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March 14, 2013

WY Department of Environmental Quality
Air Quality Division
Stationary Source Compliance Program Manager
122 West 25th Street
Cheyenne, WY 82002

RE: Black Thunder Mine - Air Quality Permit MD #10986 – March 4, 2013 exceedance of the 24 hour PM10 Standard

Dear Ms Cara Keslar

Black Thunder Mine, operating under Permit No. MD-10986, would like to notify the WY Department of Environmental Quality, AQD that we had an exceedance of the 24 hour PM10 Standard at our Section 36 TEOM monitor on March 4, 2013. The recorded 24 hour Average PM Concentration (STP) reading was 166.6$\mu g/m^3$.

This exceedance was directly related to an exceptional event caused by high winds, Black Thunder's metrological stations recorded very high winds during the day. The Administration metrological station recorded hourly readings in excess of 20 mph for 13 consecutive hours with a maximum hourly average speed in excess of 34 mph. The Section 12 metrological station recorded hourly readings in excess of 20 mph for 15 consecutive hours with a maximum hourly average speed in excess of 42 mph. The Section 12 met station also equipped to record hourly gusts showed 24 hourly readings in excess of 20 mph, with 8 consecutive hourly readings being in excess of 50 mph. Black Thunder Mine will be filing an Exceptional Event Package, requesting that this monitored data be flagged as influenced by an Exceptional Event.

If you have any questions in regards to this exceedance and/or natural events package please contact me at your earliest convenience at (307) 464-2383 or e-mail me at dkline@archcoal.com.

Sincerely

David Kline
Environmental Engineer

CC: Tanner Shatto
Kirk Billings
Per-14-2-2-28-2

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April 2, 2013

WY Department of Environmental Quality
Air Quality Division
Stationary Source Compliance Program Manager
122 West 25th Street
Cheyenne, WY 82002

RE: Black Thunder Mine - Air Quality Permit MD #10986 – NEAP/Exceptional Event Demonstration

Dear Ms Cara Keslar

On March 14, 2013, Black Thunder Mine (BTM) notified the WY Department of Environmental Quality, Air Quality Division that we had an exceedance of the 24 hour PM_{10} NAAQS at our 36 Site TEOM on March 4, 2013. BTM, is currently operating under Permit No. MD-10986. Due to extremely high winds on March 4th, this exceedance should be classifies as an exceptional event and the data flagged in the AQS data base. Attached you will find an exceptional event demonstration for the March 4th exceedance.

This exceedance was directly related to an exceptional event caused by high winds. As the package demonstrates, BTM's meteorological stations recorded extreme winds the majority of the day, well in excess of 20 mph, which classify as a high wind event.

This package documents that the event satisfies the criteria as set forth in 40 CFR §50.1(J). The package also provides documentation that BTM had BACM controls in place at the time of the event. BTM also implemented additional reactionary control measures, including shutting down major equipment at the mine. However due to the extreme high winds these control measures were overwhelmed and an exceedance occurred which should be flagged an exceptional event

If you have any questions in regards to this exceedance and/or our NEAP-Exceptional Event package please contact me at your earliest convenience at (307) 464-2383 or e-mail me at dkline@archcoal.com.

Sincerely

David Kline
Environmental Engineer
CC: Tanner Shatto
Kirk Billings
Per-14-2-2-28-2

Thunder Basin Coal Co., LLC.
Black Thunder Mine
P.O. Box 406
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BLACK THUNDER MINE

DEMONSTRATION OF EXCEPTIONAL EVENT – HIGH WINDS

36 SITE PM_{10} MONITOR

Prepared for

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

AIR QUALITY DIVISION

April 2, 2013

ArchCoal™

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INTRODUCTION

The Air Quality Division (AQD) of Wyoming Department of Environmental Quality (DEQ) requires Thunder Basin Coal Company, LLC (TBCC) to operate an approved ambient PM_{10} monitoring network at its Black Thunder Mine (BTM) to demonstrate compliance with the PM_{10} NAAQS, codified at Chapter 2, Section 2 of the Wyoming Air Quality Standards and Regulations (WAQSR). On March 4, 2013, one of BTM's ambient PM_{10} monitors near the mine measured a 24-hour average concentration of 166.6 $\mu g/m^3$. This is an exceedance of the 24-hour national ambient air quality standard (NAAQS) for PM_{10}. The purpose of this document is to demonstrate that this measured exceedance was caused by a high wind event.

BACKGROUND

TBCC operates the Black Thunder Mine, a surface coal mine located in the Power River Basin (PRB) approximately 12 miles southeast of Wright, Wyoming and having a physical address of 5669 Hwy 450 Wright, WY 82732. As shown in Exhibit 2, BTM has three major pit systems: the North Pits, the South Pits and the West Pits. The major mining equipment utilized at BTM includes 6 draglines, 19 coal and overburden shovels, 6 large-capacity loaders and a fleet of 146 haul trucks with a capacities ranging from 240 tons to 360 tons. BTM also operates a fleet of 19 water trucks and a large fleet of support equipment including dozers, scrapers, graders, loaders, service trucks and light-duty vehicles.

In 2007 DEQ began implementation of a Natural Events Action Plan (NEAP) for coal mines of the PRB. Based on the U.S. Environmental Protection Agency's (EPA's) Natural Events Policy, PRB's NEAP recognizes that high ambient concentrations of PM_{10} may be caused by an uncontrollable natural event that results in particles such as fugitive dust or smoke becoming entrained in ambient air. The NEAP further provides that a measured exceedance of an ambient PM_{10} standard in the PRB due to such events need not be considered, i.e., may be "excluded" when characterizing ambient PM_{10} levels in that area, provided the measured exceedance is demonstrated to be caused by a natural event. Finally, for a measured exceedance to be caused by a natural event, the NEAP requires that any anthropogenic sources of dust contributing significantly to the measured PM_{10} exceedance must have been controlled during that event by a three-tiered program of control measures consisting of best available control technology (BACT), best available control measures (BACM) for disturbed surface areas, and appropriate, source-specific reactionary control measures for mining operations.

Also in 2007, EPA promulgated its Exceptional Events Rule (EER). Under the EER, a demonstration that a NAAQS exceedance was caused by an exceptional event must show that:

1. The event satisfies the criteria set forth in 40 C.F.R. § 50.1(j) that:
    a. The event affects air quality;
    b. The event is not reasonably controllable or preventable;
    c. The event is caused by human activity that is unlikely to recur at a particular location of the event is a natural event; and
    d. The event is determined by the Administrator in accordance with 40 C.F.R. § 50.14 to be an exceptional event.
2. There is a clear causal relationship between the measurement under consideration and the event that is claimed to have affected the air quality in the area;
3. The event is associated with a measured concentration in excess of normal historical fluctuations including background; and
4. There would have been no exceedance or violation but for the event.

EPA issued a draft guidance in 2012 to assist States in their administration of the EER by providing examples of how each of the above elements of an exceptional event may be demonstrated.

DEMONSTRATION Of EXCEPTIONAL EVENT At BTM On March 4, 2013

On March 4, 2013, BTM's ambient PM_{10} monitor designated as 36 Site TEOM recorded a 24-hour average PM_{10} concentration of 166.6 µg/m^3, thereby exceeding the ambient 24-hour PM_{10} standard of 150 µg/m^3. The purpose of this document is to provide documentation that this monitored exceedance was caused by an exceptional event (high winds). TBCC's conclusion that this exceedance was due to a high wind event follows from a weight-of-evidence analysis as suggested by EPA. Consistent with EPA's policy that the appropriate level of supporting documentation for an exceptional event demonstration will vary on a case-by-case basis. TBCC strongly believes the documentation and analyses provided herein are more than sufficient to demonstrate that the exceedance in question was truly caused by a high wind event and this 24-hour PM_{10} concentration should be flagged in the AQS data base.

A. General Description Of The Event (Abstract)

TBCC's 36 Site TEOM recorded a 24-hour average concentration which was above the 24-hour average NAAQS for PM_{10}. On that day very high winds with hourly averages over 20 miles per hour (mph), were recorded at our Section 12 meteorological (Met) Station for 15 consecutive hours. Of the three

meteorological monitoring sites BTM maintains, the Section 12 Met Station is the most representative of the meteorological conditions at the 36 Site TEOM.

During the very early morning hours, the average hourly wind speeds varied, ranging from 15 mph to just under 20 mph, and during this time the hourly PM_{10} concentrations at the 36 Site TEOM monitor were relatively low. As the winds speeds increased to about 30 mph we started seeing increased concentrations at our 36 Site TEOM. As the wind speeds increased to excess of 40 mph, the concentrations at the 36 Site TEOM increased dramatically, making it impossible for BTM to control the concentrations being recorded.

Disturbed and final topsoil laydown areas north of highway 450 were identified as the major source of fugitive emissions that were reaching the monitor, during the high wind event. BACM and BACT measures which are constantly implemented as mining progresses at BTM, were current and in place as required by our air permit. When hourly concentrations reached high level alarm status, BTM began implementing reactionary control measures and continued to add control measures which included curtailing of a lot of the mining activities throughout the mine. The significant reduction of mining activities and production coupled with existing BACM and BACT controls appeared to have little to no discernible impact on hourly concentrations at the 36 Site Monitor, until such time as the wind speeds also began to decrease.

No correlation appeared to exist between our mining activities and the 36 site concentrations at the elevated wind speeds. Alternatively, there was a very strong correlation between wind speed recorded and the hourly concentrations recorded at the 36 Site TEOM monitor, when wind speeds were in excess of 20 mph. Analysis of recent historical data shows that when the wind direction and production configuration are very similar to the event day but the winds speeds are much lower, the concentration recorded at the 36 Site TEOM monitor are also much lower. These observations and investigations lead to the conclusion that on March 4, 2013, the 15 hours of consecutive winds in excess of 20 mph overwhelmed the BACT, BACM and the reactionary controls implemented by BTM.

The following detailed analysis provides data, observations and recorded actions associated with each of the findings listed above. When all the data that is provided below is analyzed with a weight-of-evidence approach, it is clear that the exceedance recorded at the 36 Site TEOM monitor is the direct result of high winds on that day, or a natural and exceptional event.

B. The March 4, 2013 Event Was A High Wind Event

While developing the NEAP for PRB coal mines, AQD commissioned a study of the relationship between meteorological conditions and ambient PM_{10} concentrations in the PRB. Among other things, that study found that the influence of wind speed on PM_{10} concentrations in the PRB increases as wind speed increases. In particular, that study found that wind speed is the dominant predictor of ambient PM_{10} concentrations in the PRB at wind speeds in excess of 20 mph.

According to DEQ, a "high wind event" occurs in the PRB "when hourly average wind speeds reach or exceed 20 mph". EPA has explained further that "generally, the EPA will accept that high winds could be the cause of a high 24-hour average PM_{10} or $PM_{2.5}$ concentration if there was at least one full hour in which the hourly average wind speed was above the area-specific high wind threshold."

BTM maintains three meteorological sites, the Section 12 Met Site is located about 9200 feet south of the 36 Site TEOM, the Admin Met Site is located about 29,000 feet northwest of the site and the JRM site is located northwest of the site by 55,000 feet as shown on Exhibit 2. Because of the Section 12 Met Site's proximity to the 36 Site TEOM, this monitor's wind measurements are generally the most representative of the winds experienced at the 36 Site TEOM. Table 1 identifies the hourly average wind speeds measured at the three sites on March 3-5, 2013.

Table 1, shows that hourly average wind speeds exceeded 20 mph for 15 consecutive hours at the Section 12 Met Site, 13 consecutive hours at the Admin Met Site and 20 consecutive hours at the JRM Site for the day. Because wind speeds equaled or exceeded 20 mph the majority of the day, a high wind event, by definition, clearly occurred at BTM on March 4th.

C. Evidence Indicates That High Winds Caused The PM_{10} Exceedance

1. Spatial Relationship

Exhibit 3 illustrates the location of the 36 Site TEOM which recorded the exceedance relative to BTM's various emission source areas having the potential to contribute to the measured PM_{10} levels at that monitor. This Exhibit also shows the other particulate monitor locations relative to the mining operations. With a monitoring network designed to monitor localized mining impacts, it is evident that the likely contributors to a PM_{10} monitor's measurements during a high wind event are the particular source areas which are located upwind of that monitor, especially during the specific hours in which the high winds occurred.

