WILDEARTH GUARDIANS
A FORCE FOR NATURE

August 6, 2014

Via E-mail Attachment and
Certified U.S. Mail, Return Receipt Requested

Duane Spencer
Field Manager
Buffalo Field Office
U.S. Bureau of Land Management
1425 Fort St.
Buffalo, WY 82834

Re: Significant New Information Regarding the Air Quality Analysis for the Draft Buffalo Resource Management Plan

Dear Mr. Spencer:

WildEarth Guardians writes to submit significant new information to the U.S. Bureau of Land Management ("BLM") regarding the air quality and climate impacts of land and minerals management activities that would be authorized through the approval of a revised Buffalo Resource Management Plan ("RMP").

Our organization previously commented extensively on the BLM's Draft RMP and the associated Draft Environmental Impact Statement ("DEIS"). In those comments, we provided detailed information showing how the DEIS failed to adequately analyze potentially significant air quality and climate impacts associated with proposed actions that would make vast acreages in the Buffalo Field Office open to oil, gas, and coal development, all heavily polluting industrial activities. We specifically noted that the Agency's analysis of air quality impacts utilized inaccurate emission inventory data, did not conduct quantitative modeling of ozone and other air quality impacts, overlooked monitoring data from the region indicating current air quality conditions were much worse than the BLM disclosed, and underestimated greenhouse gas emissions associated with fossil fuel development activities. *See* Comments of Western Environmental Law Center, et al. on the Proposed Buffalo RMP and DEIS (Sept. 26, 2013).

Since those comments were submitted, the BLM completed updates to its air quality impacts analysis as part of the Powder River Basin Coal Review, which revised previous analyses of the existing and cumulative impacts of coal development in southeastern Montana and northeastern Wyoming, including the Buffalo Field Office. *See* AECOM, "Task 1A Report for the Powder River Basin Coal Review Current Air Quality Conditions," available online at http://www.blm.gov/pgdata/etc/medialib/blm/wy/programs/energy/coal/prb/coalreview/task1a.Par.2390.File.dat/Task1Afinal.pdf, and AECOM, "Task 3A Report for the Powder River Basin

Cumulative Air Quality Effects," available online at http://www.blm.gov/pgdata/etc/medialib/blm/wy/programs/energy/coal/prb/coalreview/task3a.Par.8822.File.dat/Task3Afinal.pdf.

Although these reports, which were first made publicly available in February of 2014—after the public comment period on the Buffalo RMP and DEIS closed—provide insightful updates to previous Powder River Basin Coal Review air quality analyses released nearly five years ago, we are greatly concerned that the latest Task 1A and 3A reports are riddled with deficiencies and inaccurately disclose the potentially significant direct, indirect, and cumulative air quality impacts of coal mining in the Powder River Basin. As these reports will no doubt inform the BLM's development of the Buffalo RMP and preparation of any associated EISs, including analyses of the impacts of coal mining and the impacts of oil and gas development, we are greatly concerned over their shortcomings.

Attached to this letter is an expert report critiquing the most significant flaws in the updated 1A and 3A reports. This report, prepared by Cindy Copeland for WildEarth Guardians, found that:

- The monitoring data presented in the reports does not include all of the currently operating monitoring sites in the Powder River Basin, and as a result, elevated pollutant concentrations are not disclosed;
- The nitrogen oxide ("NO_X") emissions inventory underestimates current emissions by at least 25,000 tons per year;
- The modeling analysis under-predicts ozone and other air quality impacts due to significantly underestimated NO_X emissions;
- The U.S. Environmental Protection Agency ("EPA") has already commented to BLM that the modeling analysis is seriously flawed;
- The modeling analysis does not follow EPA's modeling criteria for ozone and particulate matter less than 2.5 microns in diameter ("$PM_{2.5}$");
- The modeling fails to utilize proper methods for analyzing impacts to the nitrogen dioxide ("NO_2") national ambient air quality standards; and
- Greenhouse gas emissions are significantly underestimated.

Overall, the findings indicate that the reports fail to adequately analyze and assess air quality impacts and in doing so, fail to provide any basis for the BLM to conclude that coal mining, oil and gas development, and other activities that may be authorized under the Buffalo RMP will protect federal air quality standards in accordance with the Federal Land Policy and Management Act, 43 U.S.C. § 1712(c)(8).

Importantly, these findings reaffirm that the DEIS for the Buffalo RMP is wholly inadequate under the National Environmental Policy Act ("NEPA") and in need of revision pursuant to 40 C.F.R. § 1502.9(a). These findings continue to demonstrate that the BLM is not analyzing air quality and climate impacts based on accurate emission inventories, that the methodologies utilized in the DEIS to analyze and assess air quality continue to be scientifically unsound, and that the Agency continues to discount actual monitoring data demonstrating that current air quality conditions are worse than disclosed, indicating that future air quality is very

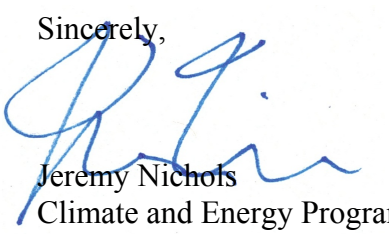
likely to be in jeopardy under the Buffalo RMP. Given the extensive amount of coal mining and oil and gas development that would be authorized by the RMP, the BLM cannot continue to turn a blind eye to the shortcomings of its air quality analyses.

We would add that these findings are especially of concern in light of expanded unconventional oil and gas drilling in the area. We note that neither the DEIS for the Buffalo RMP nor the updated Task 1A and 3A reports address the expansion of horizontal oil and gas drilling targeting shale formations in the area. The BLM has already approved dozens of drilling permits for horizontal wells with limited to no environmental analysis whatsoever. Furthermore, the neighboring Casper Field Office has proposed to approve 5,000 oil and gas wells next to the Buffalo Field Office, many of which will be horizontal wells. *See* BLM, "BLM to Initiate Environmental Impact Statement for Converse County Oil and Gas Project," http://www.blm.gov/wy/st/en/info/news_room/2014/may/16cfo-converse.html (*see also* 79 Fed. Reg. 28538-28539 (May 16, 2014)). The air quality impacts of the Buffalo RMP now are significantly underestimated, but with the absence of any consideration of the air quality impacts of unconventional oil and gas development, they defy reality.

Given that the EPA has also called on the BLM to revise the Buffalo RMP DEIS to address inadequate analyses of surface and groundwater impacts (*see* EPA, Comments on Draft Buffalo RMP and DEIS (Nov. 7, 2013)), it makes sense to undertake such a revision to ensure that air quality impacts are effectively analyzed and assessed to ensure a well-informed RMP decision.

We request this letter and the attached critique of the Task 1A and 3A reports be included in the record for the Buffalo RMP and EIS. Thank you for responding to our comments and for ensuring the scientific and legal integrity of the RMP process.

Sincerely,



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enc: Technical Comments on the Bureau of Land Management's Air Quality Assessment Portion of the Powder River Basin Coal Review, Task 1A and 3A Reports, Comments by Cindy Copeland (July 7, 2014)

cc: Neil Kornze, Director, U.S. Bureau of Land Management
Linda Lance, Deputy Director, U.S. Bureau of Land Management
Don Simpson, Wyoming State Office Director, U.S. Bureau of Land Management

Technical Comments on the Bureau of Land Management's Air Quality Assessment Portion of the Powder River Basin Coal Review, Task 1A and 3A Reports

Comments by Cindy Copeland[1]
for WildEarth Guardians

July 7, 2014

These technical comments analyze the air quality impacts analysis that was conducted for the Bureau of Land Management's (BLM) updated Powder River Basin Coal Review (Coal Review), dated February 2014. The BLM's High Plains District Office and the Wyoming State Office released new reports under Phase II of the Coal Review. The new reports, titled, "Task 1A Report for the Powder River Basin Coal Review Current Air Quality Conditions," and "Task 3A Report for the Powder River Basin Cumulative Air Quality Effects," were developed by AECOM for the BLM. A modeling analysis was conducted for the updated Coal Review, using 2008 base year emissions to model cumulative impacts for 2008 as well as projected future year emissions for 2020 and 2030.

The Powder River Basin includes nine counties in both Montana and Wyoming; Big Horn, Custer, Powder River, Rosebud and Treasure Counties in Montana as well as Campbell, Converse, Johnson and Sheridan Counties in Wyoming. The Powder River Basin is home to the 10 largest open pit coal mines in the country[2], as well as many large coal fired power plants and significant oil and gas development. Federal lands and minerals are managed in the region primarily by the BLM as part of the Buffalo Field Office in Wyoming and the Miles City Field Office of Montana.

