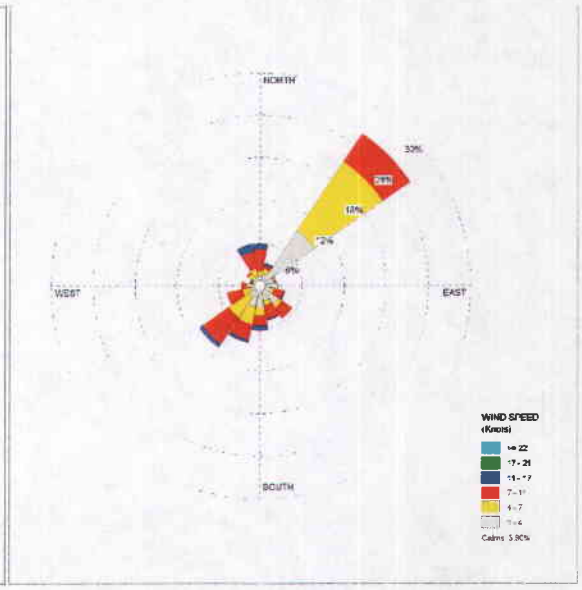
January 2011



February 2011



March 2011



4.0 DATA RECOVERY AND QUALITY ASSURANCE

4.1 Data Recovery

The PM_{10} data recovery for the three monitoring stations are presented below. Monitor 962A was only able to collect one of three valid samples of the first quarter. Monitor 962A was only able to collect the one sample due to equipment malfunction. A letter from BGI, Inc., the manufacturer of the monitor, explaining the design flaw is attached in Appendix E. Monitor 963B ran consistently and collected three of three samples. Monitor 964C collected 2 of three samples. A manual programming run setup error occurred on 3/28/11 and the monitor did not start the run. There are no other anomalies to report.

Table V - Summary of Data Recovery

SAMPLER	POSSIBLE SAMPLES	VALID SAMPLES	PERCENT DATA RECOVERY
962A	3	1	33%
963B	3	3	100%
964C	3	2	67%

4.2 Quality Assurance

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

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

4.2.1 Precision of PM_{10} Measurements

The precision of the PM_{10} measurements was determined from the duplicate samples collected from the collocated BGI PQ200 Monitors 963B and 964C. As recommended in *40 CFR, Part 58*, Appendix A, Section 5.3.1, PM_{10} precision checks are reported for instances

when the concentrations for duplicate samples both exceed 3 $\mu g/m^3$. Duplicate samples that did not meet this condition were omitted for the purposes of the precision checks. Appendix B, of this report summarizes precision calculations between the compliance monitor and the co-located monitor.

4.2.2 Audit Results

The accuracy of the PM_{10} sampler flows was verified by a performance audit conducted by Applied Environmental Consultants on April 19, 2011. A copy of the audit report is presented in Appendix D and is summarized in Table VI. The audit results indicate that the three samplers were operating properly.

Table VI - Audit Summary

SAMPLER	AUDIT % DIFFERENCE	LIMIT*	DESIGN % DIFFERENCE	LIMIT*
962A	0.3	±4%	-0.18	± 5%
963B	1.5	±4%	0.0	± 5%
964C	1.4	±4%	0.0	± 5%
*Values between ± 7% and ± 10% require recalibration but no data are invalidated.				

4.2.3 Zero and Single Point Flow Rate Checks

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

APPENDIX A

Listing of PM_{10} Concentrations

Background Monitor 962A

PM_{10} Sampler Summary

March 16, 2011 - March 31, 2011

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

Date	Filter ID	Concentration (µg/m3) LTP	Concentration (µg/m3) STP	Sample Period (hr:min)	Sample Volume (m3)	Std Volume (m3)	Mass (mg) Tare	Mass (mg) Gross	Mass (mg) Net	Flag	Comments
03/16/11		**Invalid - AV**	**Invalid - AV**								Power problem
03/22/11	T0735113	**2.9**	**3.5**	23.58	24.0	20.2	143.389	143.459	0.070		
03/28/11	P0072337	**Invalid - AG**	**Invalid - AG**	5.02	5.1	4.2	147.122	147.147	0.025	SP	T

BGI PQ200 Air Sampling System

Downloaded 2011 24 mar 10:14:48

Job Details:

Job Name:	11Mar24A.JOB	Job Code:	
Version:	5.62	Site Name:	962A
Serial No:	962	Station Code:	
Pump Time:	120:51	Operators:	kn
Flags:		User1:	
		User2:	

	Max	Min	Avg	Units
BP	583	577	580	mmHg
TA	2.8	-11.3	-3.3	°C
Q	---	---	16.72	Lpm

QCV	0.55 %
Max overheat	5 °C
occured	22-mar 11:11:42

Timer Information:

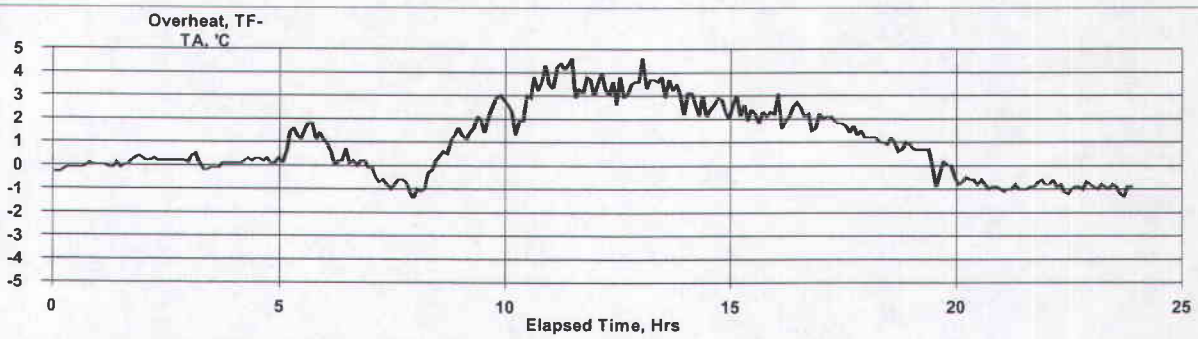
	Date dd-mmm	Time hh:mm:ss
Start:	11-22-mar	0:00:08
Stop:	11-22-mar	23:59:05
ET:	23:58	

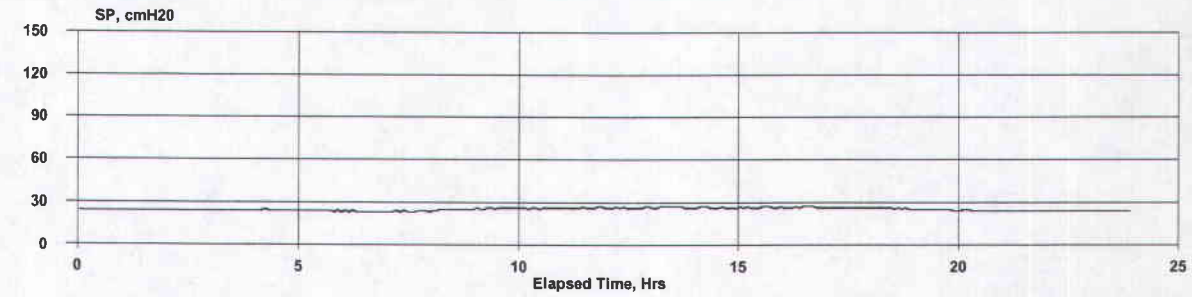
Mass Concentration Data:

Filter ID:	17	
Final Wt:		mg
Initial Wt:		mg
Delta Wt:	0.000	mg
Total Vol:	24.027	m^3
Mass Conc:	0	µg/m3

Notes 1: ran m-m on the 22nd

Notes 2:





11-22-mar	0:05:08	578	-3.9	-4.0	-0.1	24	16.73
11-22-mar	1:05:08	578	-4.2	-4.1	0.1	24	16.72
11-22-mar	2:05:08	579	-4.5	-4.3	0.2	24	16.72
11-22-mar	3:05:08	579	-4.7	-4.6	0.1	24	16.73
11-22-mar	4:05:08	579	-4.9	-4.6	0.2	24	16.72
11-22-mar	5:05:08	579	-8.7	-7.4	1.2	24	16.71
11-22-mar	6:05:08	579	-10.5	-10.2	0.3	23	16.71
11-22-mar	7:05:08	580	-8.0	-8.8	-0.7	23	16.71
11-22-mar	8:05:08	580	-3.4	-3.2	0.2	25	16.71
11-22-mar	9:05:08	581	-2.3	-0.3	2.0	26	16.74
11-22-mar	10:05:08	581	-1.2	1.6	2.9	26	16.73
11-22-mar	11:05:08	581	0.0	3.7	3.7	26	16.74
11-22-mar	12:05:08	581	0.6	3.9	3.4	26	16.72
11-22-mar	13:05:08	581	1.2	4.6	3.4	27	16.74
11-22-mar	14:05:08	581	1.5	4.1	2.6	26	16.74
11-22-mar	15:05:08	581	1.7	4.0	2.3	27	16.73
11-22-mar	16:05:08	581	1.7	3.9	2.2	26	16.73
11-22-mar	17:05:08	581	1.1	2.8	1.7	26	16.73
11-22-mar	18:05:08	582	-1.2	-0.2	1.0	26	16.73
11-22-mar	19:05:08	582	-4.9	-4.7	0.2	25	16.72
11-22-mar	20:05:08	582	-5.6	-6.3	-0.8	24	16.72
11-22-mar	21:05:08	582	-6.1	-7.0	-0.9	24	16.72
11-22-mar	22:05:08	582	-7.0	-7.9	-0.9	24	16.71
11-22-mar	23:05:08	582	-7.4	-8.4	-1.0	24	16.73

Compliance Monitor 963B

PM_{10} Sampler Summary

March 16, 2011 - March 31, 2011

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

Date	Filter ID	Concentration (µg/m3) LTP	Concentration (µg/m3) STP	Sample Period (hr:min)	Sample Volume (m3)	Std Volume (m3)	Mass (mg) Tare	Mass (mg) Gross	Mass (mg) Net	Flag	Comments
03/16/11	T0570102	**10.5**	**12.7**	23.58	24.0	19.8	145.936	146.188	0.252	XT	
03/22/11	T0735111	**2.7**	**3.2**	23.58	24.0	20.4	145.049	145.114	0.065		
03/28/11	P0072335	**8.0**	**9.7**	23.58	24.0	19.8	146.073	146.265	0.192		

BGI PQ200 Air Sampling System

Downloaded 2011 17 mar 10:03:20

Job Details:			
Job Name:	11Mar17B.JOB	Job Code:	
Version:	5.62	Site Name:	963b
Serial No:	963	Station Code:	
Pump Time:	185:39	Operators:	kn
Flags:		User1:	
		User2:	

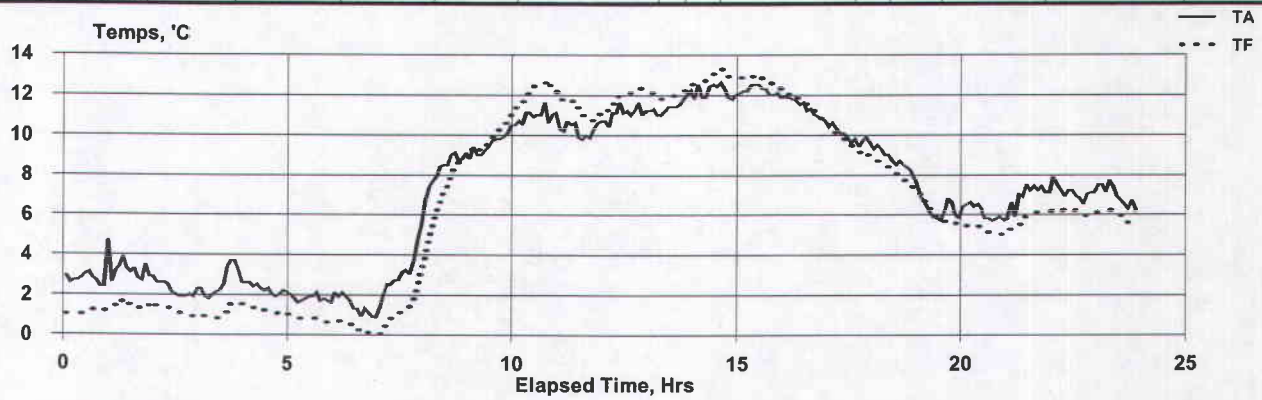
	Max	Min	Avg	Units
BP	592	588	589	mmHg
TA	12.9	0.7	7.1	°C
Q	---	---	16.71	Lpm
QCV			0.57	%
Max overheat			2.1	°C
occured	16-mar 10:49:46			

Timer Information:	Date	Time
	dd-mmm	hh:mm:ss
Start:	11-16-mar	0:00:08
Stop:	11-16-mar	23:59:05
ET:	23:58	

Mass Concentration Data:		
Filter ID:	11	
Final Wt:		mg
Initial Wt:		mg
Delta Wt:	0.000	mg
Total Vol:	24.024	m^3
Mass Conc:	0	µg/m3

Notes 1:

Notes 2:



11-16-mar	0:05:08	591	2.9	1.1	-1.8	29	16.71
11-16-mar	1:05:08	591	3.1	1.5	-1.7	30	16.71
11-16-mar	2:05:08	591	2.2	1.1	-1.1	30	16.72
11-16-mar	3:05:08	591	2.6	1.1	-1.5	30	16.71
11-16-mar	4:05:08	590	2.3	1.2	-1.0	30	16.71
11-16-mar	5:05:08	590	1.8	0.8	-1.0	30	16.72
11-16-mar	6:05:08	590	1.5	0.3	-1.1	30	16.71
11-16-mar	7:05:08	590	3.1	1.2	-1.9	30	16.70
11-16-mar	8:05:08	590	8.3	7.0	-1.3	32	16.71
11-16-mar	9:05:08	590	9.6	9.8	0.3	32	16.71
11-16-mar	10:05:08	590	10.9	12.1	1.2	33	16.71
11-16-mar	11:05:08	590	10.3	11.3	1.0	33	16.71
11-16-mar	12:05:08	590	11.1	11.9	0.8	33	16.70
11-16-mar	13:05:08	589	11.5	12.0	0.6	33	16.72
11-16-mar	14:05:08	589	12.2	12.9	0.7	33	16.71
11-16-mar	15:05:08	589	12.2	12.7	0.5	33	16.70
11-16-mar	16:05:08	589	11.4	11.5	0.2	33	16.71
11-16-mar	17:05:08	589	10.0	9.6	-0.3	33	16.71
11-16-mar	18:05:08	589	8.7	8.1	-0.6	33	16.70
11-16-mar	19:05:08	589	6.3	6.1	-0.2	33	16.71
11-16-mar	20:05:08	589	6.1	5.3	-0.9	32	16.71
11-16-mar	21:05:08	589	6.9	5.7	-1.2	32	16.71
11-16-mar	22:05:08	589	7.1	6.1	-1.0	33	16.71
11-16-mar	23:05:08	589	7.0	5.9	-1.0	33	16.72

BGI PQ200 Air Sampling System

Downloaded 2011 24 mar 11:09:09

Job Details:

Job Name:	11Mar24B.JOB	Job Code:	
Version:	5.62	Site Name:	963b
Serial No:	963	Station Code:	
Pump Time:	209:37	Operators:	kn
Flags:		User1:	
		User2:	

	Max	Min	Avg	Units
BP	589	583	587	mmHg
TA	4.3	-9.8	-2.4	°C
Q	---	---	16.71	Lpm

QCV	0.55 %
Max overheat	3.6 °C
occured	22-mar 11:43:40

Timer Information:

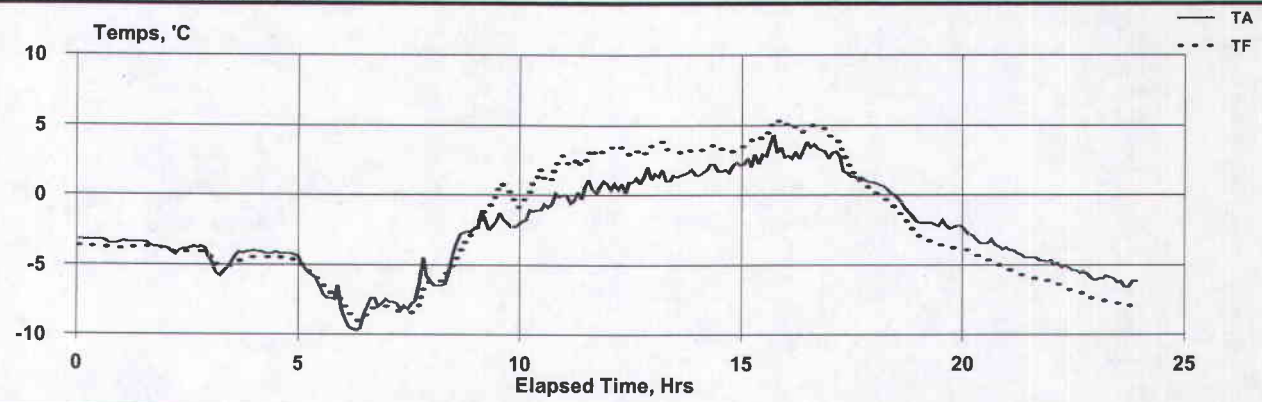
	Date dd-mmm	Time hh:mm:ss
Start:	11-22-mar	0:00:08
Stop:	11-22-mar	23:59:04
ET:	23:58	