Table 1

BTM Meteorological and PM_{10} Data for March 3, 2013 thru March 5, 2013

Date	Time	Sec. 12 TEOM Hourly PM_{10} Conc. (STP µg/m^3)	JR-5 TEOM Hourly PM_{10} Conc. (STP µg/m^3)	Sec. 36 TEOM Hourly PM_{10} Conc. (STP µg/m^3)	Sec 12 Met station avg. hourly wind speed (mph)	Sec 12 Met station max. hourly wind gust (mph)	Sec 12 Met station wind direction (degrees)	Admin Met station avg. hourly wind speed (mph)	JRM Met station avg. hourly wind speed (mph)
3-Mar-13	100	12.3	10.9	11.8	5.1	11.2	198	4.7	6.8
3-Mar-13	200	10.4	25.4	13.2	11.9	19.9	204	8.4	9.7
3-Mar-13	300	13.8	33.6	11.4	12.4	18.9	205	4.4	9.7
3-Mar-13	400	10.1	24.1	12.1	12.2	24.1	234	5.2	8.8
3-Mar-13	500	9.2	7.4	17.6	12.2	26.9	287	4.6	7.3
3-Mar-13	600	10.2	5.9	32.4	6.5	10.5	285	4.4	6.7
3-Mar-13	700	12.1	6.7	47.5	6.8	8.9	267	5.4	11.9
3-Mar-13	800	20.9	5.9	18	7.4	13.4	282	7.5	10.9
3-Mar-13	900	25.8	12.2	14.7	7.4	12.6	277	6	10
3-Mar-13	1000	7.3	15.3	32.3	14.9	23.7	259	9	9.6
3-Mar-13	1100	5.7	4.2	29	18.7	25.6	257	12.7	14
3-Mar-13	1200	5.8	1.9	17.7	15.6	25.7	257	8.8	13.7
3-Mar-13	1300	3.6	4.3	10.2	18.4	29.9	268	9.4	12.2
3-Mar-13	1400	4.5	1.3	7.5	16.1	25.3	269	9	10
3-Mar-13	1500	5.2	6.1	17.3	18.8	31.2	265	12.9	13.3
3-Mar-13	1600	28.1	1.6	31.1	24.2	33.5	249	13.5	9.3
3-Mar-13	1700	27.7	10.9	27.2	26.1	39.9	251	19	18.8
3-Mar-13	1800	25.6	14.5	10.8	19.7	30.2	250	15.1	19.3
3-Mar-13	1900	11.3	30.6	9.8	22.1	34.2	249	14.9	16.3
3-Mar-13	2000	447.2	98.6	574.4	31.2	49.2	310	27.2	39.1
3-Mar-13	2100	71.9	39.5	57.3	28.1	45.3	332	25.5	35.9
3-Mar-13	2200	28.2	5.2	26.3	28.3	42.5	332	20.1	34
3-Mar-13	2300	18.4	16.8	24.4	24.6	35.7	332	17.8	28.5
3-Mar-13	2400	11.1	24	16.1	21.8	33.6	333	19.9	21.5
4-Mar-13	100	12.6	6.6	13.6	18	27.1	319	15	18.6
4-Mar-13	200	9.2	2.9	12.3	16.4	24.4	315	13.2	17.4
4-Mar-13	300	6.5	3.4	13.9	15.8	21.9	312	8.1	13.2
4-Mar-13	400	15.4	19.4	7.8	15.1	26.7	319	12.6	21
4-Mar-13	500	15	11.8	21.4	19.8	31.1	309	13.6	24.8
4-Mar-13	600	23.7	9.6	14.3	20.9	33.1	312	17.8	23.6
4-Mar-13	700	31.7	17.7	13.7	23.7	37.3	318	15.6	24.8
4-Mar-13	800	100.7	18.7	134.7	29.1	45	318	24.2	30.4
4-Mar-13	900	178.4	61.1	235.2	34.1	51.6	317	26.1	36.5
4-Mar-13	1000	463.8	119.2	1064.1	40.8	59.2	316	34.8	39.7
4-Mar-13	1100	150.7	97.8	533.9	41.5	55.5	314	29.5	37.5
4-Mar-13	1200	135.9	93.9	460	42	56.6	314	30.3	40.1
4-Mar-13	1300	154.6	177.7	395.9	39.3	54.4	315	28.7	31.3
4-Mar-13	1400	264	113	358.9	41.5	57.7	318	31.3	39
4-Mar-13	1500	181.5	115.3	202.6	37.6	54	322	28.7	40
4-Mar-13	1600	119.9	148.4	255.2	34.4	53.1	316	29.9	38.3
4-Mar-13	1700	104.4	109.7	138	31.2	46.7	320	29.5	35.7

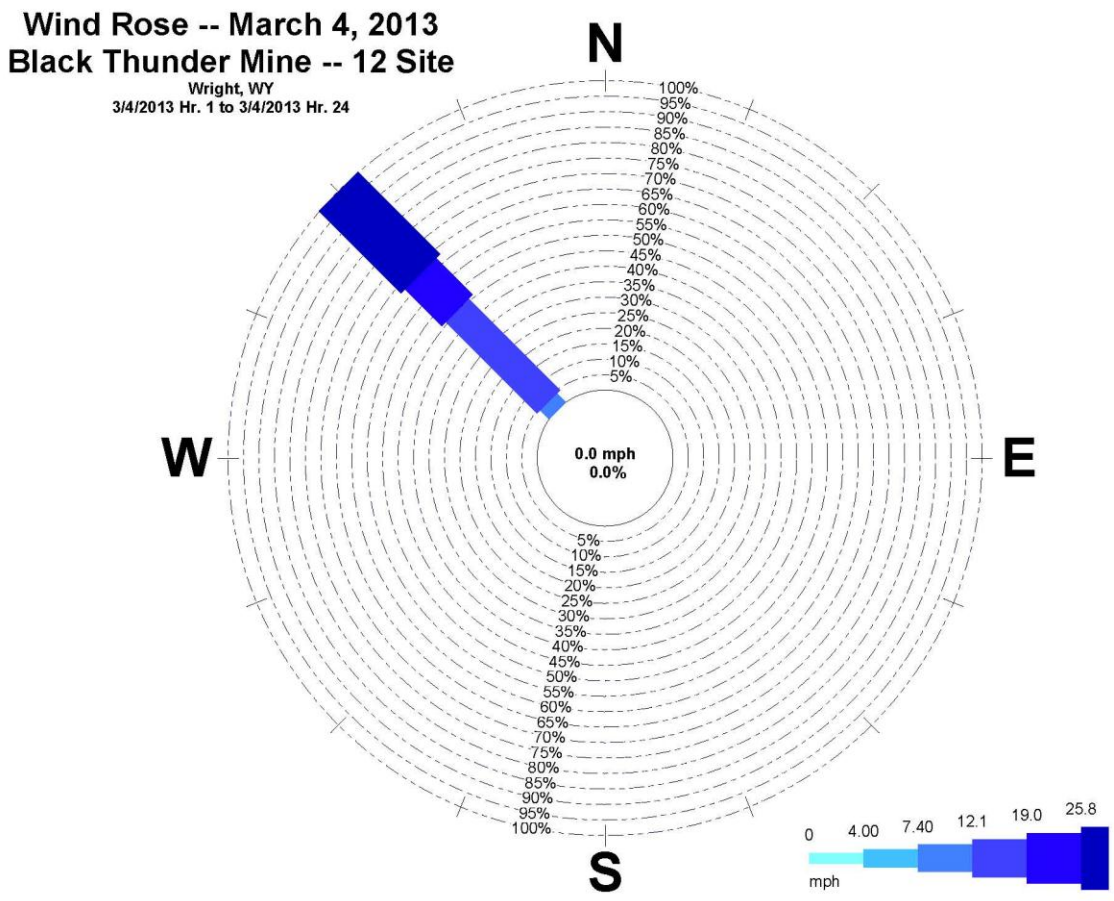
Table 1

BTM Meteorological and PM_{10} Data for March 3, 2013 thru March 5, 2013

Date	Time	Sec. 12 TEOM Hourly PM_{10} Conc. (STP µg/m^3)	JR-5 TEOM Hourly PM_{10} Conc. (STP µg/m^3)	Sec. 36 TEOM Hourly PM_{10} Conc. (STP µg/m^3)	Sec 12 Met station avg. hourly wind speed (mph)	Sec 12 Met station max. hourly wind gust (mph)	Sec 12 Met station wind direction (degrees)	Admin Met station avg. hourly wind speed (mph)	JRM Met station avg. hourly wind speed (mph)
4-Mar-13	1800	37.8	19.9	56.7	30	44.6	324	24.8	33.3
4-Mar-13	1900	33.1	40.7	17.6	25.3	38.9	323	22.7	33.3
4-Mar-13	2000	44.3	26.1	108.8	28.1	39.7	321	20.2	31.6
4-Mar-13	2100	20.1	5.8	11.6	18.5	30.2	322	13	28
4-Mar-13	2200	15.1	5.9	8.3	19.3	27.8	318	13.8	24.9
4-Mar-13	2300	22.6	14	25.7	20	28.6	313	16	20
4-Mar-13	2400	12.6	14.6	35.3	18.3	29	319	14.6	16.9
5-Mar-13	100	10.9	6.5	16.4	16.1	25.2	312	11.1	14
5-Mar-13	200	9.1	3.8	17.4	12.3	17.9	307	10	10.8
5-Mar-13	300	18.7	2.9	12.6	6.9	11.7	330	4.8	8.9
5-Mar-13	400	14.4	5.1	27.9	4.7	9.5	279	4.8	6
5-Mar-13	500	5.4	6.3	13.5	4.7	8.6	290	4.8	6.6
5-Mar-13	600	7.3	3.3	10.5	0.7	2.7	252	1.5	6.8
5-Mar-13	700	15.7	9.2	27.9	0.8	2.9	261	0.8	6.4
5-Mar-13	800	27.2	6.7	36.2	1.6	3	151	1.2	3
5-Mar-13	900	11.9	10.8	26.8	2	6.1	143	1	2.7
5-Mar-13	1000	13	13.1	13.9	3.2	6.7	149	2.3	3.6
5-Mar-13	1100	16.6	32.5	13.5	5	10.3	185	3.8	4.8
5-Mar-13	1200	12.2	33.8	15.9	4.7	11.5	183	5.3	6.5
5-Mar-13	1300	17.2	32	14.4	5.7	17.6	213	5.1	7.6
5-Mar-13	1400	17.8	15.9	20.2	6	12.4	207	3.8	6.1
5-Mar-13	1500	14.2	36.5	254.2	6.6	14.1	164	4.8	7.2
5-Mar-13	1600	11.9	35.6	11.1	6.8	13.9	131	5.5	8.4
5-Mar-13	1700	5.3	52.8	7.8	12.5	19.6	130	9.2	10.8
5-Mar-13	1800	4.2	24.5	5.7	13.2	20.1	128	10.5	14.6
5-Mar-13	1900	7.3	33.5	7	11.5	19.5	132	10.1	14.8
5-Mar-13	2000	7	39.8	8.9	16.4	23.7	136	11.3	17.9
5-Mar-13	2100	5.6	59	7.1	17.4	25.7	134	12	18.2
5-Mar-13	2200	6.8	56.1	5.6	15.7	23	132	13.3	16.2
5-Mar-13	2300	7.1	47.5	6.8	10.1	16.9	118	13.2	14.5
5-Mar-13	2400	7.1	24.8	7.2	9.1	15.6	107	10.6	10.2

Table 1 and the wind rose illustrated in Figure 1 both show that the wind direction fluctuated very little throughout the day. In particular, the winds during the high wind event blew consistently from the northwest, confined within an angle between 309° and 324°. Consequently the likely significant contributors to the PM_{10} exceedance are the emissions source areas located within the sector upwind of the monitor and bounded by wind directions between 309° and 324°.

Figure 1



Closer scrutiny of the hourly data within Table 1 reveals the presence of an “exceptionally high” wind event nested within the high wind event. From 9:00 to 16:00, the wind direction varied by only 8° (314°-322°) further reducing the possible angle of contributing sources while the hourly average wind speeds increased to 34-42 mph. These wind speeds are considerably higher than the PRB wind speed threshold. Looking at this nested time frame, half of the hourly average wind speeds were in excess of 40 mph and all were greater than 34 mph. All hours showed wind gusts in excess of 50 mph. This nested time frame on Table 1 has been highlighted in a bright yellow.

During the hours of the "exceptionally high wind" event (9:00-16:00) the 36 Site TEOM showed the greatest hourly PM_{10} concentrations (Table 1). There can be little doubt that contributions of wind-blown particulate matter to the monitor during these 8 hours were primarily responsible for that monitor's measured exceedance of the 24-hour PM_{10} NAAQS. Stated differently, the exceptionally high wind speeds coupled with the elevated PM_{10} concentrations during these 8 hours leaves little doubt that high winds "affected air quality," one of the elements of a high wind event demonstration.

The nearly constant direction of the exceptionally high winds over the 8 hour period allow construction of a focused reverse-trace from the 36 Site TEOM monitor (314°-322°) that indicates the spatial relationship between that monitor and the source areas located upwind from the monitor as shown on Exhibit 3. BTM source areas likely to have contributed to the 36 Site TEOM monitor's measured exceedance are identified below.

- Active mining areas in the North Pits;
- Topsoil laydown areas north of highway 450;
- Areas permanently reclaimed;
- Long term facility areas; and
- Undisturbed lands.

2. Temporal Relationship

As shown in Figure 2, changes in PM_{10} levels measured by the 36 Site TEOM monitor clearly correlate with changes in high wind speeds on March 4, 2013. In particular, for hourly wind speeds above the PRB's high wind threshold, hourly PM_{10} concentrations at the 36 Site TEOM monitor increased when hourly wind speeds increased. Likewise, during high winds, hourly PM_{10} concentrations decreased when hourly wind speeds decreased. On the other hand, hourly PM_{10} concentrations at the 36 Site TEOM monitor did not correlate appreciable with changes in wind speed when wind speeds were below the high wind threshold.

The straight-line distance from the 36 Site TEOM monitor to the center of the coal pit area in the north pit is approximately 8 miles. The "exceptionally high winds on March 4, blowing at an average of 38.9 mph from the coal pit area, would reach the monitor in just a few minutes. This explains why the track of hourly PM_{10} concentration at the 36 Site TEOM monitor, as shown in Figure 2, is so closely synchronized with the track of the hourly high wind speeds at BTM.

The short lag time between a change in high wind speed and the subsequent change in PM_{10} concentration at the 36 Site TEOM monitor is consistent with high wind from the north pits reaching the monitor in a matter of minutes. Figure 2 is fully consistent with AQD's earlier finding for the PRB that wind speed is the dominant predictor of ambient PM_{10} concentrations at wind speeds in excess of 20 mph. That temporal relationship between high wind speeds and PM_{10} levels at the 36 Site TEOM monitor was clearly present on March 4, 2013.