An air quality analysis was performed for the revised Coal Review that includes a modeling analysis for NO_2, ozone and $PM_{2.5}$. However, there are a number of critical flaws in BLM's analysis, among them:

- The monitoring data presented in the Coal Review do not include all of the currently operating monitoring sites in the Powder River Basin, and as a result, elevated pollutant concentrations are not disclosed;
- The NO_X emissions inventory underestimates current emissions by at least 25,000 tons per year;
- The modeling analysis under-predicts impacts due to the massively underestimated NO_X emissions;
- EPA has already commented to BLM that the modeling analysis is seriously flawed;

[1] CV attached
[2] US Energy Information Administration, http://www.eia.gov/coal/annual/pdf/table9.pdf

- The modeling analysis does not follow EPA's modeling criteria for ozone and $PM_{2.5}$ and the CAMx model used is not an acceptable method for modeling the NO_2 NAAQS; and
- Greenhouse gas emissions are underestimated in the Coal Review.

The emission inventory used in the modeling is highly inaccurate in the case of NO_X emissions, rendering the modeled predicted air quality impacts much lower than they should be. Both the EPA's National Emissions Inventory (NEI) and Wyoming's Department of Environmental Quality's (WDEQ) most recent emission inventories show much higher levels of NO_X emissions than were used in the Coal Review. The Task 1A report of the Coal Review uses 2008 as the base year, relying on inventory data from a combination of sources, including the 2005 and 2008 NEI, Western Regional Air Partnership (WRAP) inventories (for certain oil and gas sources), and a 2011 BLM inventory. The Task 1A Report shows that the coal mine NO_X emissions used in the modeling are extremely low, with a total of 4,549 tons per year (tpy) NO_X used for all coal mines in the 4-km grid modeling domain. However, according to EPA's 2011 National Emission Inventory (NEI) data, NO_X emissions from the Powder River Basin coal mines, in both Wyoming and Montana, totaled over 29,000 tpy.[3] Likewise, WDEQ's 2011 minor source emission inventory shows over 28,700 tpy NO_X emissions recorded for 11 mines in the Wyoming portion of the Powder River Basin.[4]

The fact that EPA has commented adversely in regards to the under-predictions in the Coal Review modeling analysis on several occasions fuels these concerns. In a 2013 comment letter to BLM, EPA stated:

> Based on the response to our comments [response to comments dated June 2013], our concerns/comments were not sufficiently addressed and the project moved forward without attempting to improve the model's performance. Given our concerns with the performance of the model, we do not feel confident in the predicted air quality impacts (NAAQS exceedances, visibility, deposition), and we are also concerned that the model might not be reliable for evaluating air quality impacts of future projects in the region. Further, it is difficult to determine how much the model errors and biases will impact the predicted air quality results.[5]

Past comments submitted by non-governmental organizations on documents prepared by the BLM under the National Environmental Policy Act (NEPA) have also pointed to the same problems. The September 26, 2013 comments from the Western Environmental Law Center, WildEarth Guardians, Powder River Basin Resource Council, and others on the Draft Buffalo Field Office Resource Management Plan (RMP), commented that based on a review of available BLM coal lease Environmental Impact Statement documents, the current NO_X emissions for the Powder River Basin may be as high as 21,074 tons per

[3] EPA, The 2011 National Emissions Inventory, http://www.epa.gov/ttn/chief/net/2011inventory.html
[4] WDEQ 2011 Minor Source Actual Inventory
[5] EPA Air Program, Powder River Basin Coal Review – Air Quality Effects, Summary of Comments, November 13, 2013, 1.

year.[6] These problems need to be addressed so that the final Buffalo RMP and all other future air quality plans for the Powder River Basin accurately analyze and mitigate air quality impacts.

I. Current Air Quality Conditions in the Powder River Basin

The Task 1A Report presents air quality monitoring data between 2008 and 2012 for one monitor in Campbell County, Wyoming and one monitor in Rosebud County, Montana (note that the monitors used in Task 1A are different depending on the pollutant being presented). Unfortunately, these monitors do not always represent the highest data for the Powder River Basin. The report should include comprehensive monitoring data for the nine-county Powder River Basin in order to present an accurate picture of the status of the air quality in the area.

In addition, Table 3-3, which presents the data in the Task 1A Report, only presents data under the heading "Pollutant Level" with no explanation of what pollutant level this refers to. After examination of the air quality data from EPA's AirData website (which provides access to monitored air quality data from EPA's Air Quality System Data Mart) it appears that the "Pollutant Level" presented in the Coal Review uses the 98th percentile of recorded 1-hour or 24-hour values in the case of NO_2 and $PM_{2.5}$ while the annual fourth highest daily maximum 8-hour concentration is used for ozone. While EPA uses these levels when determining attainment status for a particular area, the Coal Review should also present the highest data recorded in order to properly analyze the status of the air quality in the area. The BLM must acknowledge the existing air quality concerns in the Powder River Basin and recognize that high background levels of air pollutants can mean that the aggregate level of pollution in the area results in significant detrimental effects on human health and the environment and the expected increase in air pollution will only increase these already elevated pollutant levels.

The following sections of these comments present more comprehensive and representative 1-hour NO_2, 8-hour ozone and 24-hr $PM_{2.5}$ monitoring data for the Powder River Basin from 2008 through 2013, where available. These particular pollutants and averaging periods were chosen to highlight in these comments because they are of greatest concern in the region.

A. NO_2 Monitoring Data Show Dangerous Levels of Pollution in the Powder River Basin

Table 1 lists the available 1-hour NO_2 monitoring data for 2008 through 2013 for all monitors in the Powder River Basin. Most of the monitors do not have all six years of data due to the monitors having been set up later, shut down or relocated. The Task 1A Report, Table 3-3 uses data from the Northern Cheyenne, Garfield Peak NO_2 monitoring site, located in Rosebud County and the South Campbell County NO_2 monitoring site.

[6] Western Environmental Law Center, WildEarth Guardians, Powder River Basin Resource Council, Sierra Club and Climate Solutions, Comments on Draft Buffalo Resource Management Plan, September 26, 2013, 11-12.

The level of the 1-hour NO_2 National Ambient Air Quality Standards (NAAQS) is 100 parts per billion (ppb).

There are five NO_2 monitoring sites that operated during all or a portion of the time between 2008 and 2013. The Northern Cheyenne monitoring site recorded several high values in 2009-2012. Table 3-3 in the Task 1A Report shows that this monitoring site recorded three 1-hour NO_2 exceedances during both 2009 and 2011, one exceedance during 2010 and two exceedances during 2012. But the Coal Review fails to show just how high these exceedances were because Table 3-3 of Task 1A only includes the 98th percentile of recorded 1-hour values. As shown in Table 1 below, the first maximum 1-hour NO_2 value during 2009 was 215 ppb (while the 2nd maximum value was 145 ppb, the 3rd maximum value was 109 ppb and the 4th maximum value was 100 ppb). The data for 2011 and 2012 were also exceedingly high: during 2011, the first maximum 1-hour NO_2 value was 360 ppb, the 2nd highest was 298 ppb and the 3rd highest was 177 ppb and during 2012, the first maximum value was 335 ppb and the 2nd maximum value was 108 ppb. The Northern Cheyenne, Badger Peak NO_2 monitor recorded one exceedance in 2012, at 147 ppb.[7] The Coal Review needs to disclose how high these concentrations were and must either use them as the highest representative background values for the air quality modeling analysis or explain why these values do not represent air quality for the Powder River Basin. These high monitored values have not been flagged as due to exceptional or natural events nor have they been marked invalid in any other way in EPA's AirData system.

Regarding the NO_2 monitoring stations in Wyoming, there are eight sites that operated during at least part of the years included in this analysis. Data from the South Campbell County NO_2 monitoring site are included in the Coal Review's Task 1A. This site, along with the Thunder Basin National Grassland site, are the only monitors with data from 2008 in the Wyoming portion of the Powder River Basin, but the Belle Ayr Mine NO_2 special purpose monitor, which is also in Campbell County has recorded higher maximum values than the South Campbell County site and should be considered in this analysis. This monitor has recorded high values around 60 and 70 ppb in recent years. WDEQ's Wyoming Ambient Air Monitoring Annual Network Plan 2013 describes the objectives of the NO_2 monitors in the Powder River Basin. According to WDEQ, "The Belle Ayr Monitor is located near the rail road and represents a "maximum concentration" in and around the coal mines. The Antelope Station is located away from mining activities and is considered to be background."[8] Unfortunately, the Antelope Station has not been operating due to difficulties in obtaining a new electrical supply. Therefore, it is critical that data from the Belle Ayr Mine be included in the Coal Review's analysis in order to present data more representative of air impacts from the coal mines.