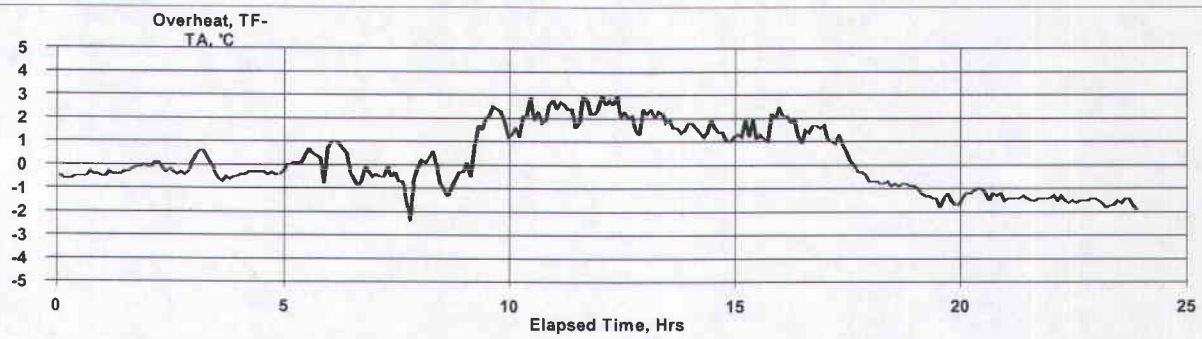
Mass Concentration Data:

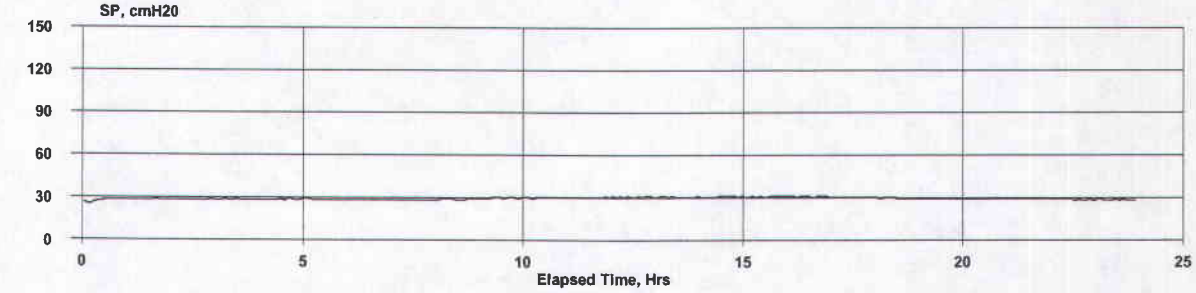
Filter ID:	15	
Final Wt:		mg
Initial Wt:		mg
Delta Wt:	0.000	mg
Total Vol:	24.023	m^3
Mass Conc:	0	ug/m3

Notes 1:

Notes 2: run date 22nd







11-22-mar	0:05:08	585	-3.3	-3.8	-0.5	27	16.71
11-22-mar	1:05:08	585	-3.5	-3.8	-0.3	28	16.72
11-22-mar	2:05:08	585	-4.0	-4.1	-0.2	28	16.71
11-22-mar	3:05:08	585	-4.7	-4.9	-0.1	28	16.71
11-22-mar	4:05:08	586	-4.2	-4.5	-0.3	28	16.71
11-22-mar	5:05:08	586	-6.6	-6.3	0.2	28	16.72
11-22-mar	6:05:08	586	-8.5	-8.5	0.1	28	16.72
11-22-mar	7:05:08	586	-7.2	-7.9	-0.7	28	16.73
11-22-mar	8:05:08	587	-4.4	-4.7	-0.3	29	16.71
11-22-mar	9:05:08	587	-2.0	-0.5	1.5	30	16.72
11-22-mar	10:05:08	588	-0.9	1.2	2.0	30	16.71
11-22-mar	11:05:08	588	0.3	2.7	2.4	30	16.73
11-22-mar	12:05:08	588	0.9	3.2	2.3	31	16.72
11-22-mar	13:05:08	588	1.4	3.3	1.9	30	16.72
11-22-mar	14:05:08	588	1.9	3.3	1.4	31	16.71
11-22-mar	15:05:08	588	2.9	4.5	1.6	31	16.73
11-22-mar	16:05:08	588	3.1	4.8	1.7	31	16.71
11-22-mar	17:05:08	588	1.7	2.0	0.4	30	16.72
11-22-mar	18:05:08	588	-0.3	-1.2	-0.8	29	16.72
11-22-mar	19:05:08	588	-2.1	-3.5	-1.4	29	16.70
11-22-mar	20:05:08	589	-3.3	-4.6	-1.2	29	16.72
11-22-mar	21:05:08	589	-4.5	-5.9	-1.4	29	16.72
11-22-mar	22:05:08	589	-5.4	-6.9	-1.5	29	16.71
11-22-mar	23:05:08	589	-6.2	-7.8	-1.6	28	16.72

BGI PQ200 Air Sampling System

Downloaded 2011 29 mar 12:57:06

Job Details:

Job Name:	11Mar29B.JOB	Job Code:	
Version:	5.62	Site Name:	963b
Serial No:	963	Station Code:	
Pump Time:	233:35	Operators:	kn
Flags:		User1:	
		User2:	

	Max	Min	Avg	Units
BP	590	584	586	mmHg
TA	12.5	-0.7	5.2	°C
Q	---	---	16.7	Lpm

QCV	0.46 %
Max overheat	2.5 °C
occured	28-mar 15:33:30

Timer Information:

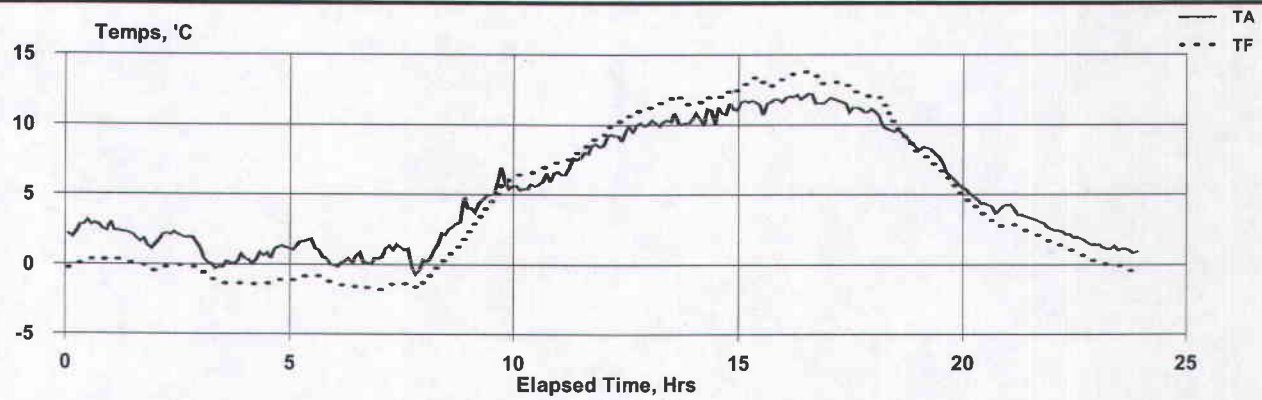
	Date dd-mmm	Time hh:mm:ss
Start:	11-28-mar	0:00:08
Stop:	11-28-mar	23:59:04
ET:	23:58	

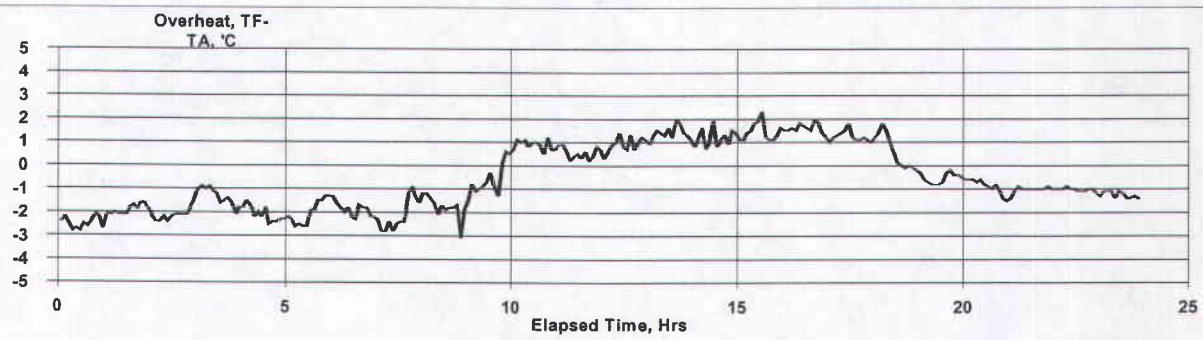
Mass Concentration Data:

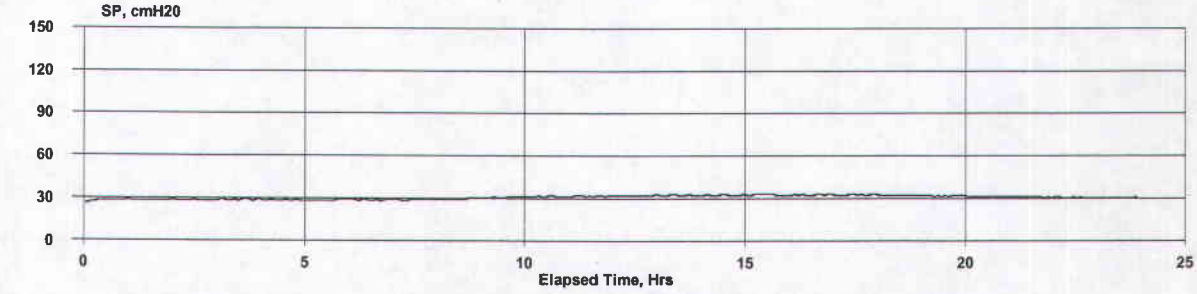
Filter ID:	6	
Final Wt:		mg
Initial Wt:		mg
Delta Wt:	0.000	mg
Total Vol:	24.022	m^3
Mass Conc:	0	µg/m3

Notes 1:

Notes 2:







11-28-mar	0:05:08	586	2.6	0.1	-2.5	28	16.70
11-28-mar	1:05:08	586	1.9	0.0	-1.9	28	16.71
11-28-mar	2:05:08	586	1.9	-0.2	-2.1	28	16.71
11-28-mar	3:05:08	586	0.1	-1.2	-1.3	29	16.72
11-28-mar	4:05:08	586	0.8	-1.3	-2.1	28	16.72
11-28-mar	5:05:08	586	1.0	-1.0	-2.0	28	16.71
11-28-mar	6:05:08	586	0.3	-1.6	-1.9	29	16.70
11-28-mar	7:05:08	587	0.6	-1.5	-2.1	29	16.71
11-28-mar	8:05:08	587	2.3	0.5	-1.8	29	16.71
11-28-mar	9:05:08	587	5.1	4.5	-0.6	31	16.72
11-28-mar	10:05:08	587	5.8	6.7	0.9	31	16.72
11-28-mar	11:05:08	587	7.7	8.2	0.5	32	16.70
11-28-mar	12:05:08	587	9.5	10.5	0.9	32	16.71
11-28-mar	13:05:08	587	10.2	11.6	1.4	32	16.71
11-28-mar	14:05:08	587	10.8	12.0	1.2	32	16.70
11-28-mar	15:05:08	587	11.6	13.0	1.5	33	16.69
11-28-mar	16:05:08	587	11.9	13.5	1.6	33	16.71
11-28-mar	17:05:08	587	11.3	12.6	1.2	32	16.71
11-28-mar	18:05:08	587	9.5	10.1	0.6	32	16.70
11-28-mar	19:05:08	587	7.2	6.7	-0.5	32	16.71
11-28-mar	20:05:08	588	4.4	3.5	-0.9	31	16.71
11-28-mar	21:05:08	589	3.3	2.2	-1.0	31	16.72
11-28-mar	22:05:08	589	1.9	0.9	-1.0	30	16.71
11-28-mar	23:05:08	590	1.1	-0.2	-1.3	30	16.72

PM_{10} Sampler Summary

March 16, 2011 - March 31, 2011

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

Date	Filter ID	Concentration (µg/m3) LTP	Concentration (µg/m3) STP	Sample Period (hr:min)	Sample Volume (m3)	Std Volume (m3)	Mass (mg) Tare	Mass (mg) Gross	Mass (mg) Net	Flag	Comments
03/16/11	T0570103	**9.6**	**11.7**	23.58	24.0	19.8	142.637	142.868	0.231	XT	
03/22/11	T0735109	**3.4**	**4.0**	23.58	24.0	20.4	143.476	143.557	0.081		
03/28/11	P0072336	**Invalid - AN**	**Invalid - AN**	23.58	24.0	20.4	146.127	146.132	0.005		P

BGI PQ200 Air Sampling System

Downloaded 2011 17 mar 09:59:22

Job Details:

Job Name:	11Mar17C.JOB	Job Code:	
Version:	5.62	Site Name:	964c
Serial No:	964	Station Code:	
Pump Time:	159:09	Operators:	kn
Flags:		User1:	
		User2:	

	Max	Min	Avg	Units
BP	592	589	590	mmHg
TA	13.2	1	7.3	°C
Q	---	---	16.71	Lpm

QCV	0.58 %
Max overheat	2 °C
occured	16-mar 10:49:20

Timer Information:

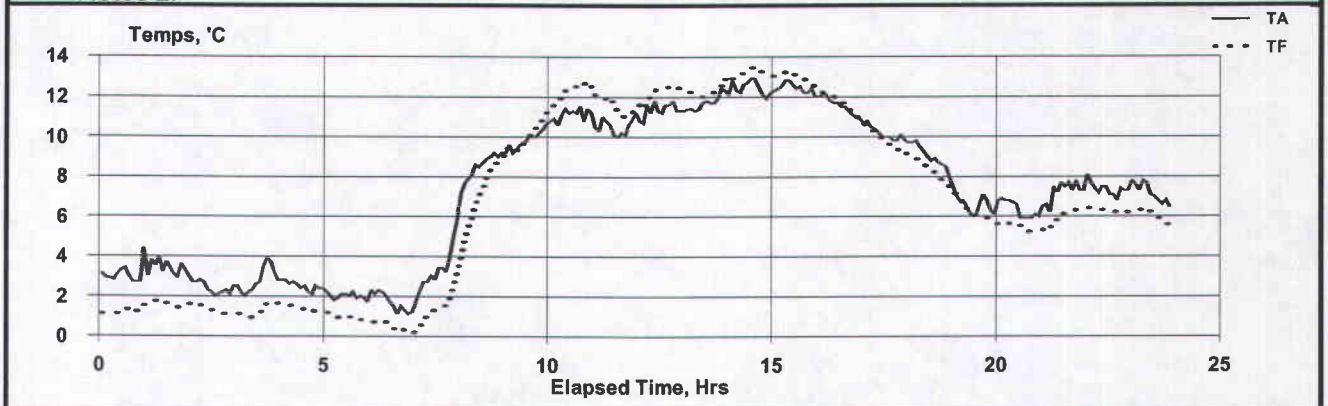
	Date dd-mmm	Time hh:mm:ss
Start:	11-16-mar	0:00:08
Stop:	11-16-mar	23:59:05
ET:	23:58	

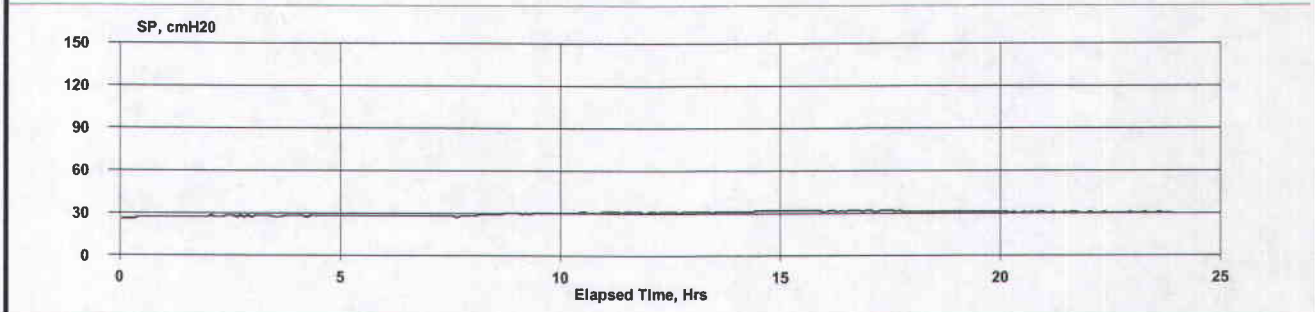
Mass Concentration Data:

Filter ID:	12	
Final Wt:		mg
Initial Wt:		mg
Delta Wt:	0.000	mg
Total Vol:	24.025	m^3
Mass Conc:	0	µg/m3

Notes 1:

Notes 2:





11-16-mar	0:05:08	592	3.1	1.2	-1.9	27	16.72
11-16-mar	1:05:08	591	3.4	1.6	-1.8	27	16.71
11-16-mar	2:05:08	591	2.4	1.3	-1.1	28	16.71
11-16-mar	3:05:08	591	2.8	1.3	-1.5	28	16.72
11-16-mar	4:05:08	591	2.5	1.4	-1.1	28	16.71
11-16-mar	5:05:08	591	2.0	0.9	-1.1	28	16.71
11-16-mar	6:05:08	591	1.7	0.5	-1.2	28	16.71
11-16-mar	7:05:08	591	3.3	1.4	-1.9	28	16.71
11-16-mar	8:05:08	591	8.5	7.0	-1.5	29	16.71
11-16-mar	9:05:08	591	9.8	10.0	0.1	30	16.71
11-16-mar	10:05:08	591	11.1	12.2	1.1	30	16.70
11-16-mar	11:05:08	590	10.5	11.5	1.0	31	16.71
11-16-mar	12:05:08	590	11.4	12.2	0.8	31	16.71
11-16-mar	13:05:08	590	11.7	12.3	0.6	31	16.71
11-16-mar	14:05:08	589	12.4	13.1	0.7	32	16.71
11-16-mar	15:05:08	589	12.4	13.0	0.5	32	16.71
11-16-mar	16:05:08	589	11.6	11.7	0.2	32	16.72
11-16-mar	17:05:08	589	10.2	9.9	-0.3	32	16.71
11-16-mar	18:05:08	589	9.0	8.4	-0.7	31	16.71
11-16-mar	19:05:08	589	6.6	6.3	-0.3	31	16.71
11-16-mar	20:05:08	589	6.4	5.5	-0.9	31	16.71
11-16-mar	21:05:08	590	7.2	5.9	-1.3	30	16.72
11-16-mar	22:05:08	590	7.4	6.3	-1.1	30	16.71
11-16-mar	23:05:08	590	7.2	6.1	-1.1	30	16.71

BGI PQ200 Air Sampling System

Downloaded 2011 24 mar 11:14:17

Job Details:

Job Name:	11Mar24C.JOB	Job Code:	
Version:	5.62	Site Name:	964c
Serial No:	964	Station Code:	
Pump Time:	183:07	Operators:	kn
Flags:		User1:	
		User2:	

	Max	Min	Avg	Units
BP	590	583	587	mmHg
TA	4	-9.7	-2.2	°C
Q	---	---	16.7	Lpm

QCV	0.46 %
Max overheat	2 °C
occured	22-mar 06:01:43

Timer Information:

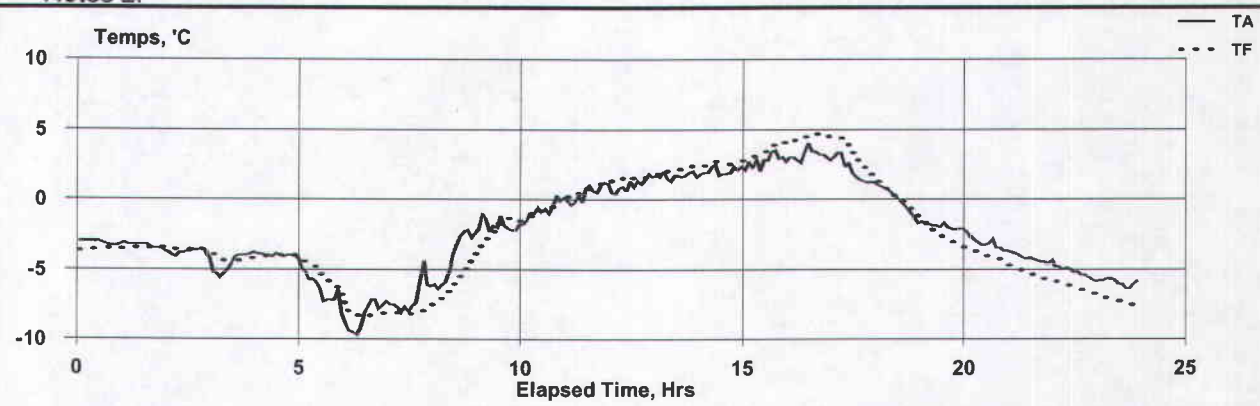
	Date dd-mmm	Time hh:mm:ss
Start:	11-22-mar	0:00:08
Stop:	11-22-mar	23:59:05
ET:	23:58	

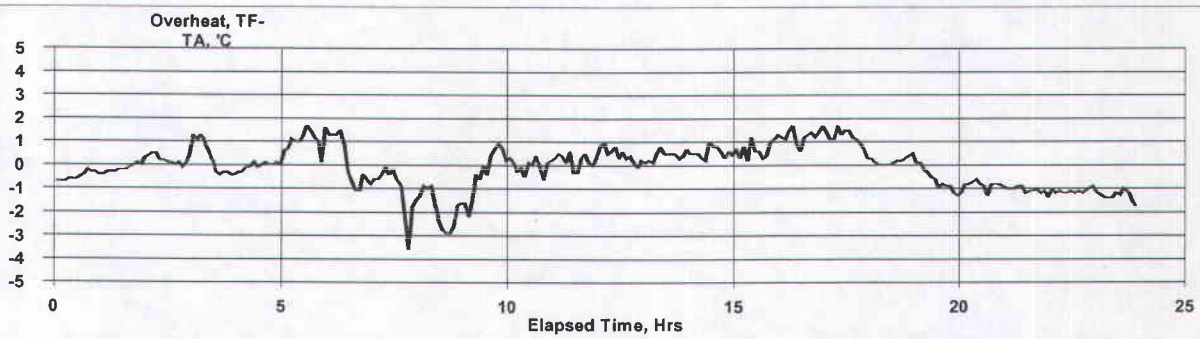
Mass Concentration Data:

Filter ID:	13	
Final Wt:		mg
Initial Wt:		mg
Delta Wt:	0.000	mg
Total Vol:	24.013	m^3
Mass Conc:	0	ug/m3

Notes 1:

Notes 2:





11-22-mar	0:05:08	585	-3.1	-3.6	-0.5	4	16.71
11-22-mar	1:05:08	586	-3.3	-3.5	-0.1	4	16.71
11-22-mar	2:05:08	586	-3.8	-3.6	0.2	4	16.71
11-22-mar	3:05:08	586	-4.6	-4.3	0.3	4	16.72
11-22-mar	4:05:08	586	-4.0	-4.1	0.0	4	16.71
11-22-mar	5:05:08	586	-6.4	-5.4	1.1	4	16.73
11-22-mar	6:05:08	587	-8.3	-8.2	0.1	4	16.72
11-22-mar	7:05:08	587	-7.0	-8.1	-1.1	4	16.71
11-22-mar	8:05:08	587	-4.1	-5.9	-1.9	4	16.71
11-22-mar	9:05:08	588	-1.8	-2.2	-0.3	5	16.72
11-22-mar	10:05:08	588	-0.7	-0.8	0.0	5	16.71
11-22-mar	11:05:08	588	0.5	0.7	0.2	5	16.69
11-22-mar	12:05:08	588	1.1	1.5	0.5	6	16.70
11-22-mar	13:05:08	588	1.7	2.1	0.4	6	16.71
11-22-mar	14:05:08	588	2.0	2.6	0.5	6	16.71
11-22-mar	15:05:08	588	2.8	3.5	0.7	6	16.71
11-22-mar	16:05:08	588	3.2	4.4	1.3	6	16.71
11-22-mar	17:05:08	588	2.0	3.2	1.2	5	16.71
11-22-mar	18:05:08	588	-0.1	0.0	0.2	5	16.71
11-22-mar	19:05:08	589	-1.9	-2.6	-0.6	4	16.71
11-22-mar	20:05:08	589	-3.2	-4.0	-0.9	4	16.72
11-22-mar	21:05:08	589	-4.3	-5.3	-1.1	4	16.70
11-22-mar	22:05:08	589	-5.3	-6.4	-1.1	4	16.71
11-22-mar	23:05:08	590	-6.0	-7.3	-1.3	4	16.71