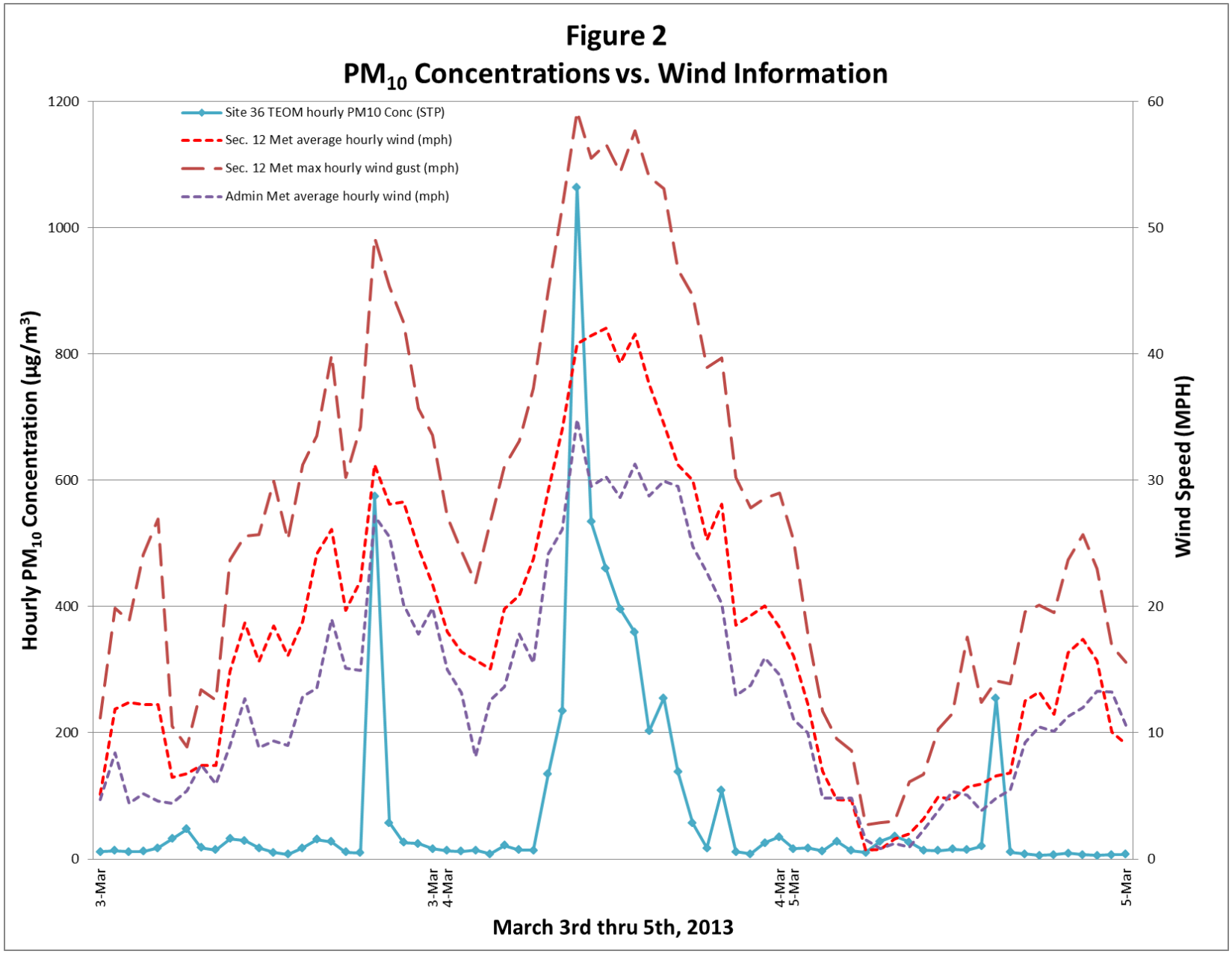


Figure 2
PM10 Concentrations vs. Wind Information
Site 36 TEOM hourly PM10 Conc (STP)
Sec. 12 Met average hourly wind (mph)
Sec. 12 Met max hourly wind gust (mph)
Admin Met average hourly wind (mph)
Hourly PM10 Concentration (µg/m3)
Wind Speed (MPH)
1200
1000
800
600
400
200
0
60
50
40
30
20
10
0
3-Mar
3-Mar 4-Mar
4-Mar 5-Mar
5-Mar
March 3rd thru 5th, 2013

3. Comparison Of Event-Affected Concentration To Non-Event Concentration

On March 4, 2013 the winds blew from the northwest at wind speeds over 20 mph for 15 consecutive hours. Similarly on March 7, 2012 the winds recorded at the Section 12 Met site were from the northwest with nearly the same consistent direction and duration as on March 4, 2013. That is, the winds recorded March 7, 2012 with an average wind direction out of the northwest @ 320°, is very similar to the limited range of the wind directions during the high winds on March 4, 2013.

However, wind speeds and gusts recorded on March 7, 2012 were lower than those on March 4, 2013. Wind speeds on March 7, 2012, averaged just over 15 mph. This was lower than average wind speeds on March 4, 2013. Hourly PM_{10} concentrations recorded at the 36 Site TEOM monitor on March 7, 2012 were 23.4 $\mu g/m^3$ which is much lower than hourly concentrations recorded during the high wind event on March 4, 2013 at 166.6 $\mu g /m^3$.

Examination of the hourly wind speeds and hourly PM_{10} concentration at the 36 Site TEOM monitor on March 7, 2012, as shown in Table 2 reveals no apparent correlation between wind speed and concentration during that day. That result is to be expected when wind speeds are consistently below 20 mph, the high wind threshold for the PRB. Conversely, on March 4, 2013 there is a direct correlation between hourly PM_{10} concentrations and hourly wind speeds over 20 mph as shown in Figure 2.

Mining operations on March 7, 2012, were not substantially different from those mining operations on March 4, 2013. Thus, the significant difference in meteorological and operational conditions on those two days is that March 4, 2013 was characterized by a prolonged period of high winds, but March 7, 2012 was not. The fact that the 24-hour average PM_{10} concentration at the 36 Site TEOM monitor on March 4, 2013 was so much higher than the concentration on March 7, 2012 highlights, a clear causal relationship between the high winds on March 4, 2013 and the measured exceedance of the 24-hour PM_{10} NAAQS.

Table 2									
BTM Meteorological and PM_{10} Data for March 7, 2012									
Date	Time	Sec. 12 TEOM Hourly PM_{10} Conc. (STP µg/m^3)	JR-5 TEOM Hourly PM_{10} Conc. (STP µg/m^3)	Sec. 36 TEOM Hourly PM_{10} Conc. (STP µg/m^3)	Sec 12 Met station avg. hourly wind speed (mph)	Sec 12 Met station max. hourly wind gust (mph)	Sec 12 Met station avg. hourly wind direction (degrees)	Admin Met station avg. hourly wind speed (mph)	JRM Met station avg. hourly wind speed (mph)
7-Mar-12	100	15.4	11.9	11.4	21.7	31.3	342	16.8	19.8
7-Mar-12	200	13.8	8	15.7	22.2	33.1	335	16.6	20.3
7-Mar-12	300	21.3	8.4	12.1	23.6	33.4	333	16.7	22.8
7-Mar-12	400	23.9	17	19.5	20.6	30.5	334	16.1	21.9
7-Mar-12	500	30.7	7.9	25.9	20.8	29.5	334	15.5	19.7
7-Mar-12	600	7.9	6.8	7.8	16.1	24.7	335	13	18.6
7-Mar-12	700	8.7	7.1	7.5	14.3	20.9	331	10.4	15.3
7-Mar-12	800	11.3	6.5	7	13.5	19	327	10.6	14
7-Mar-12	900	18.3	5.7	11.9	10.8	18.1	323	10.2	12.4
7-Mar-12	1000	16.3	6.1	18.6	13.9	21	325	9.6	12.5
7-Mar-12	1100	16.7	3.7	16.4	12.2	20.2	322	10.3	11.8
7-Mar-12	1200	24.9	7.9	17.5	10.3	20.1	316	8.4	9.9
7-Mar-12	1300	27.2	5.7	23.7	10.8	20.2	315	8.1	9.7
7-Mar-12	1400	25.6	2.9	21.9	11	19.9	318	9	10.9
7-Mar-12	1500	18.9	6.7	18	13	26.2	320	10.3	12.3
7-Mar-12	1600	14.3	7.5	25.1	15	24.9	325	12.2	14.1
7-Mar-12	1700	15.6	5.7	18.1	13.9	20.9	321	10.9	15.3
7-Mar-12	1800	24.7	8.6	26.1	13.7	20.1	311	11.7	15.5
7-Mar-12	1900	37.9	17.5	28.1	12.4	25.7	307	10.1	12.5
7-Mar-12	2000	27.9	8.5	28.9	13.3	19.6	301	9.5	13.2
7-Mar-12	2100	61.2	13.7	73.9	10.6	14.4	298	8	9.9
7-Mar-12	2200	41.6	8.9	57.6	10.6	16	284	8.9	9.5
7-Mar-12	2300	22.5	10	41.6	13.3	19.3	278	9.9	9.7
7-Mar-12	2400	22	8.2	33.6	14.5	24.1	277	10.6	10.6

4. Visual Observations

AQD issued Permit No. MD-10986 for BTM which requires adherence to the Mine's Air Quality Action Plan during "high particulate events." The Action Plan specifies that mine personnel "will determine possible emission source areas" whenever an hourly PM_{10} concentration in excess of 300 µg/m^3 is recorded. The same action must occur when the 24-hour rolling average concentration since midnight is in excess of 150 µg/m^3.

On the day of March 3, 2013 the hourly average alarm was triggered at both the Section 12 and 36 TEOM sites, at 8:06 pm. This spike was directly related to a spike in the hourly average wind speed in

excess of 30 mph, which was coming out of the northwest. However during the one hour spike in the wind, no specific source areas or emissions could be identified as likely contributing to the elevated reading, due to the short time frame of the elevated winds. Two additional water trucks were added to ensure road dust was adequately controlled.

On March 4, 2013 two alarms were triggered at the 36 Site TEOM site, at 10:06 am. One being the hourly average > 300 µg /m^3 and the other being the average 24- hour concentration since midnight > 150 µg /m^3. These alarms were directly related to the high wind event that took place on March 4, 2013. Over the course of the next several hours we experienced consecutive hours of very high winds, shown in Table 1. In the ongoing visual surveys of operations at BTM, blowing dust was observed originating in areas north of highway 450, graded areas to final post mine topography (PMT), areas topsoiled for spring reclamation and areas seeded last fall. During pit observations little to no emissions were observed in the scoria pit, with no mining activities going on in the scoria pit..

Those visual observations leading up to and throughout March 4, 2013 provided further evidence that one or more emissions source areas in the north pits were likely significant contributors to PM_{10} concentrations measured at the downwind 36 Site TEOM monitor.

5. Conclusion: High Winds Caused The PM_{10} Exceedance

The weight of the various facts discussed above clearly indicates a strong cause-and-effect relationship between sustained high winds in the area of BTM on March 4, 2013 and the concurrent measurement of the 24-hour average PM_{10} concentrations at the 36 Site TEOM monitor that exceeded the 24-hour ambient PM_{10} standard. Nothing in the information available to BTM personnel suggests that other factors were responsible for the measured exceedance, caused by the high wind event.

D. The Historical Context For The Subject High Wind Event Is Persuasive

High winds are not uncommon in the PRB. A prior study sponsored by AQD during development of the NEAP found that the southern portion of the PRB (including BTM) experienced winds in excess of 20 mph between 77 and 135 days per year. Furthermore, the same area of the PRB experienced winds in excess of 30 mph between 11 and 26 days per year. Yet, the frequency of previously measured PM10 exceedances in that region of the PRB has been far lower than the region's historical frequency of high winds.

EPA guidance acknowledges that analysis of historical fluctuations in measured concentrations is a technical element that can be satisfied by submittal of certain comparative data. To that end, a time series of 24-hour average ambient PM_{10} concentrations measured by BTM's 36 Site TEOM continuous monitor during the past three years is present in Figure 3. There have been no 24-hour PM_{10} exceedances at this monitor since July 30, 2008. That compilation of historical data plainly demonstrates that the 36 Site TEOM monitor's measured PM_{10} level of 166.6 STP $\mu g/m^3$ is not representative of PM_{10} concentrations that have been measured by that monitor since 2008.

A time series of monthly ambient PM_{10} concentrations measured by BTM's 36 Site TEOM continuous monitor during the past four years is present in Figure 4. Again this compilation of historical data plainly demonstrates that the reading measured on March 4, 2013 is not representative of the historical measurements monitored during the past four years.

Because the March 4, 2013 concentration is such an "outlier" and so far outside the normal range of historical concentrations, it is apparent that the exceedance was caused by the very high winds on March 4, 2013.