[7] EPA, AirData, Interactive Map, http://www.epa.gov/airquality/airdata/ad_maps.html
[8] WDEQ, Wyoming Ambient Air Monitoring Annual Network Plan 2013, 27 June 2013 https://deq.state.wy.us/aqd/downloads/AirMonitor/Network%20Plan_2013_Final.pdf, 34.

Table 1. 2008-2013 Powder River Basin 1-Hour Nitrogen Dioxide Monitoring Data[9]

State	County Name	Monitor Site	Site Number	Year	First Maximum 1-Hour NO_2 Value (ppb)	98th Percentile (ppb)
MT	Rosebud	Northern Cheyenne Indian Reservation	300870760	2008	48	40
				2009	22	12
				2010	40	15
				2011	19	7
				2012	30	14
		Northern Cheyenne, Garfield Peak, Colstrip	300870761	2008	9	6
				2009	215	59
				2010	103	31
				2011	360	39
				2012	335	48
		Northern Cheyenne, Badger Peak, Colstrip	300870762	2008	39	22
				2009	19	10
				2010	29	12
				2011	14	11
				2012	147	14
		Birney - Tongue River	300870001	2010	13	9
				2011	13	7
				2012	16	8
				2013	18	6
	Powder River	Broadus	300750001	2010	55	24
				2011	21	15
				2012	32	10
				2013	14	9
WY	Campbell	Thunder Basin National Grassland	560050123	2008	14	12
				2009	14	11
				2010	15	11
				2011	15.8	11.3
				2012	24.7	11.2
				2013	10.9	8.5
		Gillette: College Tech Center	560050800	2012	39.3	32.2
		South Campbell County	560050456	2008	48	33
				2009	40	29
				2010	35	32
				2011	46.1	33.4
				2012	37.6	31.9
				2013	39.4	31.6
		Belle Ayr Mine BA-4 (monitor #1)	560050892	2009	74	24
				2010	70	34
				2011	44	36

[9] EPA, AirData, Interactive Map, http://www.epa.gov/airquality/airdata/ad_maps.html

				2012	61.1	34.3
				2013	52	35.1
		Hilight-Reno Junction Gas Plant	560050011	2012 (partial year)	58	46
				2013	59	52
	Converse	Antelope Site 3 (Antelope Coal Company)	560090819	2009	32	30
				2010 (partial year)	34	33
		Mobile #3, Converse County	560090801	2013	26.7	22.8
		Tallgrass Energy Partners, Converse County	560090008	2013 (partial year)	37.1	35.8

In EPA's proposal for the NO_2 primary NAAQS, EPA proposed to set the level of the new 1-hour standard within the range of 80 to 100 ppb and solicited comment on standard levels as low as 65 ppb and as high as 150 ppb.[10] In the end, EPA finalized the standard at 100 ppb, but that was set at the upper limit of the recommendations from the Clean Air Science Advisory Board (CASAC). In advising EPA on the level of the 1-hour NO_2 standard, CASAC wrote that, "The evidence reviewed in the REA [Risk and Exposure Assessment] indicates that adverse health effects have been documented in clinical studies of persons with asthma at 100 ppb and the REA finds "...strong support for a level at or below 100 ppb…"" CASAC firmly recommends that the upper end of the range not exceed 100 ppb, given the findings of the REA."[11]

Comments on EPA's proposed NO_2 NAAQS submitted by the American Lung Association, Earthjustice, Environmental Defense Fund and the Natural Resources Defense Council, recommend that EPA set the level of the 1-hour NO_2 standard at no more than 50 ppb with a 99th percentile averaging time. These comments summarize epidemiological studies reviewed by EPA in the Risk and Exposure Assessment and the Integrated Science Assessment, as well as documented by CASAC, that point to adverse health effects at levels much lower than 100 ppb. These groups commented to EPA that rather than setting the level of the 1-hour NO_2 standard at the upper end of the range of health impacts, the level of the NAAQS should be placed below the mean concentrations, explaining:[12]

> Rather than look to the highest concentrations during the study period, EPA should look at the mean concentrations at which effects occurred (as

[10] EPA, Primary National Ambient Air Quality Standard for Nitrogen Dioxide, Proposed Rule, 15 July 2009, 74 FR 34404.
[11] Science Advisory Board letter to EPA Administrator Johnson, Clean Air Scientific Advisory Committee's (CASAC) Review Comments on EPA's Risk and Exposure Assessment to Support the Review of the NO_2 Primary National Ambient Air Quality Standard, 16 December 2008, 2.
[12] ALA, Earthjustice, EDF, NRDC, "Comments to the U.S. Environmental Protection Agency on the Proposed Rule for the Primary National Ambient Air Quality Standard for Nitrogen Dioxide," 14 September 2009, 7-16.

> well as 1 standard deviation below the mean) and set a standard below this level that incorporates a margin of safety to protect against the adverse effects. Given that harm occurred at much lower concentrations, a standard based on the highest levels only cannot possibly protect public health.[13]

Indeed, the primary NO_2 NAAQS is currently under review by EPA.[14] Given that 1-hour NO_2 concentrations in the Powder River Basin are being recorded at levels in the range of documented adverse health effects, these data should be taken seriously regardless of whether there are currently exceedances or violations of the 1-hour NO_2 NAAQS. The Coal Review must consider the impact of the coal mines on air quality in the area and must accurately analyze their potential impacts by way of using the highest monitoring data in the air quality modeling analysis.

B. Ozone Monitoring Data Show Dangerous Levels of Pollution in the Powder River Basin

The BLM used 2008 as the base year for analysis in the Coal Review modeling, and the days selected for the analysis are elevated ozone days, at 69 ppb and 65 ppb,[15] but there are higher values that should have been analyzed for their appropriateness as a representation of a worst-case scenario in the modeling. Table 2 lists the available 8-hour O_3 monitoring data for 2008 through 2013 for all nine O_3 monitors in the Powder River Basin, as well as data for the Natrona monitor. Most of the monitors do not have all six years of data due to the monitors having been set up later, shut down or relocated. The current level of the 8-hour O_3 NAAQS is .075 parts per million (ppm), or 75 ppb, but EPA is expected to lower the level of the standard to a more protective level between .070 ppm (70 ppb) and .060 ppm (60 ppb) by 2015.[16]

In the Task 1A Report, Table 3-3 uses data from one monitor in Rosebud County and one from Campbell County, and as mentioned above, the annual fourth highest daily maximum 8-hour concentrations are listed. However, those two monitors do not have any recorded exceedances for the years shown but the South Campbell County monitor has several fourth highest maximum values approaching the level of the standard. The fourth highest value in 2012 is 69 ppb, while the first maximum value in the same year is 75 ppb (see Table 2), or at the level of the standard. These high values need to be used in the Coal Review modeling to more accurately predict a worst-case scenario for the area. The ozone monitor in Gillette only has data for 2012, but that monitor also recorded a high value of 75 ppb and the Mobile #3 monitor in Converse County only has data for 2013, but it recorded a high value of 73 ppb. In 2012, the Thunder Basin National Grassland ozone monitor recorded a high value of 88 ppb while the Devil's Tower National Monument ozone monitor recorded 4 exceedances of the 8-hour standard, at 79 ppb, 78

[13] Ibid, 11.
[14] EPA, 10 February 2012, 77 FR 7149.
[15] BLM, Coal Review Task 1A Final, 2-8.
[16] EPA, "Policy Assessment for the Review of the Ozone National Ambient Air Quality Standards: Second External Review Draft," EPA-452/P-14-002, January 2014, ES-2.

ppb and two exceedances of 77 ppb. The Coal Review sites an unusually prolific wild fire season for poor air quality in the Powder River Basin, but there are no days reported as exceptional event days in the EPA's AirData for these areas.[17] These high values should be used in the Coal Review modeling to represent a worst case scenario unless the BLM can show the high values were indeed due to wild fire and not caused by air pollution from the coal mines.