APPENDIX B

Precision and Single-Point Flow Rate Checks

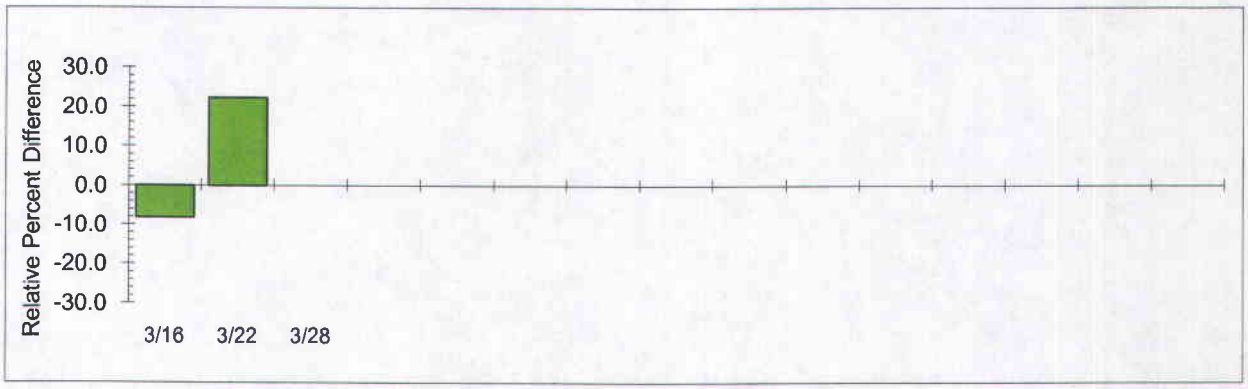
Alton Coal Development, LLC

Precision Report For Collocated Samplers

PM_{10} Concentrations ($\mu g/m^3$)
March 16, 2011 - March 31, 2011

Date	3/16	3/22	3/28											
963B	12.7	3.2	9.7											
964C	11.7	4.0												
Rel.%Diff.	**-8.2**	**22.2**	*	*	*	*	*	*	*	*	*	*	*	*

Relative Percent Difference = ((Y - X) / ((Y + X) / 2)) * 100 X=963B Y =964C



Statistical Calculations:

n=	2	S Dev=	21.5 %
Mean=	7.0	** CV=	121.0 %

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

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

One-Point Flow Rate Bias Estimate

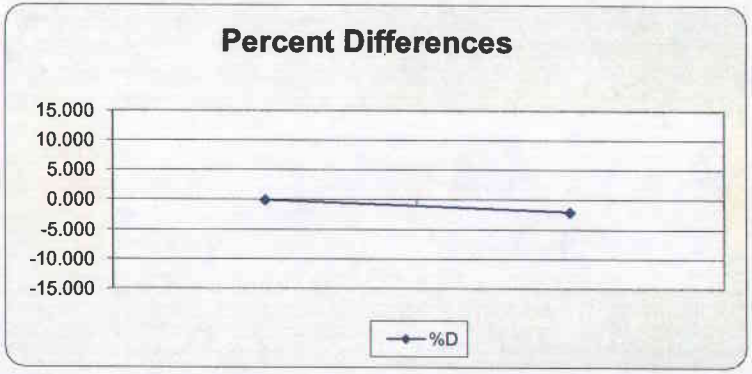
Site ID: Background Monitor 962A		Pollutant type:					Bias (%)
Meas Val (Y)	Audit Val (X)	d (Eqn. 1)	25th Percentile	d^2	|d|	$\|d\|^2$	
16.7	16.71	-0.060	-1.553	0.004	0.060	0.004	
16.72	17.07	-2.050	75th Percentile	4.204	2.050	4.204	
			-0.557				

n	$\Sigma\|d\|$	"AB" (Eqn 4)
2	2.110	1.055
n-1	$\Sigma\|d\|^2$	"AS" (Eqn 5)
1	4.208	1.408

Bias (%) (Eqn 3)	Both Signs Positive
7.34	FALSE
Signed Bias (%)	Both Signs Negative
-7.34	TRUE

Return to Main Menu

Print Worksheet



One-Point Flow Rate Bias Estimate

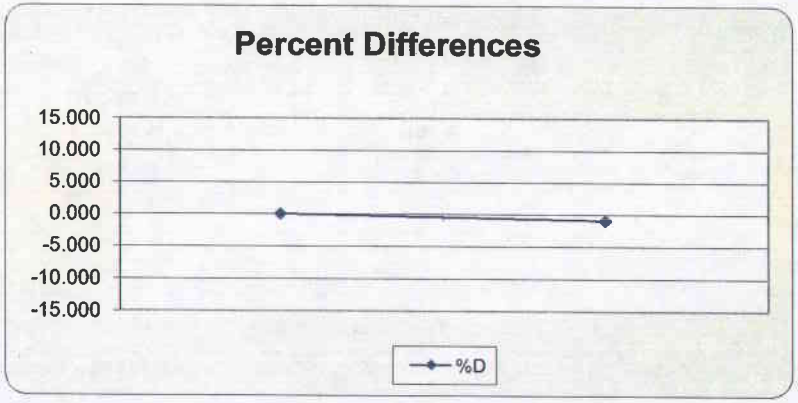
Site ID: Complaince Monitor 963B		Pollutant type:					Bias (%)
Meas Val (Y)	Audit Val (X)	d (Eqn. 1)	25th Percentile	d^2	$\|d\|$	$\|d\|^2$	
16.7	16.7	0.000	-0.668	0.000	0.000	0.000	
16.7	16.85	-0.890	75th Percentile	0.792	0.890	0.792	
			-0.223				

n	$\Sigma\|d\|$	"AB" (Eqn 4)
2	0.890	0.445
n-1	$\Sigma\|d\|^2$	"AS" (Eqn 5)
1	0.792	0.629

Bias (%) (Eqn 3)	Both Signs Positive
3.26	FALSE
Signed Bias (%)	Both Signs Negative
-3.26	TRUE

Return to Main Menu

Print Worksheet



One-Point Flow Rate Bias Estimate

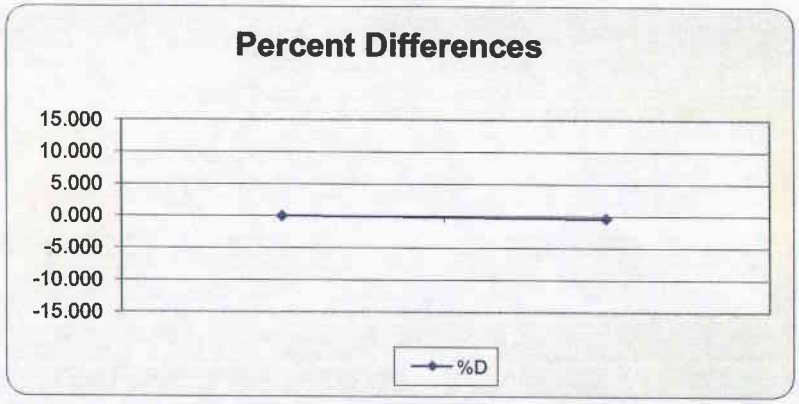
Site ID: Collocated Monitor 964C		Pollutant type:					Bias (%)
Meas Val (Y)	Audit Val (X)	d (Eqn. 1)	25th Percentile	d^2	$\|d\|$	$\|d\|^2$	
16.7	16.7	0.000	-0.268	0.000	0.000	0.000	
16.7	16.76	-0.358	75th Percentile	0.128	0.358	0.128	
			-0.089				

n	$\Sigma\|d\|$	"AB" (Eqn 4)
2	0.358	0.179
n-1	$\Sigma\|d\|^2$	"AS" (Eqn 5)
1	0.128	0.253

Bias (%) (Eqn 3)	Both Signs Positive
1.31	FALSE
Signed Bias (%)	Both Signs Negative
-1.31	TRUE

Return to Main Menu

Print Worksheet



APPENDIX C

Field Data Sheets

Background Monitor 962A

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
2-14-11	11:24am	2/14/11	11:23am		~~CH3~~	Not Good		KN
3-8-11	10:31am	3/8/11	10:30am	Not Collected	CH8	Arrived at unit, would not Power up, replaced fuse, pump came on Downloaded info. indicated start Date on 11 when fuse was replaced		
3/11/11	10:45am	3/11/11	10:45am	CH8	CH 14	Fuse blew	pint	Internal Battery
3/17/11	11:58am	3/17/11	10:57am	14	17	MM	3/22/11	KN
3/24/11	11:21am	3/24/11	10:21am	17				
3/25/11	9:34am	3/25/11	9:34am	~	5		3/28/11	
3/29/11	12:05	3/29/11	12:02	5	~~IML~~ 8	MM	4/3/11	KN
4/4/11	7:20	4/4/11	13:18	IML 8	IML 15	MM	4/9/11	
4/11/11	9:01am	4/11/11	8:59am	IML 15	14	MM	4/15/11	KN
4/18/11	9:28am	4/18/11	9:25am	14	17	MM	4/21/11	KN