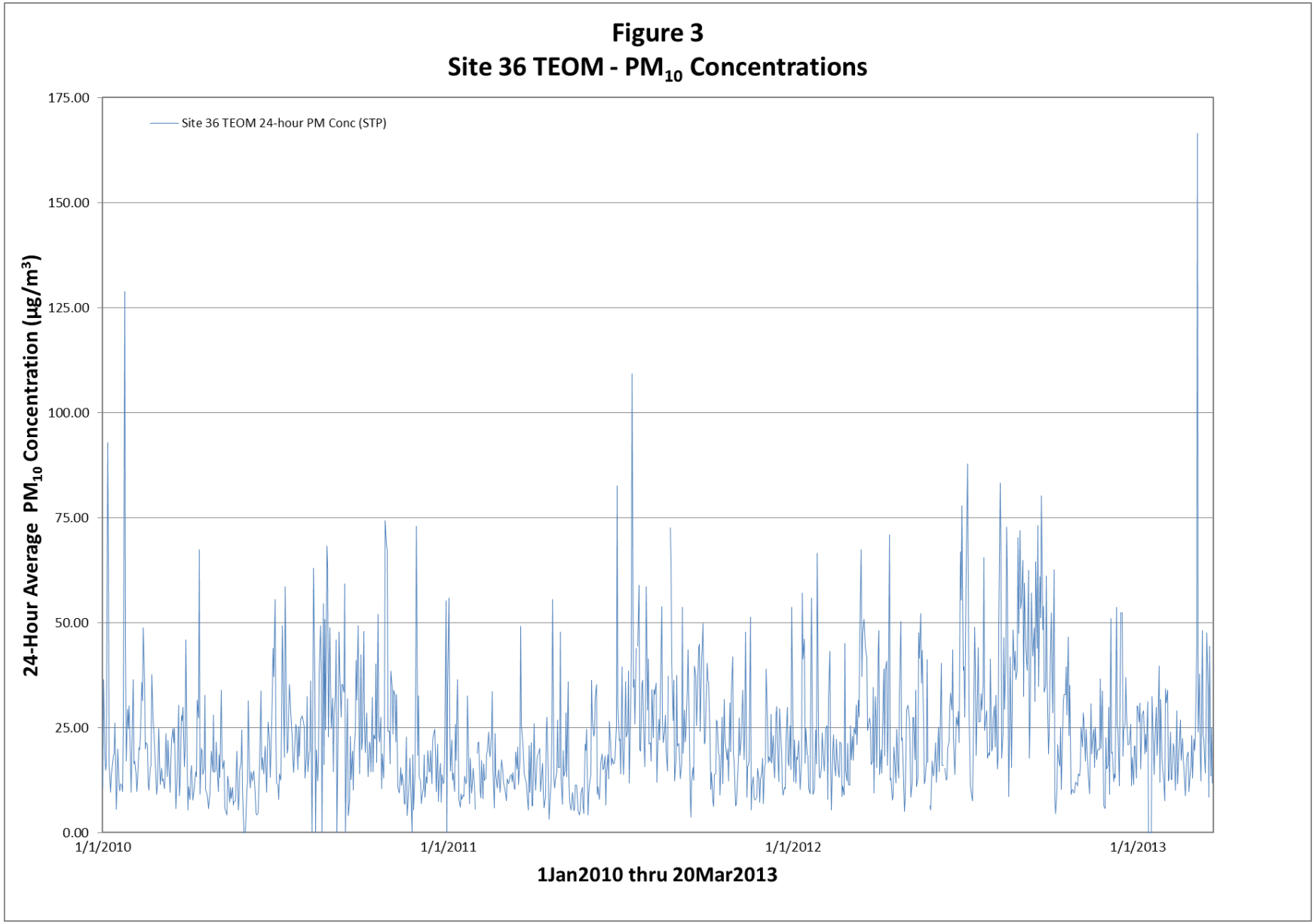


Figure 3
Site 36 TEOM - PM10 Concentrations
Site 36 TEOM 24-hour PM Conc (STP)
24-Hour Average PM10 Concentration (µg/m3)
175.00
150.00
125.00
100.00
75.00
50.00
25.00
0.00
1/1/2010
1/1/2011
1/1/2012
1/1/2013
1Jan2010 thru 20Mar2013

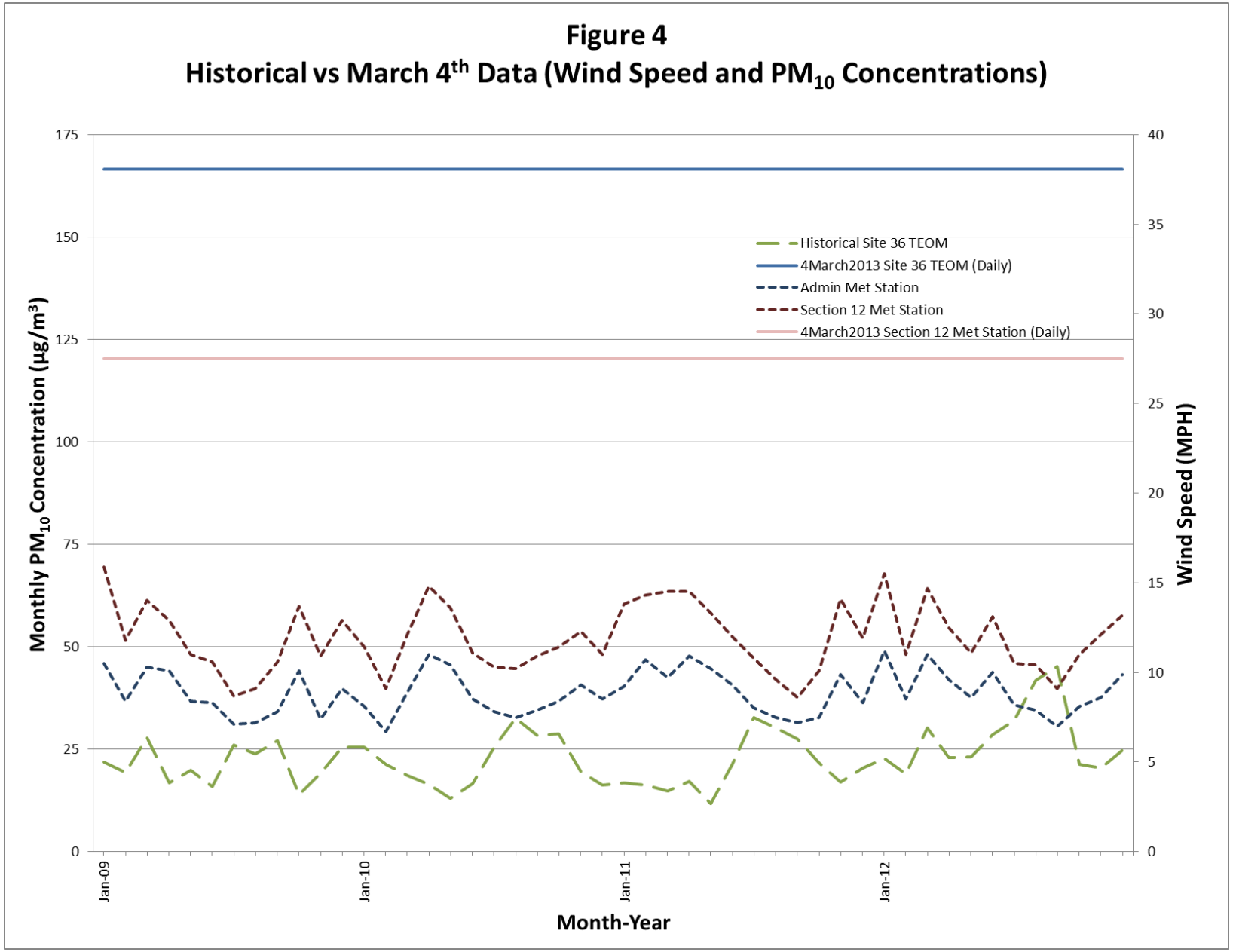


Figure 4
Historical vs March 4th Data (Wind Speed and PM10 Concentrations)
Monthly PM10 Concentration (µg/m³)
Wind Speed (MPH)
Month-Year
Historical Site 36 TEOM
4March2013 Site 36 TEOM (Daily)
Admin Met Station
Section 12 Met Station
4March2013 Section 12 Met Station (Daily)
175
150
125
100
75
50
25
0
40
35
30
25
20
15
10
5
0
Jan-09
Jan-10
Jan-11
Jan-12

E. BTM's Significantly Contributing Sources Were Not Reasonably Controllable During The High Wind Event

Demonstrating that a PM_{10} NAAQS exceedance was caused by a high wind event requires a showing that the event, including emissions for significantly contributing anthropogenic and natural dust sources, was not reasonably controllable. Importantly, EPA has explained that the degree of event-specific information and data necessary for demonstrating that emissions were not reasonably controllable will generally be less for sustained wind speeds at or above the area-specific high wind threshold. Moreover, for high winds events, EPA has observed that the level of rigor required to demonstrate that reasonable controls were (1) in place, (2) implemented and enforced, and (3) overwhelmed by high winds depends on the wind speed during the event relative to the area's high wind threshold. Finally, some anthropogenic sources are not affected by high winds, e.g., transportation and industrial point sources. Those types of sources are considered "non-event sources" that are not subject to a requirement that they be reasonably controlled during a high wind event.

1. BTM's Contributing Anthropogenic Sources Were Not Reasonably Controllable

Anthropogenic sources of dust are determined to be not reasonably controllable during a high wind event if:

(1) Those anthropogenic sources have reasonable controls in place during the event;

(2) The reasonable controls have been effectively implemented and enforced; and

(3) Wind speed was high enough to overwhelm the reasonable controls.

Consistent with the basic methodology for demonstrating each element of a high wind event, a determination whether anthropogenic sources of dust were not reasonably controllably utilizes a weight-of-evidence approach.

a. BTM's Contributing Anthropogenic Sources Had Reasonable Controls In Place On March 4, 2013

Whether controls on anthropogenic sources were reasonable for a high wind event must be judged in light of the technical information available to the agency at the time of the event. In this particular case of high winds, DEQ previously has identified the threshold for the influence of high winds in the PRB and has required implementation of economical and technically feasible controls on mines in the PRB to minimize the occurrence of PM_{10} NAAQS exceedances. In particular, PRB NEAP requires individual coal

mines in the PRB to implement (1) BACT as outlined as permit requirements, (2) BACM for disturbed areas at the mines on a continuing basis and (3) reactionary control measures for active mine operations during a "high wind event." Given the underlying purpose of those controls, they constitute "reasonable controls" for BTM's anthropogenic sources of dust.

1. BACM – "Reasonable Controls" are required at the BTM for active haul roads and for disturbed areas, as follows:

- BTM must complete daily, weekly, monthly, quarterly and annual inspections in accordance to the permit.
- The coal truck dump pads shall be cleaned, treated, and maintained to minimize the coal dust that accumulates due to spillage from the trucks. Cleaning practices or treatment of the road surfaces shall be maintained on a continuous basis to the extent that cleaning or the surface treatment remains a viable control measure that will be adequate to control fugitive dust emissions.
- That permanent haul roads shall be treated with a chemical dust suppressant in addition to water to control fugitive dust emissions, and shall be maintained continuously to the extent that such treatment remains a viable control measure.
- All temporary haul routes, including pit floor haul routes, shall be treated with water and or chemical dust suppressant to control fugitive dust emissions, on a schedule such that treatment remains a viable control measure.
- That the coal truck dumps shall be limited to less than 20 percent opacity, per the requirements of Subpart Y.
- The permitted atomizer/fogger system shall be operated and maintained so the system enclosures exhibit no visible emissions.
- The permitted atomizer/fogger systems and associated monitoring equipment shall be operated during all times that the respective coal preparation facilities are in operation.
- Topsoil areas greater than 150 contiguous acres that will not be revegetated within 60 days of completion of topsoil laydown and regarded backfill areas greater than 150 contiguous acres that will not be topsoiled within 60 days, shall be ripped or chiseled to create a

roughened surface, seeded with temporary vegetative cover, or otherwise effectively stabilized against wind erosion.

- Topsoiled areas less than 150 contiguous acres that will not be immediately revegetated and regraded backfill areas less than 150 contiguous acres that will not be topsoiled for an extended period of time, shall be ripped or chiseled to create a roughened surface, seeded with a temporary vegetative cover, of otherwise effectively stabilized against wind erosion as soon as feasible.
- That TBCC shall utilize a program to mitigate coal fires that result from spontaneous combustion. Attempts to extinguish coal fires must be initiated within twenty-four hours of discovering the fire and pursued until the fire is extinguished, unless operational safety issues are present.
- Contractors are required to apply water and/or chemical dust suppressant in their haulage area.
- Operations should schedule topsoil removal, grading of backfill and topsoil replacement concurrently to minimize open areas when possible.
- Where appropriate, non-vegetated barriers will be applied to erodible surfaces to reduce surface erosion.
- Long-term, out of pit overburden and topsoil stockpile which have been graded should be controlled.
- Reclamation is one of the best defenses against wind erosion. BTM works aggressively to reclaim and revegetate disturbed areas as soon as possible. During the calendar year of 2012, there were approximately 149 acres revegetated and approximately 790 acres where topsoiled and ripped. On March 4th, the majority of the unseeded, topsoiled areas had been ripped. During the calendar year of 2013, BTM is projecting to revegetate approximately 1,500 acres in the spring. At the end of the 2012 calendar year there have been over 12,189 acres permanently reclaimed.

As previously explained, sources that likely contributed significantly to the PM_{10} NAAQS exceedance measured by the 36 Site TEOM monitor were identified by constructing a “reverse trace” from the 36

Site TEOM monitor. Exhibit 3 shows that there were extensive BACM's in-place at the time of the exceedance both within the area of direct monitor influence (reverse trace area) and throughout the mine site.

In short, reasonable controls were in place and enforced on March 4, 2013 for those disturbed areas at the BTM that were likely significant contributors to the exceedance at the 36 Site TEOM monitor.