Table 2. 2008-2013 Powder River Basin 8-Hour Ozone Monitoring Data[18]

State	County Name	Monitor Site	Site ID	Year	First Maximum 8-Hour O3 Value (ppb)	Fourth Maximum 8-Hour O3 Value (ppb)
MT	Rosebud	Birney - Tongue River	300870001	2010	64	59
				2011	53	52
				2012	64	59
				2013	59	56
	Powder River	Broadus	300750001	2010	64	56
				2011	57	54
				2012	61	56
				2013	61	56
WY	Campbell	South Campbell County	560050456	2008	69	64
				2009	65	60
				2010	67	61
				2011	63	62
				2012	75	69
				2013	67	61
		Gillette: College Tech Center	560050800	2012	75	65
		Thunder Basin National Grassland	560050123	2010	69	63
				2011	67	61
				2012	88	71
				2013	66	61
		Devil's Tower	560111013	2010	71	58
				2011	64	57
				2012	79	77
	Converse	Mobile #3, Converse County	560090801	2013	73	67
		Tallgrass Energy Partners	560090008	2013 (partial year)	43	42
	Sheridan	Sheridan, WARMS Station	560330004	2013	63	58
	Natrona	Natrona	560252601	2011 (partial year)	63	61
				2012	66	62
				2013	64	57

[17] EPA, AirData, Interactive Map, http://www.epa.gov/airquality/airdata/ad_maps.html
[18] Ibid.

The importance of protecting the air quality for people who live in the Powder River Basin, and more importantly for sensitive populations, including children, the elderly and those with respiratory conditions, is huge. Exposure to ozone is a serious concern as it can cause or exacerbate respiratory health problems, including shortness of breath, asthma, chest pain and coughing, decreased lung function and even long-term lung damage.[19] According to a recent report by the National Research Council "short-term exposure to current levels of ozone in many areas is likely to contribute to premature deaths".[20] And because ozone is a regional pollutant, it is likely that the Powder River Basin coal mines are contributing to ozone pollution in nearby counties as well.

The level of the 8-hour ozone NAAQS is 75 parts per billion (ppb, or 0.075 parts per million (ppm)), set on March 27, 2008.[21] EPA is currently reviewing the ozone standard and a new, more conservative standard is expected to be promulgated soon. Based on increasing evidence showing adverse health impacts from ozone at lower levels, the Clean Air Scientific Advisory Committee (CASAC) has made recommendations to EPA. In its First External Review Draft of the "Policy Assessment for the Review of the Ozone National Ambient Air Quality Standards" EPA made a preliminary conclusion that, "With regard to CASAC advice, we note that the CASAC O_3 Panel has repeatedly recommended setting the level of the 8-hour O_3 standard no higher than 70 ppb, within a range of 60 to 70 ppb, which is below the level of the current standard (i.e., 0.075 ppm or 75 ppb)."[22] In considering the scientific evidence now available on short-term O_3 exposures, EPA Staff determined that:

> [T]he available evidence clearly calls into question the adequacy of the current standard and provides strong support for considering potential alternative standards to increase public health protection, especially for at risk groups. This preliminary conclusion places considerable weight on the array of O_3-related respiratory effects that have been reported following short-term exposures to O_3 concentrations below the level of the current standard, including clear evidence from controlled human exposure studies of lung function decrements, respiratory symptoms and pulmonary inflammation, as well as evidence of clearly adverse effects from epidemiologic studies, including respiratory hospital admissions and emergency department visits, and premature mortality.[23]

In a March 12, 2009 letter from Governor Freudenthal to EPA Region 8 detailing the 8-hour ozone designation recommendations from the state, the design values used for the

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[19] See EPA's National Ambient Air Quality Standards for Particulates and Ozone, 62 FR 38,856 (July 18, 1997).
[20] National Research Council, http://www.nationalacademies.org/morenews/20080422.html
[21] EPA, 73 FR 16436, effective 27 May 2008.
[22] EPA, OAQPS, Health and Environmental Impacts Division Ambient Standards Group, Policy Assessment for the Review of the Ozone National Ambient Air Quality Standards, First External Review Draft, August 2012, 4-45.
[23] Ibid, 4-43.

Campbell County (Gillette 456) and Thunder Basin National Grassland ozone monitors, while not showing violations, indicate high values. The design value for Campbell County was 0.067 ppm (67 ppb) for the 2005-2007 3-year average, while the 2006-2008 3-year average design value was 0.066 ppm (66 ppb). The 2005-2007 design value for Thunder Basin National Grassland was 0.069 ppm (69 ppb), while the 2006-2008 design value was 0.073 ppm (73 ppb).[24] If EPA lowers the level of the 8-hour ozone NAAQS to somewhere between 0.070 ppm (70 ppb) and 0.060 ppm (60 ppb), as is expected, these levels could constitute violations.

C. $PM_{2.5}$ Monitoring Data Show Dangerous Levels of Pollution in the Powder River Basin

Table 3 lists the available 24-hour $PM_{2.5}$ monitoring data for 2008 through 2013 for all monitors in the Powder River Basin. Most of the monitors do not have all six years of data due to the monitors having been set up later, shut down or relocated but these data show high maximum $PM_{2.5}$ values that should not be ignored. The level of the 24-hour $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS) is 35 micrograms per cubic meter ($\mu g/m^3$). In the Task 1A Report, Table 3-3 uses data from the Rosebud County (Birney – Tongue River) $PM_{2.5}$ monitoring site and the Belle Ayr Mine site in Campbell County. As explained above, it appears that the "pollutant level" reported in Table 3-3 (Task 1A of the Coal Review) is the level of the 98th percentile for a given year. And the table in the Coal Review notes that there are no data available for the number of NAAQS exceedances during the listed years. However, these data are available from EPA's AirData site. The data presented in Table 3-3 show that the 98th percentile for the Belle Ayr Mine site was 55 $\mu g/m^3$ for 2012. Indeed, during 2012, the Belle Ayr Mine recorded one $PM_{2.5}$ 24-hour NAAQS exceedance of 55.3 $\mu g/m^3$ and the 98th percentile for the same year is reported at 55.3 $\mu g/m^3$. In 2010, the same site also recorded a high value of 32.9 $\mu g/m^3$.

The Rosebud County monitor used in the Coal Review was not operating during 2008 and 2009, nor did it have any information available on exceedances. As Table 3 below shows, this monitor recorded an exceedance of 50.9 $\mu g/m^3$ in 2011. And in 2012, two exceedances of 41.3 $\mu g/m^3$ and 38.4 $\mu g/m^3$ were recorded, along with 3rd and 4th maximum values of 34.4 $\mu g/m^3$ and 34.1 $\mu g/m^3$, just below the level of the standard. The Coal Review must disclose these exceedances and use the values in a worst-case modeling scenario. The other $PM_{2.5}$ monitor in Montana, the Powder River County monitor, was also not operational during 2008 and 2009. The 2011 and 2012 highest maximum 24-hour values recorded for this monitor are also near the level of the standard, at 32.6 $\mu g/m^3$ and 32.2 $\mu g/m^3$ respectively.[25]

The Buckskin Mine monitoring site recorded a maximum $PM_{2.5}$ 24-hour value of 42.4 $\mu g/m^3$ and a second high value of 33.5 $\mu g/m^3$ in 2011. The Gillette: College Tech Center monitor only has data for 2012, but it recorded one exceedance during that year of 56.5

[24] Governor Freudenthal, 12 March 2009 letter to Carol Rushin, Acting Regional Administrator, EPA Region 8.
[25] EPA, AirData, Interactive Map, http://www.epa.gov/airquality/airdata/ad_maps.html

$\mu g/m^3$. And in 2011, the Black Thunder Mine monitor recorded one exceedance of 43.8 $\mu g/m^3$ and the Antelope Site #3 monitor recorded one exceedance of 47 $\mu g/m^3$ in 2012. The Sheridan monitor recorded one exceedance in 2009 of 38.6 $\mu g/m^3$ and has values in the range of 30 $\mu g/m^3$ during recent years.[26]

Table 3. 2008-2013 Powder River Basin 24-Hour $PM_{2.5}$ Monitoring Data[27]