Low Battery Shut down

Installed 5Au

Monthly Flow Rate Verification

A

Table I - Leak Test

Date	Time	Initial SP Value	Final SP Value	Pass/Fail	Initials
3/11/11	9:45am	98	97	Pass	KN
4/4/11	13:28	95	94	Pass	KN

Table II - 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
~~3/11/11~~	~~9:56am~~	16.70						16.71		
4/4/11	13:34	16.72	588	590	7.2°C	8.0	14.05	17.07	-0.2	KN

Accuracy = $\frac{\text{Monitor Flow Value - Delta Cal Flow (Qa)}}{\text{Delta Cal Flow (Qa)}}$ x 100

Compliance Monitor 963B

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
2-14-11	10:55a	2-14-11	10:55	[redacted]	CH1			KN
2-16-11	12:57pm	2-16-11	12:57pm	CH1	CH 84	Midnight	2/23/11	KN/KR
2-24-11	12:30PM	2-24-11	12:30 pm	CH4	CH6	M-M		KSR
3-6-11	14:35pm	3-6-11	14:35 pm	CH6	CH9	MM	3/10/11	KN
3-11-11	13:50pm	3-11-11	13:50 pm	CH9	CH11	MM	3/16/11	KN
3-17-11	11:16am	3-17-11	10:15am	CH11	[redacted] 15	MM	3/25/11	KN
3/24/11	12:21pm	3/24/11	11:21pm	15				KN
3/25/11	11:15am	3/25/11	11:15am	[redacted]	6		3/28	KN
3/29/11	13:05	3/29/11	13:05	6	TML12	M-M	4/5	KN
4/4/11	15:00	4/4/11	15:00	TML 17	TML 25	M-M	4/9	KN
4/11/11	9:56am	4/11/11	9:56am	TML 25	[redacted] 15	M-M	4/15/11	KN

Monthly Flow Rate Verification

B

Table I - Leak Test

Date	Time	Initial SP Value	Final SP Value	Pass/Fail	Initials
3/8/11	4:05pm	95	95	Pass	KN
4/4/11	15:06	98	97	Pass	KN

Table II - 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
		16.70						16.71		
4/4/11	15:09	16.70	59~~4~~	595	10.3°C	10.9	13.84	16.85	-0.01	KN

Accuracy = $\frac{\text{Monitor Flow Value - Delta Cal Flow (Qa)}}{\text{Delta Cal Flow (Qa)}}$ x 100

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
2/14/11	11:06am	2/14/11	11:06am		CH2			
2/22/11	12:34am	2/22/11	12:34am	CH2	CH5	midnight	2/23/11	KN/JK
2-24-11	12:35pm	2-24-11	12:35pm	CH5	CH7	M-M		QKS/R
2-26-11	14:39pm	3-6-11	14:39pm	CH7	CH10	M-M	3/10	KN
3-11-11	14:03	3-11-11	14:01pm	CH10	CH12	M-M	3/16	KN
3-17-11	11:17am	3-17-11	10:06am	12	13	M-M	3/22	KN
3-24-11	12:26am	3-24-11	11:26am	13				KN
3-25-11	11:20am	3-25-11	11:20am	[illegible]	7	MM	3/28	KN
~~3-29-11~~	~~1:05pm~~	~~3-29-11~~	~~13:05~~	~~6~~	~~EML12~~	~~MM~~	~~4/3~~	~~KN~~
3-29-11	13:12	3-29-11	13:11	7	EML11	MM	4/3	KN
4-4-11	15:02	4-4-11	15:02	EML11	EML26	MM	4/9	KN
4-11-11	10:09	4-11-11	10:09	EML26	16	MM	4/15	KN

Monthly Flow Rate Verification

C

Table I - Leak Test

Date	Time	Initial SP Value	Final SP Value	Pass/Fail	Initials
3/8/11	3:22pm	98	96	Pass	KN
4/4/11	15:19	100	99	Pass	KN

Table II - 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
<		16.70						16.70		
4/4/11	15:25	16.70	594	596	10.9°C	11.2	13.72	16.76	-0.3	KN
e II										

$$\text{Accuracy} = \frac{\text{Monitor Flow Value - Delta Cal Flow (Qa)}}{\text{Delta Cal Flow (Qa)}} \times 100$$

APPENDIX D

Independent PM_{10} Sampler Performance Audit Report

ALTON COAL DEVELOPMENT

PM_{10} SAMPLER AUDIT REPORT

Date: April 19, 2011

Prepared for:

Alton Coal Development
463 North 100 West, Suite 1
Cedar City, UT
Contact: Kirk Nicholes

Prepared by:

Applied Environmental Consultants
1553 W. Elna Rae, Ste. 101
Tempe, Arizona 85281
Contact: Thitipong (Jeep) Chindavijak
480.829.0457

MAY 4, 2011

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1. INTRODUCTION

This report summarizes the results of the audit of the three BGI PQ200 Samplers (measuring PM_{10}) for the Alton Coal Development (Alton) Monitoring Stations near the Coal Hollow Surface Coal Mine. The audit was conducted by Applied Environmental Consultants (AEC) on April 19, 2011 at both stations. The Compliance Monitoring Station (963B) and the Collocated Monitoring Station (964C) are located near the road, northwest of the Alton property. The Background-A Monitoring Station is located to the northeast, well beyond the property boundary.

The Alton particulate matter monitoring system consists of two collocated BGI PQ200 to collect PM_{10} samples at the Primary Station, and one BGI PQ200 to collect PM_{10} samples at the Background-A Station. The sampler inlets are located approximately 3 meters above the ground. The BGI PQ200 samplers are designed to operate at a flow rate of 16.7 actual liters per minute (alpm). All three samplers must meet flow rate criteria in relation to the design flow rate and the flow rate reported by an NIST-traceable device.

2. AUDIT PROCEDURES

The purpose of the audit is to determine the accuracy of the PM_{10} monitoring systems. Audit criteria and detailed audit procedures are presented below.

2.1 AUDIT CRITERIA

The audit criteria and applicable guidelines used to evaluate the PM_{10} monitoring systems are presented in Table 2.1.

2.2 BGI PQ200 SAMPLERS

The audit is performed according to the guidelines described in the *EPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II, Ambient Air Quality Monitoring Program, December 2008,* and *the PQ200 Instruction Manual, Section 3.* The audit employs a BGI deltaCal audit thermometer, barometer, and flow device with an audit traceable to NIST standards. An audit certificate for the device is located in Appendix B.

The audit consists of a general inspection of the physical condition of the equipment, followed by four audit procedures:

- ambient temperature sensor check
- filter temperature sensor check
- barometric pressure sensor check
- flow rate check

These procedures are discussed in Sections 2.2.1 through 2.2.4 below.

2.2.1 *Ambient Temperature Sensor Check*

The deltaCal was previously certified to an NIST-traceable (see Appendix B). The sampler flow inlet was removed and replaced with the deltaCal inlet. A paired measurement on the audit device and the sampler were taken. The absolute error of the sensor response was then calculated. The difference was within 2°C, indicating that the sensor is working properly.

2.2.2 *Filter Temperature Sensor Check*

The filter temperature sensor check compared the filter temperature, measured by the sampler, with the filter temperature measured with the transfer standard. The temperature probe (attached to the deltaCal) was inserted into the filter compartment and the temperature was allowed to stabilize. A paired measurement on the audit device and the sampler were taken. The absolute error of the sensor response was then calculated. The difference was within 2°C, indicating that the sensor is working properly.

2.2.3 *Pressure Sensor Check*

The deltaCal inlet was installed on the sampler, as with the ambient temperature sensor check. A paired measurement on the audit device and the sampler were taken. The difference was within 10 mm Hg, indicating that the sensor is working properly.

2.2.4 *Flow Rate Check*

The flow rate check compares the actual flow rate of the sampler, measured by the deltaCal, with the flow rate measured by the sampler.

The first step of the audit flow rate check was to install a clean filter. This was followed by removal of the sampler inlet and the installation of the deltaCal inlet (as with the ambient temperature and pressure sensor checks). The sampler was turned on and allowed to warm up for 5 minutes. After the motor reached its normal operating temperature, the flow rate reported by the deltaCal and the sampler were recorded.

A paired measurement of the flow rate reported by the deltaCal, Q_{TS}, and the sampler, Q_S, were compared. The absolute error of the sensor response was then calculated. Q_S was within 4% of Q_{TS}, indicating that the sampler is working properly.