2. Reactionary Control Measures Utilized On March 4th

BTM's AQD permit, in particular, BTM's required reactionary control measures are contained in the mine's *Dispatch Air Quality Event Action Plan.* That Action Plan must be implemented for "high particulate events". Reactionary controls must be implemented when hourly PM_{10} concentrations exceed 300 µg/m^3 or the calculated 24-hour average since midnight is equal to or greater than 150 µg/m^3. When these levels are reached, mine personnel are notified through the onsite air quality monitoring system. The monitoring system alerts mine dispatch of high concentrations who then in turn notify the shift supervisor of the elevated concentrations. Mine personnel then go through a number of steps , including (1) status checks of ongoing operations in the different areas of the mine, (2) periodic visual observations and monitoring of key meteorological parameters, (3) identification of emission source areas possibly contributing to elevated PM concentration of concern, and (4) general planning for utilization of personnel and equipment resources if monitored PM_{10} concentrations continue to increase. Should measured PM_{10} concentrations continue to increase, then BTM is required to focus on water treatment in active mine areas and to implement, "if necessary, temporary realignment, slow down or suspension of certain mine activities that are determined to contribute to the levels of concern.

Notably, however, BTM's Action Plan does not identify any specific reactionary control measure that must be applied to a particular type of mining activity, nor does the plan specify either the extent of any particular activity's "temporary realignment, slow down or suspension" that may be "necessary" or the criteria for determining when such responses are "necessary."

Reactionary control measures implemented on March 4, 2013 were coordinated on a mine-wide basis in an effort to maximize the reduction of fugitive emissions and at the same time, continue to meet contractual commitments to our customers.

a) Focused Reactionary Control Measures Implemented To Control Emissions Impacting The 36 Site TEOM monitor.

Prior to receiving a weather advisory e-mail from the District III Air Quality Supervisor (Exhibit 1), BTM was experiencing very high winds and had already started to implement reactionary control measures. Listed below are reactive measures taken during the course of the day to help ensure that mine related emissions were controlled to the best of our ability.

(1) Water truck operations started as normal operations required. After the high PM_{10} concentration spiked midmorning to 1064.1µg /m^3, all available water trucks were put into operation. A total of eleven (11) trucks were available to be operated. The water trucks were used to control emissions from haul roads. Haulage equipment was also slowed down to ensure that road emissions were well controlled. In addition, the water trucks were dispatched to disturbed areas that were at or above grade where dust emissions were evident and there was safe access for the water trucks. Over the course of the day over 3,000,000 gallons of water were placed to help control emissions. During the first quarter of 2013, the average day showed approximately 2,000,000 gallons of water being applied to roads. This is a 50% increase over an average day for this quarter.
(2) Two (2) dozers were relocated from an above drill grade project on the north side highwall to a project below grade within the pit to eliminate any emissions from coming into contact with the high winds.
(3) Scrapers operations in the south pit area recovering scoria from the old south haul road were shut down, late morning. Scraper operations in the 2 north laydown areas were shut down, early afternoon.
(4) All blades operating at ground level or above were relocated to projects within the pit below ground surface for the remainder of the day.
(5) All dumps were relocated to the lowest possible dump level late in the morning.
(6) During lunch breaks, all units were shut down on both sides of the highway for approximately 1 hour. No skeleton crews operated during this time frame.
(7) All coal hauls were routed to the closest near pit crusher to minimize the haulage distances. No coal trucks were allowed to cross under the highway again to ensure that travel distances were minimized.
(8) The 22 shovel was removing upper material near the ground surface and was operating within the area of significant influence for the 36 Site TEOM. This shovel was shut down at approximately 11:30 for the remainder of the day. During the shutdown, this unit lost 52% of its planned daily production.
(9) The 24 shovel was removing upper material near the ground surface and was operating within the area of significant influence for the 36 Site TEOM. This shovel was shut down at approximately 14:00 for the remainder of the day. During the shutdown, this unit lost 40% of its planned daily production.
(10) The 28 shovel was removing upper material near the ground surface and was operating with the area of significant influence of the JRM 4 monitor. This shovel was shut down at approximately 17:30 for the remainder of the day. During the shutdown, this unit lost 40% of its planned daily production.
(11) With the shutdown of these three shovels, 21 haul trucks were also shutdown. These trucks were not relocated.
(12) The day shift started with a fleet of 92 trucks operating, with the parking of the 21 trucks for the remainder of the day, 30 trucks were operating in coal and 41 in overburden. This reduced our overburden fleet by 33%.

(13) The 7 dragline was shut down at approximately 13:00 for the remainder of the day. This equipment's potential line of influence is the 12 TEOM and the Peabody monitors. During the shutdown, this unit lost 69% of its planned production.
(14) The 12 dragline was shut down at approximately 16:00 for the remainder of the day. The dragline was operating below grade but was near the area of significant influence of the 36 Site TEOM. During the shutdown, this unit lost 30% of its planned production.
(15) The 10 dragline was shut down at approximately 16:00 for the remainder of the day. The dragline was operating below grade and not in the direct zone of influence for 36 Site TEOM but was shut down to try and minimize overall wind erosion impacts. During the shutdown, this unit lost 63% of its planned production.
(16) The remaining truck/shovel, truck /loader fleets were slowed down considerably in an effort to reduce dust the entire day which is shown in the production losses below.
    a. The 20 shovel lost 20% of its planned production for the day.
    b. The 21 shovel lost 26% of its planned production for the day.
    c. The 25 shovel lost 18% of its planned production for the day.
    d. The 27 shovel lost 12% of its planned production for the day.
    e. The loader fleet lost 99% of its planned production for the day.
(17) Total overburden production was reduced by 31% for the day.

3. Summary

As required by BTM's permit, BACM was fully in place and enforced during the high wind event for those disturbed areas that likely contributed significantly to the measured exceedance. Furthermore, BACM had also been implemented at the BTM's other disturbed areas that likely did not contribute significantly to the measured exceedance. BTM also implemented a series of practicable and appropriate reactionary control measures, ultimately leading to the shutdown of a significant portion of the operating fleet that were likely significant contributors to the measured exceedance.

Reactionary control measures as listed above were implemented for activities where fugitive emissions were likely to have contributed significantly to the concentration at the 36 Site TEOM monitor. Reactionary control measures were also implemented across the mine site, including the shutdown of equipment which would not have been expected to directly influence concentrations at the 36 Site TEOM monitor. This extreme level of reactionary measures was an attempt to reduce the concentration recorded not only at the 36 Site TEOM monitor but also at other nearby monitors, including monitors at the nearby Peabody operations. Although at the end of the day even the additional, reactionary control measures were unable to prevent the exceedance at the 36 Site TEOM monitor because the high winds overwhelmed the control practices.

TBCC believes the extreme, across the mine reactionary measures were directly responsible for compliant concentrations at the 12 Site TEOM monitor as well as nearby Peabody downwind monitors

throughout the high wind event. TBCC remains mindful that nothing within Wyoming's NEAP or EPA's EER mandates a shutdown of core mining operations during a high wind event. Rather, the NEAP and the EER contemplate the implementation of reasonable control measures during a high wind event in an attempt to offset the increase of fugitive dust emissions when high winds simply overwhelm the operation's BACM. However, TBCC determined that the circumstances of the high winds and substantial gusts, dictated that extreme reactionary control measures should be implemented in this particular case.

The evidence arising from an objective assessment of (1) the reduced production, and ultimate shutdown of a significant number of pieces of equipment, (2) the increased frequency of watering haul roads and outlying areas, and (3) the BACM fully in place and enforced for BTM's disturbed areas affected by high winds weighs heavily in support of a conclusion that BTM's anthropogenic sources of dust upwind of the 36 Site TEOM monitor were reasonable controlled, given the conditions of the high wind event.

b. BTM's Reasonable Controls Have Been Effectively Implemented and Enforced

Compliance with BTM's requirements to implement BACM and reactionary control measures is evaluated in a variety of ways. Each year DEQ conducts a full on-site inspection of BTM's operations to assess the mine's compliance with the relevant requirements in BTM's air quality permit. The most recent DEQ inspection prior to March 4, 2013 was performed on June 10, 2012. DEQ's inspection report noted that BTM was in compliance with all permit conditions and noted that all open areas appeared to have been roughened to reduce wind erosion at needed disturbed areas. In particular, the following excerpts (8 pages) from DEQ's 2012 inspection report summarize DEQ's observations of BTM's compliance with general site requirements and individual BACM requirement:

Permit MD-10986
March 16, 2011

Air Quality Permit MD-10986 was issued March 16, 2011 to combine the Black Thunder Mine and Jacobs Ranch Mine into one entity (Black Thunder Mine) with a maximum annual coal production rate of 190 million tons per year, and modify the coal progression sequence. This permit supersedes all previous Chapter 6, Section 2 permits and waivers for the Black Thunder and Jacobs Ranch Mine, except for Permit MD-10900.

1. That authorized representatives of the Division of Air Quality be given permission to enter and inspect any property, premise or place on or at which an air pollution source is located or is being constructed or installed for the purpose of investigating actual or potential sources of air pollution and for determining compliance or non-compliance with any rules, standards, permits or orders.

2. That all substantive commitments and descriptions set forth in the application for this permit, unless superseded by a specific condition of this permit, are incorporated herein by this reference and are enforceable as conditions of this permit.

3. That a permit to operate, in accordance with Chapter 6, Section 2(a)(iii) of the WAQSR, is required after a 120-day startup period in order to operate this facility.

IN COMPLIANCE		✓ YES		NO
COMMENTS: Request for a permit to operate received 5/11/2011.				

4. That all notifications, reports and correspondences associated with this permit shall be submitted to the Stationary Source Compliance Program Manager, Air Quality Division, 122 West 25th Street, Cheyenne, WY 82002 and a copy shall be submitted to the District Engineer, Air Quality Division, 2100 West 5th Street, Sheridan, WY 82801.

IN COMPLIANCE		✓ YES		NO
COMMENTS:				

5. That written notification of the anticipated date of initial startup of the change in coal removal progression, in accordance with Chapter 6, Section 2(i) of the WAQSR, is required not more than sixty (60) days or less than thirty (30) days prior to such date. Notification of the actual date of startup is required within fifteen (15) days after startup.

IN COMPLIANCE		✓ YES		NO
COMMENTS:				

6. That the following requirements shall be met for all atomizer/fogger systems at the Black Thunder Mine:

   a. The atomizer/fogger systems shall be operated and maintained so the system enclosure exhibits no visible emissions as determined by Method 22 of appendix A, 40 CFR part 60.

   b. That the atomizer/fogger systems and associated monitoring equipment shall be operated during all times that the respective coal preparation facilities are in operation.

   c. Thunder Basin Coal Company shall conduct, at minimum, daily visual observations of the atomizer/fogger systems to determine the presence of visible emissions on any day the respective coal preparation facilities are in operation. Records shall be kept documenting whether visual emissions are noted and the corrective action taken. These records shall be maintained for a period of five (5) years and shall be made available to the Division upon request.

   d. Thunder Basin Coal Company may utilize 40 CFR §60.255(f) of Subpart Y in lieu of utilizing (b) of this condition to demonstrate continuous compliance with (a) of this condition.

7. That the following sources shall be controlled with atomizer/fogger systems:

Source Description
Black Thunder
Primary Crusher
Secondary Crusher
Belt 2902 Transfer
Belt 2903 Transfer
North Silo Headhouse
Belt 2901 Transfer
Belt 612 Transfer
Belt 626 Transfer
Belt 609 Transfer
Near Pit Crusher #1
Near Pit Crusher #2
Near Pit Overland Conveyor Transfer
5-West Crusher
West Black Thunder
West Crusher
West Overland Conveyor Transfer
East Black Thunder
East Circuit #4 ROM Conveyor
East Circuit #4 Overland Conveyor
East Circuit #4 Surge Bin
East Circuit #1 South Transfer
East Circuit #2 North Transfer
East Circuit #2 Storage Conveyor
East Circuit #1 Storage Conveyor
East Circuit #3 Storage Conveyor
East #5 Belt
East #6 Belt
East #8 Belt
East #A4 Belt
East #9 Belt
East #A2 Belt

8. That Thunder Basin Coal Company shall comply with the applicable requirements of 40 CFR part 60, subpart Y.

IN COMPLIANCE	✓ **YES**	**NO**
COMMENTS: No visible emissions were observed from any source controlled by an atomizer/fogger system. Daily observations were reviewed and records were complete and in order.		

9. That Thunder Basin Coal Company shall conduct the following for the coal truck dumps equipped with stilling sheds at the Black Thunder Mine:

   i. Thunder Basin Coal Company shall conduct, at minimum, a control effectiveness demonstration on each truck dump equipped with a stilling shed each calendar quarter. Control effectiveness for each truck dump control system shall be determined by using the methodology in 40 CFR §60.255(h)(1)(i) and (ii). The Division shall consider the threshold defining relative control effectiveness to be no greater than twenty percent (20%) opacity for each truck dump. Observations shall be conducted by an observer certified in accordance with Section 3.1 of Method 9.

   ii. A control effectiveness demonstration with an opacity of 20 percent or greater shall prompt immediate inspection and, if necessary, corrective action. Corrective action must be initiated when the control device is determined to be improperly maintained or operated as determined by inspection. Thunder

Basin Coal Company shall document any inspection of the truck dumps equipped with a stilling shed and any corrective actions taken. The duration of any corrective action taken to resolve any items found during an inspection shall be noted along with any justification for delays. Upon completion of the corrective action at the truck dump, Thunder Basin Coal Company shall conduct a demonstration of the control effectiveness of the truck dump equipped with a stilling shed, as described in (i) of this condition.