State	County Name	Monitor Site	Site ID	Year	First Maximum Value (µg/m3)	98th Percentile (µg/m3)
MT	Powder River	Broadus	300750001	2010	16.8	13.5
				2011	32.6	21.4
				2012	32.2	25.2
				2013	20.8	15.3
	Rosebud	Birney - Tongue River	300870001	2010	12.2	10.9
				2011	50.9	17.3
				2012	41.3	29.3
				2013	17.1	10.9
WY	Campbell	Buckskin Mine North Site (monitor #1)	560051899	2008	11.8	11.8
				2009	15.9	12
		Buckskin Mine North Site (monitor #3)	560051899	2010	12.1	10
				2011	42.4	15.5
				2012	22.6	17.9
				2013	20.2	13.7
		Gillette: College Tech Center	560050800	2012	56.5	20.2
		Belle Ayr Mine BA-4 (monitor #1)	560050892	2008	19.9	14.5
				2009	22.5	12
				2010	10.1	10.1
		Belle Ayr Mine BA-4 (monitor #3)	560050892	2010	32.9	18.1
				2011	26.3	20.4
				2012	55.3	55.3
				2013	15.3	13.5
		Bell Ayr Mine BA-4 (monitor #4)	560050892	2013	15.6	11.5
		Black Thunder Mine, BTM 36-2 (monitor #1)	560005891	2009	9.6	9.5
				2010	10.5	10.5
		Black Thunder Mine, BTM 36-2 (monitor #2)	560005891	2008	17.3	17.3
				2009	10.3	9.8
		Black Thunder Mine, BTM 36-2 (monitor #3)	560005891	2010	23.2	12.3
				2011	43.8	13.9
				2012	22.5	15.8
				2013	17.6	13.6
	Converse	Antelope Site 3 (monitor #1)	560090819	2008	16.3	9.2
				2009	27.8	7

[26] EPA, AirData, Interactive Map, http://www.epa.gov/airquality/airdata/ad_maps.html
[27] EPA, AirData, Interactive Map, http://www.epa.gov/airquality/airdata/ad_maps.html

				2010	13.2	13.2
		Antelope Site 3 (monitor #3)	560090819	2010	16.1	6.1
				2011	17.3	10.9
				2012	47	26.5
				2013	8.8	8
		Tallgrass Energy Partners	560090008	2013 (partial year)	10.7	8.2
	Sheridan	Sheridan, Highland Park	560330003	2008	19.3	14
		Sheridan, Meadowlark Elementary	560331003	2013	16.5	14.4
		Sheridan, Police Station (monitor #1)	560033002	2008	27.5	23.6
				2009	38.6	21
				2010	30.8	27
				2011	30.4	23
				2012	24.8	18.9
				2013	23.5	16.7

In 2006, EPA lowered the short-term $PM_{2.5}$ standard from 65 micrograms per cubic meter ($\mu g/m^3$) to 35 $\mu g/m^3$ because scientific information showed that the pollutant is a health concern at levels lower than what the previous standard allowed.[28] $PM_{2.5}$ can become lodged deep in the lungs or can enter the blood stream, worsening the health of asthmatics and even causing premature death in people with heart and lung disease. $PM_{2.5}$ is also a major contributor to visibility impairment. See the EPA's staff paper on particulate matter (EPA-452/R-05-005a, December 2005) as well as the EPA's Air Quality Criteria Document for Particulate Matter (EPA/600/P-99/002aF and EPA/600/P-99/002bF, October 2004) for more detailed information on the health effects of $PM_{2.5}$.[29] Even $PM_{2.5}$ concentrations lower than the current NAAQS are a concern for human health. The CASAC, in their letter to the EPA on the revised $PM_{2.5}$ standard, unanimously recommended that the 24-hour $PM_{2.5}$ standard be lowered from 65 $\mu g/m^3$ to 30-35 $\mu g/m^3$ and that the annual standard be lowered from 15 $\mu g/m^3$ to 13-14 $\mu g/m^3$.[30] EPA set the standard on the high end of the CASAC recommended range for the short-term standard and chose not to lower the annual standard at all. But on December 14, 2012, EPA promulgated a new NAAQS for the primary $PM_{2.5}$ annual standard that lowers the level of the standard to 12 $\mu g/m^3$, averaged over three years.

[28] 71 FR 61144, effective December 18, 2006.
[29] *See* http://www.epa.gov/ttn/naaqs/standards/pm/data/pmstaffpaper_20051221.pdf and http://cfpub2.epa.gov/ncea/cfm/recordisplay.cfm?deid=87903
[30] EPA-CASAC-LTR-06-003, Clean Air Scientific Advisory Committee Recommendations Concerning the Final National Ambient Air Quality Standards for Particulate Matter, September 29, 2006, http://yosemite.epa.gov/sab/SABPRODUCT.NSF/1C69E987731CB775852571FC00499A10/$File/casac-ltr-06-003.pdf, included as Exhibit 2.

II. Emission Inventories

A. Coal Mine Emissions are Greatly Underestimated in the Coal Review's 2008 Base Year Impacts Analysis

The Task 1A report of the Coal Review presents the modeled 2008 emission inventory used in the updated report. According to the February 2014 version of the Technical Support Document (TSD) for the Coal Review, the 2008 inventory uses data from a combination of sources, including the 2005 and 2008 NEI, Western Regional Air Partnership (WRAP) inventories (for certain oil and gas sources), and a 2011 BLM inventory. The Coal Review inventory is also based on estimates of mobile source and wildfire emissions using specialized models. Annual emissions are listed by sector for the modeled 4-km grid domain used in the Comprehensive Air Quality Model with Extensions (CAMx) modeling system. However, Table 2-3 of the Task 1A Report shows that the coal mine NO_X emissions used in the modeling are extremely low, with a total of 4,549 tons per year (tpy) NO_X used for all coal mines in the 4-km grid modeling domain. The Coal Review's modeled 2008 emission inventory grossly under-represents actual emissions from the Powder River Basin coal mines. According to EPA's 2011 National Emission Inventory (NEI) data, NO_X emissions from coal mines in the Powder River Basin totaled over 29,000 tpy.[31] Likewise, WDEQ's 2011 minor source emission inventory shows over 28,700 tpy NO_X emissions recorded for 11 mines in the Wyoming portion of the Powder River Basin (see Table 4 below).[32] This enormous discrepancy resulted in the under-prediction of current and future NO_X impacts from coal mines in the Powder River Basin and surrounding areas in the modeling analysis. The air quality modeling analysis will be discussed in more detail below.

Table 4. Recent Powder River Basin Coal Mine Emission Inventories

Montana Inventory[33]				
Facility Name	**County**	**NO_2**[34]	**$PM_{2.5}$**	**VOC**
Absaloka Mine	Big Horn	67.95	126.45	0.56
Decker Mine	Big Horn	22.01	528.52	none listed
Rosebud Mine	Rosebud & Treasure	200.62	301.39	1.78
Spring Creek Mine	Big Horn	164.07	456.09	none listed
Montana Totals		**454.65**	**1412.45**	**2.34**
Wyoming Inventory[35]				
Facility Name	**Location**	**NO_X**	**$PM_{2.5}$**	**VOC**
Belle Ayr Mine	Campbell	730.06	202.41	0.22
Black Thunder Mine	Campbell	11726.21	751.57	0.07
Buckskin Mine	Campbell	312.14	366.3	5.03

[31] EPA, 2011 National Emissions Inventory, http://www.epa.gov/ttn/chief/net/2011inventory.html
[32] WDEQ 2011 Minor Source Actual Inventory
[33] Montana DEQ 2013 Emissions Inventory Detail, data pull 4/9/14
[34] Montana DEQ's emissions are reported as NO_2 rather than NO_X; NO_2 emissions are a component of NO_X emissions and therefore these figures would be higher if they were reported as NO_X.
[35] WDEQ 2011 Minor Source Actual Inventory

Caballo Mine	Campbell	790.52	47.66	49.69
Coal Creek Mine	Campbell	9100.37	34.04	0.15
Dry Fork Coal Mine	Campbell	299.24	17.78	11.67
Eagle Butte Mine	Campbell	648.32	195.94	0.34
North Antelope Rochelle Mine	Campbell	3324.79	112.66	113.39
Rawhide Mine	Campbell	449.89	21.33	22.29
Wyodak Mine	Campbell	236.53	84.98	0.15
Antelope Mine	Converse	1082.5	213.8	41.04
Wyoming Totals		**28700.57**	**2048.47**	**244.04**
Montana & Wyoming Totals		**29155.22**[36]	**3460.92**	**246.38**

As Table 4 shows, the Montana Department of Environmental Quality's (MDEQ's) coal mine emission inventory figures are lower than WDEQ's. However, there are only four mines in this area and the Montana mines are smaller than many of the Wyoming mines, but it is also likely that emissions are under-reported for Montana as well. For the Absaloka, Spring Creek and Decker Mines, NO_2 emissions are listed only under explosives, and NO_2 emissions are only included under explosives and overburden for the Rosebud Mine. Other sources of NO_X emissions, such as heavy diesel equipment are not included in this inventory.[37]