Table 2.1 Performance Audit Criteria

Parameter	Method	Reference	Limit(s)
BGI PQ200			
1. Temperature	Stable mass comparison with NIST-traceable thermometer.	Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II	± 2.0 °C temperature error
2. Barometric Pressure	Single-point comparison with NIST-traceable audit barometer.	Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II	≤ 10 mm Hg error
3. Flow Rate	Flow comparison with NIST-traceable calibrator.	Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II	± 4% flow error

3. SUMMARY AUDIT RESULTS

The results of the audit are presented in Table 3.1. The audit worksheets are included in Appendix A. These values are within the acceptable range described in Section 2.

Alton personnel perform regularly scheduled maintenance on the samplers, including regular cleaning of the inlet.

Table 3.1 Audit Results

	Pass/Fail Criteria	deltaCal	Sampler	Difference	Pass/Fail	deltaCal	Sampler	Difference	Pass/Fail
		Primary Monitoring Site							
		Compliance Monitor (963B)				Collocated Monitor (964C)			
Temperature (°C)									
Inlet	<±2	14.4	14.9	-0.5	Pass	13.4	13.2	0.2	Pass
Filter	<±2	14.9	14.2	0.7	Pass	13.9	13.8	0.1	Pass
Pressure (mmHg)	≤10	590	588	2	Pass	588	589	-1	Pass
Flow Rate (LPM)	<±4%	16.45	16.70	1.5%	Pass	16.47	16.70	1.4%	Pass
		Background-A Monitoring Site							
		Background Monitor (962A)							
Temperature (°C)									
Inlet	<±2	12.0	12.5	-0.5	Pass				
Filter	<±2	12.3	12.3	0.0	Pass				
Pressure (mmHg)	≤10	584	582	2	Pass				
Flow Rate (LPM)	<±4%	16.72	16.67	-0.3%	Pass				

N/A: Not Applicable

APPENDIX A

SAMPLER AUDIT WORKSHEETS

BGI PQ200 PM_{10} & $PM_{2.5}$ SAMPLER AUDIT REPORT FORM

Part A: General Information

Project Name:	Alton	Date:	4/19/2011
Site ID:	Primary	Sampler SN:	963B
Location:	Primary	Technician:	Thitipong Chindavijak

Test Device Make / Model:	BGI / deltaCal	SN:	844

Current Date:	4/19/2011	Current Time:	13:12	Sampler Date:	4/19/2011	Sampler Time:	13:12

Part B: Temperature Sensor Calibration

Audit Test Point	Reference Thermometer °C		Sampler Temperature °C		Difference (Ref - Sample) °C		Pass/Fail	
	Inlet	Filter	Inlet	Filter	Inlet	Filter	Inlet	Filter
1	14.4	14.9	14.9	14.2	-0.5	0.7	PASS	PASS

Part C: Barometric Pressure Sensor Calibration

Audit Test Point	Reference Pressure mmHg	Sampler Pressure mmHg	Difference (Ref - Sample) mmHg	Pass/Fail
1	590	588	2	PASS

Part D: Sampler Flow Rate Calibration (Note: Complete the Temp. and Press. cals PRIOR to the Flow Rate cal.)

Leak Check Passed?	Passed

Audit Test Point	Reference Flow Rate LPM	Sampler Flow Rate LPM	Difference (Ref - Sample) LPM	Pass/Fail
1	16.45	16.70	-0.25	PASS

Notes / Comments:

BGI PQ200 PM_{10} & $PM_{2.5}$ SAMPLER AUDIT REPORT FORM

Part A: General Information

Project Name:	Alton	Date:	4/19/2011
Site ID:	Collocated	Sampler SN:	964C
Location:	Collocated	Technician:	Thitipong Chindavijak

Test Device Make / Model:	BGI / deltaCal	SN:	844

Current Date:	4/19/2011	Current Time:	12:52	Sampler Date:	4/19/2011	Sampler Time:	12:52

Part B: Temperature Sensor Calibration

Audit Test Point	Reference Thermometer °C		Sampler Temperature °C		Difference (Ref - Sample) °C		Pass/Fail	
	Inlet	Filter	Inlet	Filter	Inlet	Filter	Inlet	Filter
1	13.4	13.9	13.2	13.8	0.2	0.1	PASS	PASS

Part C: Barometric Pressure Sensor Calibration

Audit Test Point	Reference Pressure mmHg	Sampler Pressure mmHg	Difference (Ref - Sample) mmHg	Pass/Fail
1	588	589	-1	PASS

Part D: Sampler Flow Rate Calibration (Note: Complete the Temp. and Press. cals PRIOR to the Flow Rate cal.)

Leak Check Passed?	Passed

Audit Test Point	Reference Flow Rate LPM	Sampler Flow Rate LPM	Difference (Ref - Sample) LPM	Pass/Fail
1	16.47	16.70	-0.23	PASS

Notes / Comments:

BGI PQ200 PM_{10} & $PM_{2.5}$ SAMPLER AUDIT REPORT FORM

Part A: General Information

Project Name:	Alton	Date:	4/19/2011
Site ID:	Background-A	Sampler SN:	962A
Location:	Background-A	Technician:	Thitipong Chindavijak

Test Device Make / Model:	BGI / deltaCal	SN:	844

Current Date:	4/19/2011	Current Time:	11:54	Sampler Date:	4/19/2011	Sampler Time:	11:54

Part B: Temperature Sensor Calibration

Audit Test Point	Reference Thermometer °C		Sampler Temperature °C		Difference (Ref - Sample) °C		Pass/Fail	
	Inlet	Filter	Inlet	Filter	Inlet	Filter	Inlet	Filter
1	12.0	12.3	12.5	12.3	-0.5	0.0	PASS	PASS

Part C: Barometric Pressure Sensor Calibration

Audit Test Point	Reference Pressure mmHg	Sampler Pressure mmHg	Difference (Ref - Sample) mmHg	Pass/Fail
1	584	582	2	PASS

Part D: Sampler Flow Rate Calibration (Note: Complete the Temp. and Press. cals PRIOR to the Flow Rate cal.)

Leak Check Passed?	Passed

Audit Test Point	Reference Flow Rate LPM	Sampler Flow Rate LPM	Difference (Ref - Sample) LPM	Pass/Fail
1	16.72	16.67	0.05	PASS

Notes / Comments:

APPENDIX B

CERTIFICATION DATA FOR DELTACAL

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

deltaCal

CERTIFICATE OF CALIBRATION - NIST TRACEBILITY

(Refer to instruction manual for further details of calibration)

deltaCal Serial Number: 000844 DATE 4-Jan-11

Calibration Operator: YI TIAN

Critical Venturi Flow Meter: Max Uncertainty = 0.346%
Serial Number: 1 *CEESI NVLAP NIST Data File 01BGI002*
Serial Number: 2 *CEESI NVLAP NIST Data File 01BGI003*
Serial Number: 4 *CEESI NVLAP NIST Data File 02BGI004*

Room Temperature : Uncertainty = 0.071% Room Temperature: 22.8 C
Brand: *Ertco* Serial Number: 9216
NIST Traceability No. 516837
deltaCal:
Ambient Temperature (set): 22.8 C
Aux (filter) Temperature (set): 22.8 C

Barometric Pressure and Absolute Pressure
Vaisala Model PTB330(50-1100) Digital Accuracy: 0.019%
S/N C4310002
NIST Traceable (Princo Primary Standard Model 453 S/N W12537) Certificate No. P-7485
deltaCal:
Barometric Pressure (set): 756.98 mm of Hg

Results of Venturi Calibration

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

Q= 4.05402 ΔP ^ 0.52248

Overall Uncertainty: 0.35%

Date Placed In Service 1/13/11
(To be filled in by operator upon receipt)

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

Revised: June 2008

To Check a deltaCal 4-Jan-11 YT

1.5-19.5 VER 2.56

Mbar= 1009.22

mm of Hg 756.98

Maximum allowable error at any flow rate is .75%. Room Temp= 22.8 C

Serial No. 844

Venturi	Reading Abs. P Crit. Vent. MB	Reading Abs. P Crit. Vent. mm of Hg	Crit. Vent. Temp	Q 720/20 Flow Lpm	QA Flow Lpm	QA Delta Cal Indicated	% Error
# 2	239.67	179.8	21.80	2.01	2.04	2.05	0.39
	687.74	515.8	21.80	5.87	5.95	5.93	-0.34
# 1	341.91	256.5	21.80	10.12	10.26	10.19	-0.70
	462.97	347.3	21.80	13.76	13.95	13.91	-0.28
	626.16	469.7	21.80	18.67	18.92	18.98	0.32
						Average %	-0.12