10. That the coal truck dumps shall be limited to less than 20 percent (20%) opacity, per the requirements of Subpart Y. Compliance with the 20 percent opacity limit at the coal truck dumps will be determined by Method 9 of appendix A, 40 CFR part 60.

11. That Thunder Basin Coal Company shall conduct an annual Method 9 observation (one 6-minute average) of each coal truck dump to measure the opacity of any fugitive emissions. The Method 9 observations shall be conducted by an observer certified in accordance with Section 3.1 of Method 9 and shall follow the requirements and procedures of Method 9 as contained in 40 CFR part 60, appendix A.

12. That Thunder Basin Coal Company shall conduct, at minimum, weekly inspections of the truck dump control systems installed at each coal truck dump to determine any repair measures necessary to minimize fugitive dust emissions and maintain proper operation of the control system. Corrective action and repair measures must be initiated in an expeditious manner when the control device is determined to be improperly maintained or operated.

IN COMPLIANCE	✓ YES	NO
COMMENTS: Annual Method 9 readings are being conducted. Weekly inspections of the stilling shed are being conducted. Records were found to be compete and in order.		

13. The coal truck dump pads shall be cleaned, treated, and maintained to minimize the coal fines that accumulate due to spillage from the trucks. Cleaning practices or treatment of the road surfaces shall be maintained on a continuous basis to the extent that cleaning or the surface treatment remains a viable control measure that will be adequate to control fugitive dust emissions.

14. That all permanent haul roads shall be treated with a chemical dust suppressant in addition to water to control fugitive dust emissions, and shall be maintained continuously to the extent that such treatment remains a viable control measure.

15. That all temporary haul routes, including pit floor haul routes, shall be treated with water and/or chemical dust suppressants to control fugitive dust emissions, on a schedule such that treatment remains a viable control measure.

IN COMPLIANCE	✓ YES	NO
COMMENTS: Truck dump pads were clean and clear of coal fines. Haul roads were wet and water trucks were observed throughout the inspection.		

16. That Thunder Basin Coal Company shall submit to the Division by April 1st of each year, a report addressing road dust control measures employed during the past year and a disturbed acreage report for the year. This plan shall include the following:

    a. A map based on the past year end conditions with the following information:
        - All roads existing at the end of the calendar year, which have been treated with water and/or dust suppressant.
        - Locations of active operations, treated disturbed areas, and reclaimed areas.
    b. Type and annual quantity of dust suppressants used for the past year and a description of the general application procedures and schedule.
    c. Number of water trucks, capacities of each water truck, and quantity of water used for the past year.
    d. Operating hours by water truck and total water truck fleet hours for the past year.
    e. Total length in miles of permanent and temporary haul roads existing at the end of the calendar year, which have been treated with water and/or dust suppressant.

f. Overburden and coal production rates for the past year.

g. A table summarizing the acreages and control measures or BMP uses/applied by active operations, treated disturbed areas, and reclaimed areas.

IN COMPLIANCE	✓ YES	NO
COMMENTS: Dust control reports have been received by the Division.		

17a. Topsoiled areas greater than 150 contiguous acres that will not be revegetated within 60 days of completion of topsoil laydown and regraded backfill areas greater than 150 contiguous acres that will not be topsoiled within 60 days, shall be ripped or chiseled to create a roughened surface, seeded with a temporary vegetative cover, or otherwise effectively stabilized against wind erosion.

17b. Topsoiled areas less than 150 contiguous acres that will not be immediately revegetated and regraded backfill areas less than 150 contiguous acres that will not be topsoiled for an extended period of time, shall be ripped or chiseled to create a roughened surface, seeded with a temporary vegetative cover, or otherwise effectively stabilized against wind erosion as soon as feasible.

18. That Thunder Basin Coal Company shall utilize a program to mitigate coal fires that result from spontaneous combustion. Attempts to extinguish coal fires must be initiated within twenty-four (24) hours of discovering the fire and pursued until the fire is extinguished, unless operational safety issues are present. For all coal fires where efforts to extinguish the fire were not initiated within twenty-four (24) hours, or for fires which were not extinguished within twenty-four (24) hours of the initial attempt to extinguish the fire, Thunder Basin Coal Company shall document the measures taken to extinguish the fire and the reasons for any delays.

IN COMPLIANCE	✓ YES	NO
COMMENTS: All open areas were roughened, seeded with temporary vegetative cover, or otherwise effectively stabilized against wind erosion. Coal fire records are being kept and were found to be complete and in order.		

19. That Thunder Basin Coal Company shall operate, in accordance with the requirements of 40 CFR parts 50 and 58 an approved ambient monitoring program that includes an ambient PM_{10} monitoring network at the Black Thunder Mine to demonstrate compliance with the ambient PM_{10} standards in Chapter 2, Section 2 of the WAQSR. Thunder Basin Coal Company shall maintain a quality assurance plan for the monitoring network, as required by 40 CFR part 58 and shall be approved by the Division.

20. Thunder Basin Coal Company shall comply with all commitments made in the quality assurance plan for the ambient PM_{10} monitoring network in Condition 19 for the Black Thunder Mine, and the data generated by the ambient PM_{10} monitoring network shall be submitted in a Division approved format on a quarterly basis, within 60 days following the end of the quarter.

21. Thunder Basin Coal Company shall notify the Division within 15 days of a monitored exceedance at any of the continuous monitors, and within 30 days of a monitored exceedance at any filter based monitor in the ambient PM_{10} monitoring network at the Black Thunder Mine.

22. That annually, Thunder Basin Coal Company shall submit to the Division, a demonstration that the ambient PM_{10} monitoring network is sufficient for monitoring impacts and demonstrating compliance with the ambient particulate standards in Chapter 2, Section 2 of the WAQSR from current as well as future (5-year projection) mining activities. This demonstration shall consist of a discussion of the ambient monitoring network along with an annual windrose, and current UTM coordinate locations of the monitors. In addition, a map showing current monitor locations in relation to active mining areas along with projected mining areas shall be included. The ambient monitoring network demonstration shall be submitted along with the annual report required for dust control measures in Condition 16, and a copy shall be submitted to the Air Quality Monitoring Program located in Cheyenne. The Administrator may require Thunder Basin Coal Company to modify their ambient monitoring network, including monitor locations, based on a review of the demonstration.

IN COMPLIANCE	✓ YES	NO
COMMENTS: Quarterly monitoring reports have been received by the Division. The annual monitoring network demonstration was received by the Division on March 28, 2012.		

23. That Thunder Basin Coal Company shall adhere to their contingency action plan for high particulate events at the Black Thunder Mine. A copy of this plan titled *Dispatch Air Quality Event Action Plan* is attached in Appendix A. The contingency action plan for high ambient particulate impacts may be revised without administratively amending the permit, but revisions shall be approved by the Division prior to implementation.

24. That Thunder Basin Coal Company shall submit, if required by the Administrator, a demonstration that their *Dispatch Air Quality Event Action Plan* will adequately minimize high ambient particulate impacts. The Administrator may require Thunder Basin Coal Company to propose modification to their *Dispatch Air Quality Event Action Plan* based on the action plan demonstration.

25. That Thunder Basin Coal Company shall document the measures taken when an action level is triggered in their *Dispatch Air Quality Event Action Plan* in Condition 23.

26. That Thunder Basin Coal Company shall maintain a meteorological station at the Black Thunder Mine acceptable to the Division. Surface air meteorological data measurements shall be collected at the Black Thunder Mine, as specified in the EPA document: Meteorological Monitoring Guidance for Regulatory Modeling Applications. The meteorological data measurements shall consist of hourly observations of:

    a. Wind speed using an anemometer height of 10 meters
    b. Wind direction
    c. Ambient temperature

27. The meteorological data specified in Condition 26 shall be submitted in an electronic format on a quarterly basis.

IN COMPLIANCE	✓ YES	NO
COMMENTS:		

28. That Thunder Basin Coal Company will limit public access to the lands defined by the Administrator as necessary to conduct mining operations. Limiting public access will include posting of fences with signs posted at one quarter mile intervals identifying the enclosed area and prohibiting access, locked gates and security at all mine entrances. The signs will identify the mine operator and inform the public of the restricted area. The Administrator has determined that the Lands Necessary to Conduct Mining boundary is described on a map titled *Black Thunder Mine Pit Progression*, which is shown in Figure 1.

29. The maximum coal production by year at the Black Thunder Mine shall not exceed a production rate of 190 million tons per year. Mining may continue through the year 2024 as described in the mine plan contained in the application for this permit.

IN COMPLIANCE	✓ YES	NO
COMMENTS: 2011 Production Coal: **104,900,000 Tons** Limit: 190,000,000 Tons		

30. Thunder Basin Coal Company shall retain, at the Black Thunder Mine, records of the daily inspections, monthly observations, PM records, Method 22 observations, and support information as required by this permit for a period of at least five (5) years from the date such records are generated and the records shall be made available to the Division upon request.

31. That this permit shall supersede all previous Chapter 6, Section 2 permits and waivers issued for the Black Thunder Mine and Jacobs Ranch Mine except for permit MD-10900. All conditions of MD-10900 shall remain in effect unless superseded by a specific condition of this permit.

IN COMPLIANCE	✓ YES	NO
COMMENTS: Records are being kept.		

Permit No. MD-10900
March 14, 2011

Air Quality Permit MD-10900 was issued March 14, 2011 to combine operations of the Black Thunder Mine and Jacobs Ranch Mine for stationary sources and to establish conditions to ensure that the Black Thunder Mine remains a synthetic minor source under Chapter 6, Section 3 of the WAQS&R.

1. That authorized representatives of the Division of Air Quality be given permission to enter and inspect any property, premise or place on or at which an air pollution source is located or is being constructed or installed for the purpose of investigating actual or potential sources of air pollution and for determining compliance or non-compliance with any rules, standards, permits or orders.

2. That all substantive commitments and descriptions set forth in the application for this permit, unless superseded by a specific condition of this permit, are incorporated herein by this reference and are enforceable as conditions of this permit.

3. That a permit to operate, in accordance with Chapter 6, Section 2(a)(iii) of the WAQSR, is required after a 120 day start-up period in order to operate this facility.

4. That all notifications, reports and correspondences associated with this permit shall be submitted to the Stationary Source Compliance Program Manager, Air Quality Division, 122 West 25th Street, Cheyenne, WY 82002 and a copy shall be submitted to the District Engineer, Air Quality Division, 2100 West 5th Street, Sheridan, WY 82801.

IN COMPLIANCE	✓ YES	NO
COMMENTS:		

5. That emissions from the seven (7) diesel fired engines shall be limited as follows:

Engine	NO_x			CO		
	g/hp-hr	lb/hr	tpy	g/hp-hr	lb/hr	tpy
200 hp Plant Emergency Generator	14.1	6.2	0.9	3.0	1.3	0.2
225 hp Fire Pump	14.1	7.0	1.0	3.0	1.5	0.2

6. Each diesel emergency generator and diesel fire pump shall be limited to 300 operating hours per year. Each engine shall be equipped with a non-resettable hour meter, and the hours of operation for each of the diesel fired engines shall be recorded every quarter.

7. That emissions from the two (2) boilers shall be limited as follows:

Source	NO_x			CO			SO_2		
	lb/MMBtu	lb/hr	tpy	lb/MMBtu	lb/hr	tpy	lb/MMBtu	lb/hr	tpy
Boiler #1	0.7	13.1	13.7	1.5	28.7	30.2	0.7	12.3	13.0
Boiler #2	0.7	25.1	26.3	1.5	55.2	57.9	0.7	23.6	24.8

8. The combined fuel usage for the two (2) boilers shall be limited to 6,530 tons coal per year. Thunder Basin Coal Company, LLC shall maintain records of coal usage.

IN COMPLIANCE	✓ YES	NO
COMMENTS: In 2011, the diesel emergency generators and diesel fire pumps ran for a total of 29.1 hours and the boilers burned 4,560 tons of coal.		

9. Performance tests shall be conducted on the four (4) top-off dust collector systems within ninety (90) days of permit issuance:

Opacity: Method 22 of 40 CFR part 60, Appendix A. Performance tests shall be at least thirty (30) minutes in duration, with observations taken from each side of the top-off system buildings.

A test protocol shall be submitted and approved prior to testing. The operator shall provide fifteen (15) days prior notice of the test date. A written report of the results is to be submitted within forty-five (45) days of completion.

IN COMPLIANCE		✓ YES		NO
COMMENTS: Testing was conducted June 7 & 8, 2011.				

10. Thunder Basin Coal Company, LLC shall follow the testing requirements as follows for the five (5) diesel emergency generators, two (2) diesel fire pumps and Boiler #1 and Boiler #2:

    i. That at least once every five (5) years, each diesel emergency generator and diesel fire pump shall be tested to verify compliance with the NO_x and CO limits set forth in this permit. The next periodic testing for each diesel fired engine shall be performed in the year 2013. The testing shall be conducted in accordance with EPA reference methods or the State of Wyoming's Portable Analyzer Protocol. Notification of the test date shall be provided to the Division fifteen (15) days prior to testing. Results of the tests shall be submitted to the Division within forty-five (45) days of completing the tests.

    ii. That at least once every five (5) years, Boiler #1 and Boiler #2 shall be tested for NO_x, CO, SO_2 and particulate to determine if the boilers are operating within the emission limits specified in this permit. The next periodic tests for the two (2) boilers shall be performed in the year 2013. Testing for NO_x, CO, and SO_2 shall be conducted using EPA Reference Methods or a portable analyzer, following the State of Wyoming's Portable Analyzer Protocol. Particulate testing shall consist of three (3) 1-hour tests following EPA Reference Methods 1-4 and 5. A written report of the results is to be submitted to the Division within forty-five (45) days of completion. Notification of the test date shall be provided to the Division fifteen (15) days prior to testing. The testing frequency may be revised without administratively amending the permit, but shall be approved by the Division prior to implementation.

    iii. The Air Quality Division shall be notified within twenty-four (24) hours of any engine, boiler, and baghouse where the testing/monitoring required by (i) through (iii) of this condition shows operation outside the permitted emission limits. By no later than seven (7) calendar days of such testing/monitoring event, the owner or operator shall repair and retest/monitor the affected engine to demonstrate that the engine has been returned to operation within the permitted emission limits. Compliance with this permit condition regarding repair and retesting/monitoring shall not be deemed to limit the authority of the Air Quality Division to cite the owner or operator for an exceedance of the permitted emission limits for any testing/monitoring required by (i) through (iii) of this condition which shows noncompliance.