Despite the fact that WDEQ's 2011 actual NO_X emission inventory figures are much higher than the year 2008 WDEQ inventory and the 2008 inventory used in the Coal Review, this inventory does not appear to account for cast blasting emissions at all of the coal mines. Emission inventory data for the Belle Ayr, Eagle Butte, Caballo, Dry Fork, Wyodak and Rawhide Mines do not include categories that would cover blasting emissions. However, either blasting emissions or fugitive NO_X emissions are recorded for the Black Thunder, Buckskin, Antelope, Coal Creek and North Antelope Rochelle Mines. WDEQ's 2011 emission inventory lists 1,223 tpy NO_X for the mining fugitives category that includes "OB [overburden] & Coal removal, erosion, hauling, grading, blasting, etc.." However, in WDEQ's December 15, 2010 Permit Application Analysis for the merging of the Jacobs Ranch Mine with the Black Thunder Mine, the predicted 2014 and 2015 NO_X emissions from blasting at the Black Thunder Mine are 3,155 tons per year and 3,254 tons per year, respectively (see Table 5 below).[38] Therefore, NO_X emissions from blasting are likely still underrepresented in WDEQ's 2011 inventory.

Table 5. Annual NO_X Emissions Projections for Black Thunder Mine, used in 2014 and 2015 Permit Modeling Analysis[39]

Emission Source	2014 NO_X Emission Rate (tpy)	2015 NO_X Emission Rate (tpy)
Haul Trucks	2,612	2,663
Graders	62	62

[36] This figure reflects the Wyoming NO_X totals added to the Montana NO_2 totals due to the lack of reporting for NO_X emissions in Montana. It can be assumed that emissions would be higher if MDEQ reported NO_X emissions.
[37] Montana DEQ 2013 Emissions Inventory Detail, data pull 4/9/14
[38] WDEQ, Air Quality Division, Permit Application Analysis AP-10986, 15 December 2010, 33, table 10-8.
[39] Ibid.

Dozers	261	264
Scrapers	64	64
Water Trucks	132	133
Locomotives	273	273
Blasting	3,155	3,254
Totals	**6,558**	**6,713**

The coal mine total organic gas (TOG) emissions used in the Coal Review also appear to be low, with 104 tpy TOG from coal mines,[40] while the 2011 NEI data report over 218 tpy VOC from coal mines.[41] WDEQ's 2011 minor source emission inventory reports 244 tpy VOC from the Powder River Basin coal mines. VOC emissions attributed to the Powder River Basin coal mines should also be reevaluated because their adverse air quality impacts are likely under-predicted in the modeling analysis. The Black Thunder Mine, with the largest NO_X and $PM_{2.5}$ emissions reported the smallest amount of VOC emissions. The WDEQ's minor source inventory includes VOC values for the Antelope and Caballo mines for engines and portable generators, construction and heavy equipment, and gasoline storage tanks categories. The other mines likely have the same equipment and thus those emissions should at the very least be estimated in the Coal Review.

The $PM_{2.5}$ emissions used in the revised Coal Review appear to be similar to the 2011 NEI. The Coal Review used 6,678 tpy $PM_{2.5}$ for both coal mine point source and fugitive dust emissions (the bulk of the emissions accounted for (6,158 tpy) are fugitive dust). This is similar to the 2011 NEI data, which reported 6,534 tons per year of primary $PM_{2.5}$ emissions from coal mines in the Powder River Basin. The NEI $PM_{2.5}$ values include both the filterable and condensable portion of $PM_{2.5}$ emissions.[42] Fortunately, the $PM_{2.5}$ emissions used in the revised Coal Review are higher than the total mine related $PM_{2.5}$ actual emissions on record with both MDEQ and WDEQ because it is likely that $PM_{2.5}$ emissions are underestimated in the state reports. The total $PM_{2.5}$ emissions in the WDEQ minor source inventory for the coal mines is 2,048 tpy, however, $PM_{2.5}$ appears under-represented for some of the mines because emissions sources such as fugitive emissions and exposed acreage are not included, such as at the Caballo Mine.[43] It is also not clear whether the WDEQ inventory includes condensable $PM_{2.5}$ emissions. Mine related $PM_{2.5}$ emissions for the four mines in Montana total 1,412.45, which includes both the filterable and condensable $PM_{2.5}$ fraction and is closer to the 2011 NEI estimates. But there are only four coal mines in the Montana portion of the Powder River Basin compared to 11 in the Wyoming portion and the mines in Wyoming are typically larger than the Montana mines.

The 2008 base year emission inventory also likely under-represents oil and gas production related emissions. The point source oil and gas emission inventory is based on 2008 NEI data. According to the TSD, this inventory was compared with the 2006

[40] BLM, Coal Review Task 1A Report, Table 2-3.
[41] EPA, 2011 NEI
[42] EPA, 2011 NEI.
[43] WDEQ, 2011 Minor Source Actual Inventory

WRAP Phase II and Phase III inventories, but since they were not as current as the 2008 NEI inventory at the time, the WRAP inventories were not used. Non-point source oil and gas emissions data were from a mixture of the 2008 NEI, WRAP Phase II and Phase III inventories, as well as BLM data. Conventional gas and CBNG emissions are based on the 2006 WRAP Phase III report.[44] There is however, a 2009 Phase IV WRAP inventory that may be more appropriate for use in this analysis.

NO_X emissions in the 2008 base year inventory total 40,323 tpy from the oil and gas categories for the 4-km domain, however the 2009 WRAP inventory shows a total of 29,278 tpy NO_X for just the Powder River Basin.[45] Because the 4-km domain in the Coal Review modeling is a much larger area, and includes areas outside the Powder River Basin, the NO_X emissions in the area of the 4-km domain are most likely much higher. Additionally, the BLM should use a more accurate source for the base year emissions rather than the 2008 NEI since EPA notes in the TSD for the 2008 NEI that oil and gas emissions are under-represented in the inventory. The EPA TSD states, "EPA recommends that users of the NEI look to alternative data sources to fill in emissions from this emissions source, which was in a high growth pattern during calendar year 2008."[46]

B. The 2020 and 2030 Future Year Emissions Inventories Under-predict Emissions

The Coal Review used 2008 for a base year inventory and projected emissions forward to 2020 and 2030. Task 3A of the Coal Review shows the projected 2020 and 2030 emissions by source sector for the 4-km domain. As, explained above, the 2008 base year inventory significantly underrepresented coal mine emissions and the projected emissions are also significantly under-predicted. The NO_X emissions projections for mine point sources are 5,510 tpy for 2020 and 6,575 tpy for 2030.[47] As explained above, the coal mine NO_X emissions in 2011 were at least 29,000 tpy per EPA's NEI and Wyoming and Montana emission inventories. The 2020 and 2030 projected inventories should be much higher than 5,510 and 6,575 tpy NO_X, respectively. As table 5 above shows, the Black Thunder Mine alone is expected to emit 6,713 tpy NO_X during 2015. This figure is based on the permit modeling analysis for the mine. If there is some reason the BLM has found that these emissions are not accurate for the mines and that significantly reduced NO_X emissions are more appropriate the BLM must explain this in the Coal Review. However, because the state emission inventories show much higher levels of emissions and the emissions are likely even higher than reported in these inventories, the Coal Review's projections are massively under-predicting impacts. This discrepancy calls into question the entire modeling analysis for the Coal Review.

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[44] AECOM, Powder River Basin Coal Review – Air Quality Assessment Technical Support Document, February 2014, 3-9 and 3-11.
[45] WRAP, Oil and Gas Emissions Inventory, Phase IV, http://www.wrapair2.org/PhaseIV.aspx
[46] EPA, 2008 National Emissions Inventory, version 3, Technical Support Document, September 2013 Draft, 61.
[47] BLM, Coal Review, Task 3A, Table 2-9 and 2-10.

Past comments on EIS documents have also pointed to the same problems. The September 26, 2013 comments from the Western Environmental Law Center, WildEarth Guardians, Powder River Basin Resource Council, and others, commented that based on a review of available BLM coal lease EIS documents, the current NO_X emissions for the Powder River Basin may be as high as 21,074 tons per year.[48]

Additionally, the 2020 and 2030 projected emissions differ in the TSD from those used in Task 3A. The February 2014 version of the TSD lists the mine point source NO_X emissions for the 4-km grid as 5,231 tpy for 2020, while the same figure of 6,575 tpy is used for 2030 projections.[49] It is not clear why the figures differ between reports.

The Coal Review's 2020 and 2030 projections shown in Task 3A for coal mine point TOG are 136 tpy and 153 tpy, respectively. As explained above, emissions for 2011 would be 218 tpy VOC, per EPA's NEI, or 246 tpy VOC based on Montana and Wyoming emission inventory reports, therefore, the 2020 and 2030 projections used in the Coal Review should be even higher than those reported figures.

The 2020 and 2030 annual projected emissions tables (Table 2-9 and 2-10) in the Task 3A report list "mine area" as an emissions category. The TSD explains that this category is for mines other than coal mines, which includes bentonite, leonardite, and aggregate (sand/gravel/scoria), but the Task 3A report does not explain this category. This report should also briefly explain this category to avoid confusion with the coal mine emissions that are listed under the "mine point" and "mine fugitive dust" categories. The Task 1A report does not mention other mine emissions in the 2008 base year inventory documentation, so it is not clear whether these emissions were accounted for in the base year. The base year inventory does include a "Coal Mine Fugitive Dust" category that lists $PM_{2.5}$ emissions as 6,158 tpy. The 4-km 2020 and 2030 future projections for the mine (including all mines) fugitive dust category are 6,707 tpy $PM_{2.5}$ and 7,294 tpy $PM_{2.5}$ respectively, after processing the emissions estimates with SMOKE. Prior to processing the emissions, the total $PM_{2.5}$ emissions for this category were projected to be 12,112 tpy and 14,676 tpy for 2020 and 2030, respectively in the 4-km grid.[50] However, if the 2008 base year emissions for coal mines alone were already 6,158 tpy $PM_{2.5}$, the future year predictions for all mine categories seem lower than would be expected especially because the $PM_{2.5}$ estimates for the sand/gravel/scoria category are almost as high as those for the coal mines (6,054 tpy in 2020 and 7,574 tpy in 2030). The large reduction in projected emissions relative to the base year emissions should be explained further.

The Coal Review's Projections for oil and gas production in the Powder River Basin show an overall decrease in future years. However, the WRAP Phase III projections show an overall increase in CBM well counts in the Wyoming portion of the Powder River Basin until 2015, due to projections in several counties being held constant and an

[48] Western Environmental Law Center, WildEarth Guardians, Powder River Basin Resource Council, Sierra Club and Climate Solutions, Comments on Draft Buffalo Resource Management Plan, September 26, 2013, 11-12.
[49] BLM, Coal Review, TSD, 3-44, Tables 3-41 and 3-42.
[50] AECOM, TSD, 3-50, Table 3-49 and 3-50.

increased well count for Johnson and Sheridan Counties.[51] The Coal Review shows significantly decreased CBNG production in 2020 and 2030 (although 2030 shows an increase from 2020) compared to 2008. While the WRAP projections only go to the year 2015, CBM (or CBNG) production is projected to be much higher than the Coal Review projects for the Wyoming Powder River Basin Study Area. WRAP projections for Johnson and Sheridan Counties, which represent the core development area for CBM in the Powder River Basin, are about 680,000,000 cubic feet[52] while the Coal Review projections for the entire Wyoming Powder River Basin Study Area are 159,908,000 cubic feet in 2020 and 282,937,000 cubic feet in 2030.[53] The WRAP 2015 analysis shows that oil and gas related NO_X emissions would be over 23,000 tons per year for the Powder River Basin counties (in both Montana and Wyoming).[54] Unfortunately, the Coal Review does not show emissions by county or for a total of the Powder River Basin counties, but it shows emission projections for the 4-km grid domain, which is a much larger area than the Powder River Basin. Oil and gas related NO_X emissions for the 4-km grid domain are predicted to be around 33,000 tpy in 2020. This area includes a high amount of oil and gas development outside of the Powder River Basin, so it is difficult to compare, but it is extremely likely that oil and gas related NO_X emissions in other portions of this area would amount to much more than an additional 13,000 tpy. Additionally, future oil and gas related emissions should be reevaluated for the Coal Review given the increasing shale oil development in Converse County. The Converse County Oil and Gas Project Plan of Development projects that up to 5,000 oil and gas wells would be drilled over 10 years.[55] Thus, oil and gas related emissions may not be decreasing in the future and the predicted 2020 emissions in the Coal Review should reflect this new development.

C. The Greenhouse Gas Inventory Underestimates Emissions

In Task 3A, the Coal Review provides a 2020 and 2030 estimated greenhouse gas inventory for the Powder River Basin and the TSD provides further details on how the inventory was derived. Projected emissions of carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and carbon dioxide equivalent (CO_2e) were included. For the coal mines, calculations were made to include in-situ methane emissions, which is the amount of methane released from the coal seam due to the surface mining activity. The TSD notes that the EPA estimate for the in-situ methane content in the Northern Great Plains region is 20.0 cubic feet per short ton. The EPA's "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2012," notes that CH_4 emissions from surface mines were calculated using the basin-specific gas content and an emission factor of 150 percent to

[51] Environ, Draft Final Report, "Development of 2015 Oil and Gas Emissions Projections for the Powder River Basin: Phase III Oil and Gas Emissions Inventory Project," November 27, 2012.
[52] Environ, Draft Final Report, "Development of 2015 Oil and Gas Emissions Projections for the Powder River Basin: Phase III Oil and Gas Emissions Inventory Project," November 27, 2012, 10 and Figure 5.
[53] BLM, Task 1A Report, 2-12, Table 2-6.
[54] Environ, 41, Table 7.
[55] BLM, Casper Field Office, Converse County Oil and Gas Plan of Development, March 20, 2014, http://www.blm.gov/pgdata/etc/medialib/blm/wy/information/NEPA/cfodocs/ConverseCntyOG.Par.85178.File.dat/conversectyeispod.pdf

estimate methane emissions.[56] The last portion of this calculation, using the 150 percent emission factor, does not appear to have been conducted by the BLM for the Coal Review. Please explain if the calculation was indeed made or if not, please evaluate its use so that the greenhouse gas emission estimates in the Coal Review will be in line with EPA's methods.

The Coal Review should consult the EPA's "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2012: ANNEX 3 Methodological Descriptions for Additional Source or Sink Categories," for the methodologies that should be used in estimated greenhouse gas emissions from the various source categories. The TSD only notes that this document was used for the in-situ methane content of surface coal. Annex 3 includes methodologies for estimating emissions for coal mining, transportation related emissions, oil and gas and stationary sources, which would be particularly useful in the Coal Review. Again, this document should be reviewed to ensure that the estimates in the Coal Review are in accordance with the most up to date methods for estimating greenhouse gas emissions.

For the power plant greenhouse gas emissions, the TSD explains that for the three power plants that were not operational during 2009, the emissions data for three existing similar sized plants were used as surrogates.[57] The TSD should also explain whether these new or planned power plants are also similarly controlled as the plants used as surrogates. The power plants could be similarly sized as these existing plants but still emit more or less greenhouse gases depending on the level of control.

The Coal Review included greenhouse gas emission estimates for oil, gas and CBNG development and production, coal mining, power plants and coal transportation by railroad to the Powder River Basin boundary. The greenhouse gas emission estimates in the Coal Review project between 34,446,877 and 38,319,227 metric tons (or tonnes) CO_2e for the 2020 lower and upper development scenarios, respectively for all inventoried sources and between 36,361,575 and 47,352,653 metric tons CO_2e for the 2030 lower and upper development scenarios, respectively.[58] EPA's Greenhouse Gas Reporting Program includes 2012 data for large facilities only. Reporting for the counties that make up the Powder River Basin shows higher data for 2012 than the Coal Review projects in 2020 and 2030. And these data only include emissions from power plants and some of the petroleum and natural gas systems in the area.[59] Other major sources such as the coal mines and transportation are not included in this inventory, and three of the nine Powder River Basin counties do not have any reported data. Despite that, the 2012 inventory total for six reporting counties is 31,962,561 metric tons CO_2e.[60] This suggests that the Coal Review greenhouse gas estimates that include many more sources than does EPA's inventory should be higher than projected. This same rationale should be

[56] EPA, "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2012," EPA 430-R-14-003, 15 April 2014, 3-49.
[57] BLM, Coal Review TSD, 4-15
[58] AECOM, 4-33, Table 4-21.
[59] EPA, 2012 Greenhouse Gas Emissions from Large Facilities, http://ghgdata.epa.gov/ghgp/main.do
[60] Ibid.

considered in the final Buffalo RMP also, because the greenhouse gas emission estimates in the draft EIS/RMP are much lower than these estimates as well.