11. That particulate emissions from the following sources shall be limited as follows:

Sources	lb/hr	tpy
Boiler #1 baghouse	1.9	8.2
Boiler #2 baghouse	3.6	15.7
Four (4) top-off system dust collectors[1]	0.35	6.1

[1] Emissions in lb/hr are for each dust collector system, emissions in tpy are for the four (4) top-off dust collector systems combined

IN COMPLIANCE		✓ YES		NO
COMMENTS: Each diesel emergency generator and diesel fire pump was tested for NO_X and CO on April 29, 2008. Boiler #1 and Boiler #2 were tested for PM, NO_X, and CO on February 6, 2008 and January 3, 2008, respectively. All emissions tested below permit limits.				

12. Thunder Basin Coal Company, LLC shall comply with 40 CFR part 60, subpart Y for the four (4) coal top-off dust collector systems. Subpart Y limits opacity from the four (4) coal top-off dust collector systems to less than twenty percent (20%) as determined by 40 CFR part 60, appendix A, Method 9.

13. Thunder Basin Coal Company, LLC shall, on a daily basis, check for the presence of any visual emissions at each of the baghouses and top-off dust collector system on any day that they are operating. The visual observation shall be conducted at each baghouse and top-off dust collector system by personnel who are educated on the general procedures for determining the presence of visible emissions but not necessarily certified to perform Method 9 observations. Observation of any visible emissions from any of these units shall prompt immediate inspection and, if necessary, corrective action. The daily observation forms (Boiler Baghouse Report, Black Thunder Mine Plant Daily Fogger and Passive Control Report, Black Thunder East Plant – Fogger/Top-off System, and Black Thunder Mine West Plant Daily Fogger and Passive Control Report) attached as Appendix A, shall be utilized to document any visual observations conducted. These forms may be revised without administratively amending the permit, but revisions shall be provided to the Division for approval, along with a justification for any revisions.

IN COMPLIANCE	✓ YES	NO
COMMENTS:		

14. That the propane heaters shall be limited to a total propane usage of 2.5 million gallons per year. Thunder Basin Coal Company, LLC shall maintain quarterly records of propane usage.

IN COMPLIANCE	✓ YES	NO
COMMENTS: In 2011, the propane heaters burned 1,044,263 gallons of propane.		

15. By January 31 of each calendar year, Thunder Basin Coal Company, LLC shall submit to the Division a summary report, attached as Appendix B of this permit, documenting operations for the previous calendar year. The first compliance date shall be December 31, 2011 for the period from January 1 through December 31, 2011.

IN COMPLIANCE	✓ YES	NO
COMMENTS: The 2011 summary report (MD-10900) was received by the Division on January 25, 2012. Records are being kept.		

16. Records required by this permit shall be maintained for a period of at least five (5) years and shall be made available to the Division upon request.

c. Wind Speeds Were High Enough To Overwhelm BTM's Reasonable Controls

DEQ has determined that 20 mph is the high wind threshold for the PRB. An area-specific high wind threshold is representative of the sustained wind speeds that are capable of overwhelming reasonable controls on anthropogenic sources of dust. As a result of those reasonable controls being overwhelmed, significant emissions begin to be transported in the direction of the high winds.

The high wind event demonstration has previously shown that wind speeds exceeded 20 mph for a total of 15 hours. These winds generally came from the northwest passing over the North Pits. Moreover, 8 of those hours were characterized by exceptionally high winds with hourly average wind speed of 34 - 42 mph. Winds gusts during this same time frame were in excess of 50 mph for each hour ranging from 51.6 - 59.2 mph.

d. Conclusion

The following conclusions are supported by the information presented in this high wind demonstration package relating to the high wind event at the BTM on March 4, 2013:

- That BTM's anthropogenic sources which likely contributed to the measured PM_{10} exceedance at the 36 Site TEOM had reasonable controls in place prior to commencement of the high wind event:
- That those reasonable controls have been effectively implemented by BTM and enforced by DEQ: and
- That wind speeds during March 4, 2013 were high enough to overwhelm BTM's reasonable controls that were in place on that day.

Based on that showing, TBCC has demonstrated that BTM's significantly contributing anthropogenic sources were not reasonably controllable on March 4, 2013.

2. BTM's Contributing Natural Sources Were Not Reasonably Controllable.

Natural sources of dust are determined to be not reasonably controllable if wind speeds are high enough to cause emissions from reclaimed or undisturbed, native areas. An area-specific high wind threshold is representative of the sustained wind speeds that are capable of causing emissions from reclaimed and undisturbed areas. DEQ has determined that 20 mph is the high wind threshold representative of conditions in the PRB.

Figure 5 shows elevated readings at our JR-5 TEOM monitor, which lies along the north boundary of our permit. Given that the winds were out of the northwest, this monitor would have been upwind of any mining activity and concentrations were influenced by particulate emissions primarily from native, undisturbed lands. In that this monitor was also recording increased concentrations from native, undisturbed lands provides further documentation that an exceptional high wind event occurred on March 4, 2013. The JRM Met station, located next to the JR-5 TEOM monitor, recorded 20 consecutive hours of wind speeds in excess of 20 mph ranging from 20 to 40.1 mph.

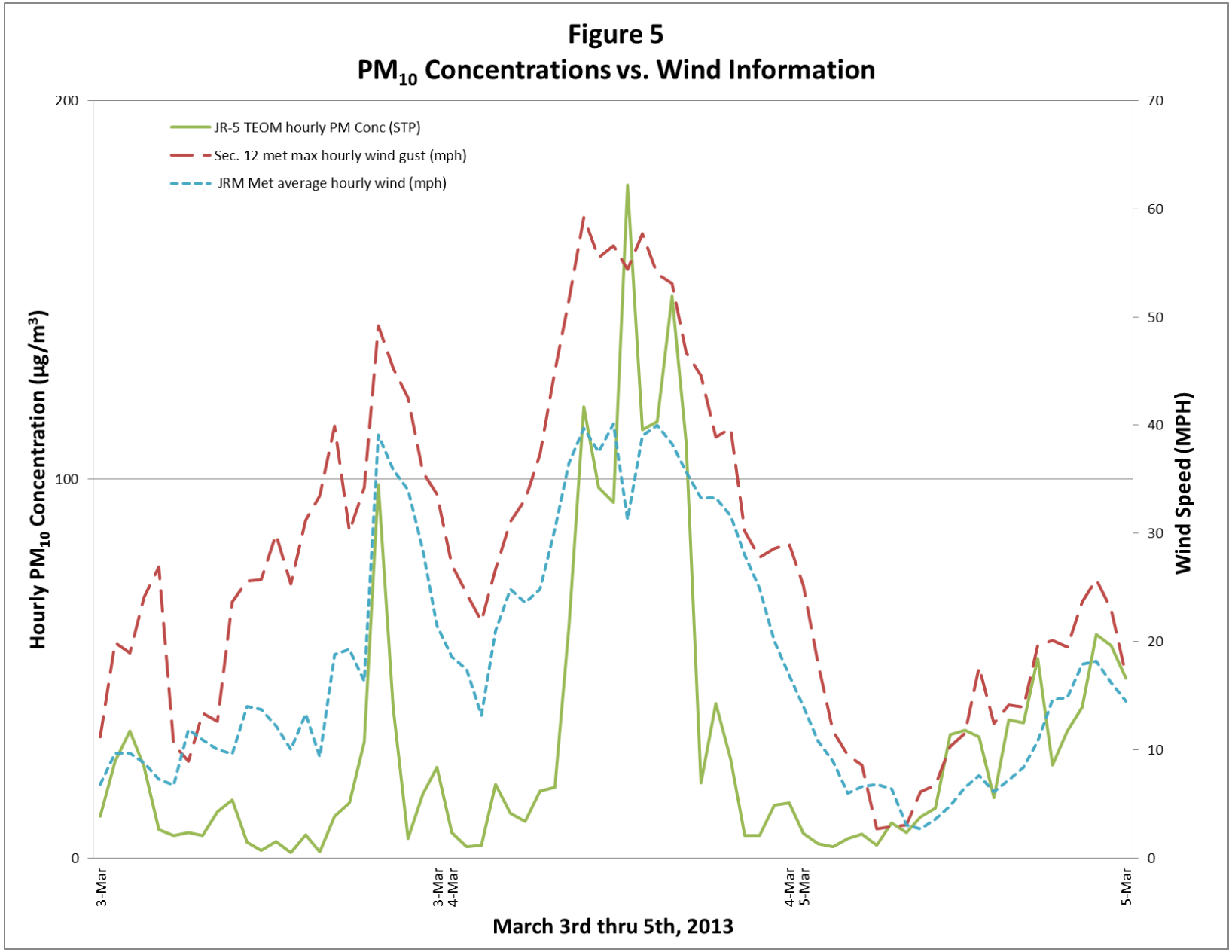


Figure 5
PM10 Concentrations vs. Wind Information
JR-5 TEOM hourly PM Conc (STP)
Sec. 12 met max hourly wind gust (mph)
JRM Met average hourly wind (mph)
Hourly PM10 Concentration (µg/m3)
Wind Speed (MPH)
200
100
0
70
60
50
40
30
20
10
0
3-Mar
3-Mar 4-Mar
4-Mar 5-Mar
5-Mar
March 3rd thru 5th, 2013

F. The High Wind Event Was A Natural Event

A high wind event is classified as a natural event in cases where windblown dust is entirely from natural sources or where all significant anthropogenic sources of windblown dust have been reasonable controlled. In this demonstration, TBCC has first identified those particular anthropogenic sources at the BTM (mining activities and disturbed areas) that were located upwind of the 36 Site TEOM monitor during extended periods of high winds. Those were the "significant anthropogenic sources" on March 4, 2013 that had to be reasonable controlled in order for the high wind event to be classified as a natural event.

TBCC has shown herein (1) how each of the "significant" disturbed areas was reasonable controlled with the applicable BACM required, and (2) how each of the "significant" mining activities was reasonable controlled through implementation of practical and appropriate reactionary control measures that were consistent with the control scheme within BTM's permitted Action Plan.

Therefore, because a high wind event occurred and the significant sources of windblown dust were reasonably controlled, the high wind event also constituted a natural event on that day.

G. The Measured Exceedance Would Not Have Occurred But For The High Wind Event

The demonstration of a high wind event must also show that the measured concentration would have been below the applicable NAAQS without the impact of the high winds. However, that showing generally does not need a single or precise approximation of the estimated air quality impact from the event. Rather, for events where the typical concentration would not have been an exceedance but for the high winds may be relatively straightforward and a qualitative explanation may be acceptable.

The circumstances of the particular high wind event, justify a qualitative explanation for why the exceedance on that day would not have occurred but for the high wind event. First, the previous historical fluctuations analysis showed that the typical 24-hour PM_{10} concentration at the 36 Site TEOM monitor over the past three years to be 25 $\mu g/m^3$. This is well below the NAAQS of 150 $\mu g/m^3$. The measured concentration of 166.6 $\mu g/m^3$ on March 4, 2013 was nowhere near the average concentration that would otherwise have been expected at the 36 Site TEOM monitor on that day.

Second, a previous analysis herein compared hourly concentrations at the 36 Site TEOM monitor on March 4, 2013 to hourly concentration at the site on another day. During those two days, wind directions were virtually the same, except wind speeds for the two days were different. On March 4,

2013 wind speeds ranged from 15.1-42 mph, while wind speeds on March 7, 2012 were, except for a few outlying hours, below the high wind threshold of 20 mph. With all key factors other than wind speed being roughly the same on the 2 days, the 24-hour average particulate concentrations varied significantly from 166.6 to 23.4 $\mu g/m^3$. This supports the fact that a high wind event was certainly responsible for the much higher 24-hour average PM_{10} concentration for that day.

Finally, on March 4, 2013 a full suite of BACM had been in place on all disturbed areas that could have contributed significantly to the measured exceedance. Moreover, BTM took extraordinary measures to mitigate emissions not only from active mining sources that appear to have contributed significantly to the measured exceedance but also from the remaining active sources throughout the mine, even though those latter sources were not implicated as significant contributors to the exceedance. Even though BTM shut down several large pieces of equipment and curtailed the rest as noted earlier, sustained wind speeds being well above the high wind threshold, most, if not all, of the BACM were overwhelmed. Emission reductions achieved by reactionary control measures were not able to offset enough of the emission increase caused by the extreme high winds. In spite of the comprehensive and extreme control measures implemented an exceedance of the 24-hour PM_{10} NAAQS was measured by one of BTM's ambient monitors.

In light of those considerations, TBCC believes the measured exceedance is a perfect example of an uncontrollable high wind event. Sources upwind of the measured exceedance were reasonably controlled, but the magnitude and the long duration of the high winds on that day plainly caused our controls to be inadequate. Had the high winds not overwhelmed the reasonable controls in place, the likelihood that an exceedance would still have occurred is very minimal.

The weight of the evidence presented herein that high winds caused the exceedance is very persuasive. A finding that the measured exceedance at the 36 Site TEOM monitor would not have occurred but for the high winds is the only reasonable conclusion that the evidence clearly supports.

CONCLUSION

On March 4, 2013, sustained high winds impacted normal operations at Black Thunder Mine. At the end of the day, an exceedance of the PM_{10} NAAQS was recorded at the 36 Site TEOM PM_{10} monitor. The proceeding discussion has demonstrated just how strongly the occurrences are interrelated.

In particular, the demonstration above has shown that on March 4, 2013 (1) a natural event in the form of high winds, were present at the BTM and that (2) those high winds affected air quality in the general area and at the 36 Site TEOM monitor, in particular. Moreover, the demonstration herein has shown that (3) the measured exceedance at the 36 Site TEOM monitor was far in excess of the normal fluctuations recorded by this monitor, and that (4) there was a clear causal relationship between the persistent high winds and the measured exceedance. In addition, the above demonstration has shown that (5) a high wind event occurred because BTM's significant anthropogenic and natural sources of dust were overwhelmed by the high winds. Finally, the demonstration herein has shown that (6) the measured exceedance would not have happened in the absence of high, and at times, exceptionally high, wind speeds from predominately northwest winds which overwhelmed the reasonable controls in place at the Black Thunder Mine.

In sum, the demonstration has shown that the measured PM_{10} NAAQS exceedance on March 4, 2013 was caused by a high wind event.

Exhibit 1

From: Tanner Shatto [mailto:tanner.shatto@wyo.gov]
Sent: Monday, March 04, 2013 11:50 AM
To: Adam Stephens; Allison Kalpin (CPE); Amber Potts; Belle Ayr Dispatch; Bernadette Hinshaw; Beth Goodnough; Bill Boger; Bill Jenkins; Bob Edwards; Stowe, Robert; Brad Steidley; Brent Helms; Brian Hansen; Brian Percifield; Caballo Guards; Cara Keslar; Chris Hanify; Cody Weatherly; Craig Weber; DaLyn Hugo; Darla Potter; Darryl Maunder; Darryl Maunder; Kline, David; Dorran Larner; Eagle Butte Dispatch; Shinkle, Gordon; J Vauthier; Jack Clary; Jamie O'Dell; Jeffrey Goldsmith; Jeffrey Hancock; Jim Smith; Judy Stallman; Blake, Justin; Hampleman, Kevin; Keith Guille; Ken Grey; Kim Deti; KOAL; Landon Smith; Laura Ackermann; Blake, Laura; Laurel Vicklund; Craft, Lecia; Sweet, Lynn; Mark Thrall; Minestar Dispatcher; Michael Thiry; Williams, Monica; NARM Security; Rawhide Security; Rena Knezovich; Rick Comer; Robert Gill; Rose Basko; Norman, Scott; Scott Rexroat; Staci Hammond; Stevan Mueller; Tim Mendenhall; Tom Osborn; Tom Ruff; Hutchinson, Wendy
Subject: High Wind Alert

I pulled this alert from Weather Underground, I have reports of the same conditions in the Southern PRB.

Northern Campbell
Winter Weather Advisory
Statement as of 9:30 AM MST on March 04, 2013

... Winter Weather Advisory remains in effect until 8 PM MST this evening...

A Winter Weather Advisory remains in effect until 8 PM MST this evening.

* Timing... late this morning into this evening.

* Main hazard... periods of snow... combined with northwest winds of 30 to 40 mph with gusts to around 50 mph... will greatly reduce visibility at times due to blowing snow.

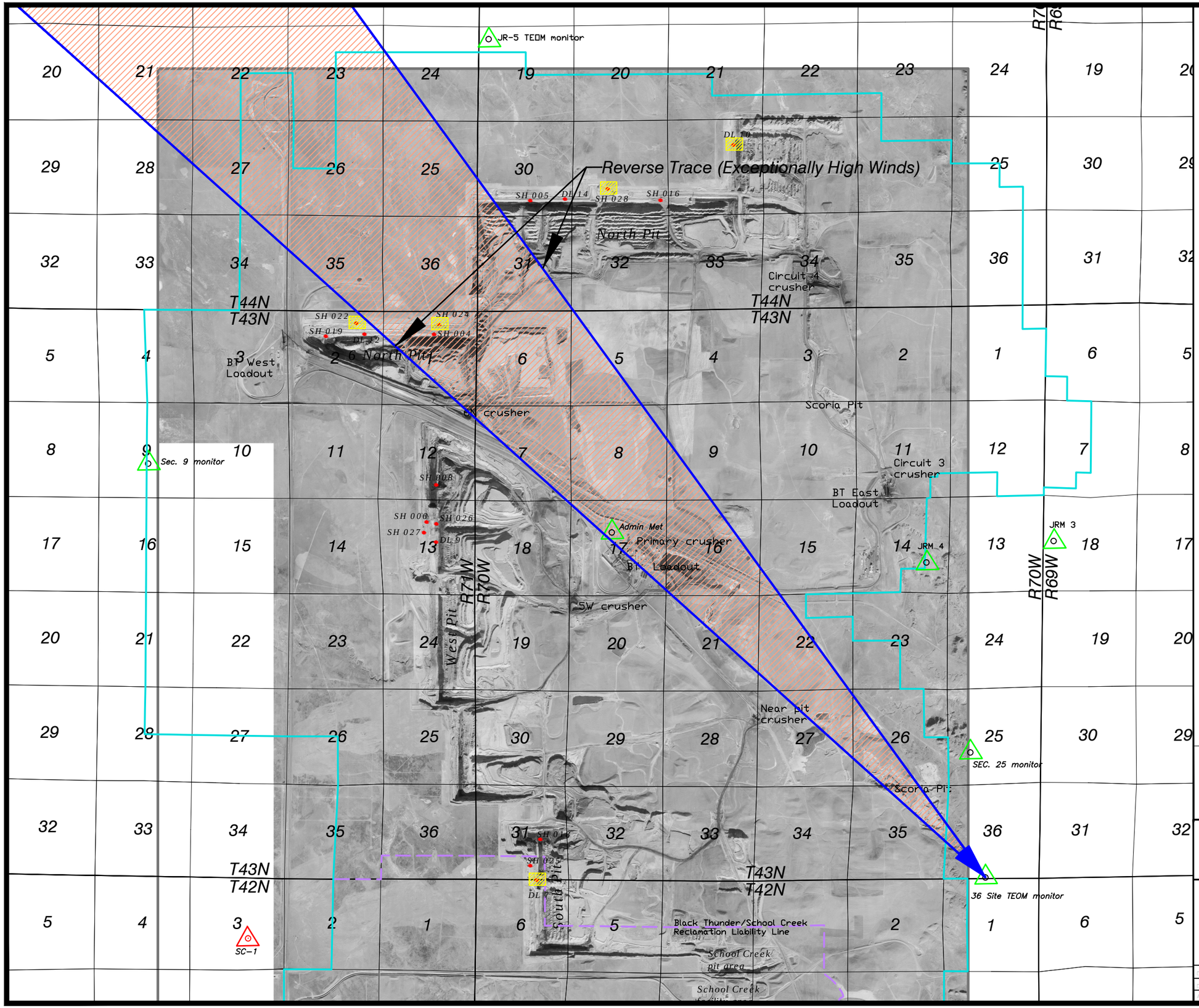
* Other conditions... snow accumulations into this evening will generally be up to an inch... with local amounts up to 2 inches possible.

Precautionary/preparedness actions...

A Winter Weather Advisory for snow and blowing snow means reduced visibility will create hazardous conditions. Use caution when outdoors or traveling.

--
Tanner B. Shatto
District 3 Engineer
Wyoming Department of Environmental Quality
Air Quality Division
Direct: (307)675-5626
Office: (307)673-9337
Fax: (307)672-2213
tanner.shatto@wyo.gov

E-Mail to and from me, in connection with the transaction of public business, is subject to the Wyoming Public Records Act and may be disclosed to third parties.



Black Thunder LNCM

Wind Direction during Exceptionally High Wind

Equipment Shutdown on 4March2013

Black Thunder Air & Met Monitoring Sites

School Creek Mine Air Monitoring Sites

SH Shovel

DL Dragline

N

Thunder Basin Coal Company

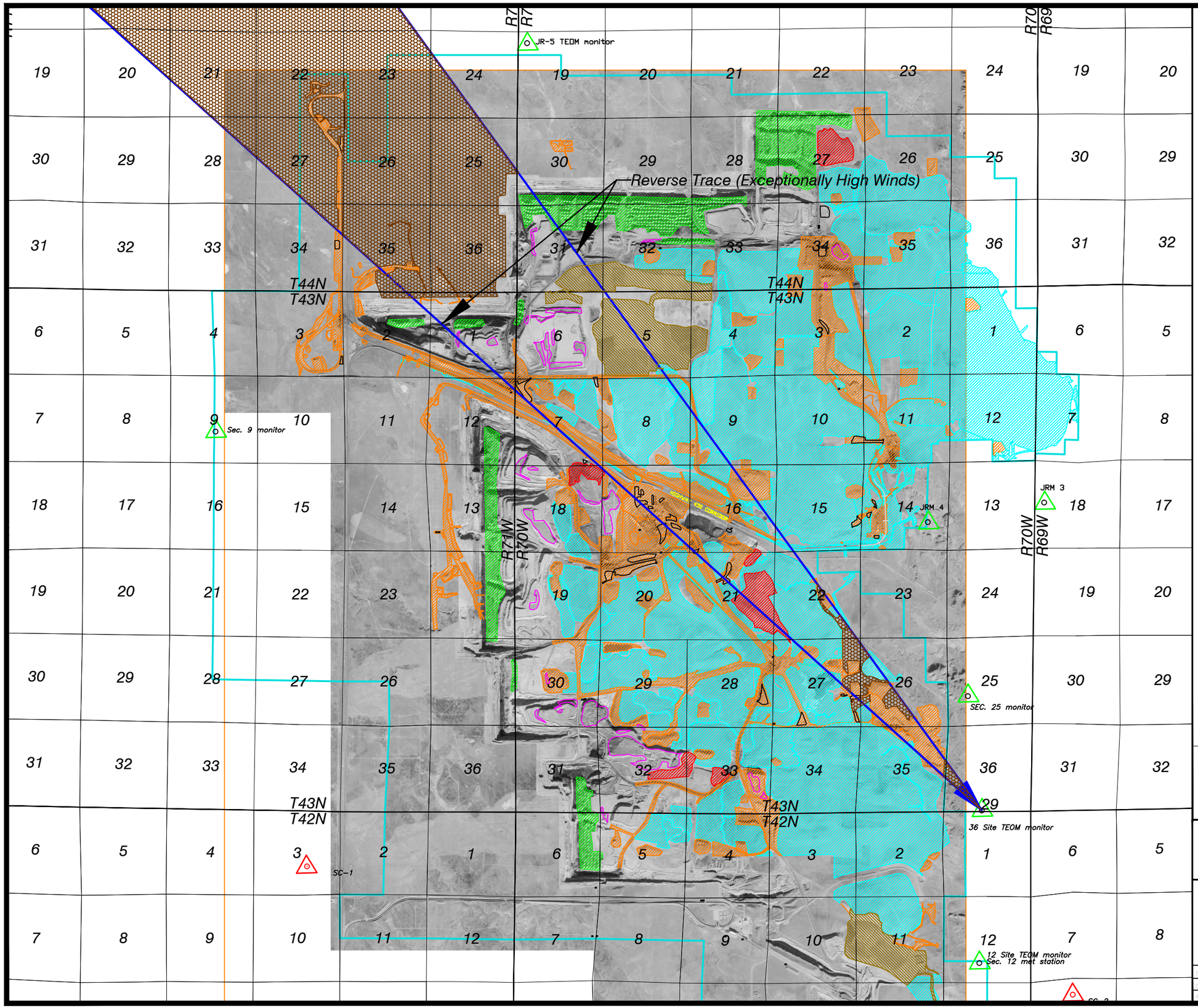
Black Thunder Mine
P.O. Box 405 Wright, WY 82732

ARCH WESTERN RESOURCES, LLC

Permit No. 233

Exhibit 2
BLACK THUNDER MINE
Reverse Trace with Equipment and Monitor Locations

Designed/Engineered by: D. Kline	Scale: No Scale	File: Exhibit 2.dwg	
Drawn by: D. Kline	Date: 29March2013	Ortho Date: 2012	
Approved/Checked by:	Page: 1 of 1		



Black Thunder LNCM

Permanent Reclamation Areas

Rough Graded Areas

Rough Spoil Areas

Rough Dump Areas

Long Term Mining and Reclamation Facilities Areas

Rocked Areas (Excluding haulage routes)

Topsoiled and Ripped - Not Planted Areas

Native Lands

Black Thunder Air & Met Monitoring Sites

School Creek Mine Air Monitoring Sites

N

Thunder Basin Coal Company

Black Thunder Mine

P.O. Box 405 Wright, WY 82732

ARCH WESTERN RESOURCES, LLC

Permit No. 233

Exhibit 3

BLACK THUNDER MINE

Reverse Trace with Land Status and Monitor Locations

Designed/Engineered by:	D. Kline	Scale:	No Scale	File:	Exhibit 3.dwg
Drawn by:	D. Kline	Date:	29March2013	Ortho Date:	2012
Approved/Checked by:		Page:	1 of 1		