III. The Coal Review's Modeling Analysis Under-Predicts Air Quality Impacts and is based on an Incomplete Analysis and Underestimated Emissions Data

The revised Coal Review's model inputs and the way in which the BLM performed the modeling analysis are not adequate to fully assess the potential impacts in an area already heavily impacted by industrial growth. The result of the deficiencies in the modeling is that the adverse air quality impacts from the development are almost certainly worse than what is disclosed in the revised Coal Review. And in fact, the EPA Region VIII Air Program has already provided comments on the modeling to that effect. In November 2013, EPA commented to BLM that:

> In past comments on the Draft Air Quality Model Performance Evaluation (AQ MPE) [comments dated March 2013], we noted several concerns with the magnitude of the under-predictions and the wide range of biases/errors reported in the AQ MPE for the base year…Based on the response to our comments [response to comments dated June 2013], our concerns/comments were not sufficiently addressed and the project moved forward without attempting to improve the model's performance. Given our concerns with the performance of the model, we do not feel confident in the predicted air quality impacts (NAAQS exceedances, visibility, deposition), and we are also concerned that the model might not be reliable for evaluating air quality impacts of future projects in the region. Further, it is difficult to determine how much the model errors and biases will impact the predicted air quality results.[61]

In response to EPA's comments on the model's performance, BLM acknowledged these problems but noted that they could not be addressed for the current analysis.[62] In particular, EPA expressed concern with the model performance for ozone during spring and winter because the model under-predicted impacts and the Weather Research and Forecasting (WRF) model was outside the acceptable statistical benchmarks for wind speed, wind direction and temperature.[63] Following a review of the Coal Review modeling documentation, there are indeed numerous issues with this analysis; the areas of greatest concern are discussed in more detail below.

The modeled air quality impacts in the Coal Review show that criteria pollutant concentrations are mostly below the level of the NAAQS except for CO, ozone and PM_{10}

[61] EPA Air Program, Powder River Basin Coal Review – Air Quality Effects, Summary of Comments, November 13, 2013, 1.
[62] Powder River Basin Coal Review – Phase II, Reviewer Comments on Air Quality Assessment Technical Support Document – October 2013, 1.
[63] EPA Air Program, Powder River Basin Coal Review – Air Quality Effects, Summary of Comments, November 13, 2013, 1.

during wildfire episodes.[64] Some exceedances at Class I and Class II areas are explained as being the results of specific fires.[65] Unfortunately, the Coal Review does not include a source apportionment analysis that would demonstrate how much of the elevated pollution levels are due to fires. While there is no doubt that the wildfires had an impact on air quality values, without source apportionment, the BLM cannot say whether all of the exceedances are due to fires.

The Coal Review explains that 2008 was a particularly extreme fire season for the area but with ever increasing fires in the West, this may be the norm. During 2008, over 160,000 acres burned in Montana during wildland fires and almost 37,000 acres burned in Wyoming during wildland fires. However, the fire season in 2008 does not appear to be too much of an outlier compared to other recent years, for example in 2012 where over 1.2 million acres in Montana burned during wildland fires and over 350,000 acres burned in wildland fires in Wyoming.[66]

A. The Model's Under-Predictions of Ozone, NO_2 and $PM_{2.5}$ Greatly Discredits the Predicted Air Quality Impacts

Unfortunately, as explained above, the emission inventory used in the modeling is highly inaccurate in the case of NO_X emissions, rendering the modeled predicted air quality impacts much lower than they should be. The Coal Review's NO_X emissions projections for mine point sources are 5,510 tpy in 2020 and 6,575 tpy in 2030.[67] The EPA's National Emissions Inventory (NEI) and the Wyoming and Montana DEQ's recent emission inventories show much higher levels in 2011, of at least 29,000 tpy. The fact that EPA appears to have commented adversely in regards to several aspects of the under-predictions in the Coal Review modeling analysis on several occasions is very concerning. Past comments on EIS documents have also pointed to the same problems. The September 26, 2013 comments from the Western Environmental Law Center, WildEarth Guardians, Powder River Basin Resource Council, and others commented that based on a review of available BLM coal lease EIS documents, the current NO_X emissions for the Powder River Basin may be as high as 21,074 tons per year.[68]

The revised Coal Review acknowledges some under-predictions in the modeling, explaining that:

> Future year results are limited by the model's ability to reproduce observed concentrations. Based on the Air Quality MPE (AECOM 2013a) which evaluated the modeled base year 2008 results in relation to reported monitoring data, the model tended to under-predict concentrations of

[64] BLM, Coal Review, 4-1, Table 4-1.
[65] BLM, Coal Review, 4-2.
[66] National Interagency Fire Center, http://www.nifc.gov/fireInfo/fireInfo_statistics.html
[67] BLM, Coal Review, Task 3A, Table 2-9 and 2-10.
[68] Western Environmental Law Center, WildEarth Guardians, Powder River Basin Resource Council, Sierra Club and Climate Solutions, Comments on Draft Buffalo Resource Management Plan, September 26, 2013, 11-12.

> several gas-phase criteria pollutants (i.e., NO_2, CO, and SO_2). This indicates that the future year concentrations likely would be higher than the modeled values presented in this report.[69]

The model's NO_X under-predictions are especially concerning due to the magnitude of the underestimated NO_X emissions inventory. According to Task 1A of the Coal Review:

> The concentrations of NO_X were under-predicted in most locations throughout the year. Given that the model systematically under-predicted the observed peak concentrations but was able to reproduce the observed diurnal cycle as well as expected spatial patterns of emissions sources, the model is appropriate for use in predicting future cumulative NO_X impacts with the understanding that model predictions were approximately 50 percent low on an annual basis.[70]

In other words, the Coal Review acknowledges that NO_X impacts are under-predicted in the modeling analysis in addition to the fact that these NO_X predictions are based on an emissions inventory that is *at least 25,000 tpy lower* than actual emissions.

Additionally, the Task 1A report explains that the model under-predicted gas-phase pollutants for the modeled 2008 base year and that as a result, modeled NO_2 and SO_2 values are lower than actual monitored values. Modeled $PM_{2.5}$ is also lower than actual monitored values within the Powder River Basin.[71]

B. BLM Must Identify Background Concentrations for the Modeled Pollutants

The BLM must identify the background concentrations for each modeled pollutant. According to the EPA's Guideline on Air Quality Models (Appendix W Modeling Guidance), "[b]ackground air quality includes pollutant concentrations due to: (1) Natural sources; (2) nearby sources other than the one(s) currently under consideration; and (3) unidentified sources." *See* 40 CFR 51, Appendix W, Section 8.2.1. The background concentration is meant to represent natural sources, minor sources and distant major sources that contribute to the existing air quality in the area but that are not included in the modeling. The Appendix W Modeling Guidance, and subsequent guidance and clarifications, are applicable to the BLM's application in air quality assessments for federal land management decisions in addition to State Implementation Plan and Prevention of Significant Deterioration applications. Indeed Appendix W notes that the guidance is applicable to Federal Agencies with land management responsibilities.[72]

[69] BLM, Task 3A Report, 3-5.
[70] BLM, Coal Review Task 1A Report, 2-11
[71] BLM, Coal Review Task 1A Report, 4-2
[72] 40 CFR Part 51, Appendix W, "Guideline on Air Quality Models," Section 1.0.

C. BLM Must Use AERMOD for NO_2 Modeling

For Phase II of the Coal Review, the BLM used the Comprehensive Air Quality Model with Extensions (CAMx), a multi-scale, three dimensional photochemical grid model, along with the Weather Research and Forecasting Model (WRF) and Sparse Matrix Operator Kernel Emissions (SMOKE) to model NO_2, ozone, $PM_{2.5}$, PM_{10}, CO and SO_2. While CAMx is a good choice for ozone modeling, the BLM should use the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) to demonstrate the NO_2 impacts in the Powder River Basin. For example, the recent Red Cliff Mine Draft EIS and the White River RMP used AERMOD to assess near-field impacts.[73] AERMOD is the EPA, "…preferred model for dispersion for a wide range of applications…" for NO_2 modeling demonstrations.[74] EPA recommends the use of AERMOD for demonstrations with the 1-hour NO_2 NAAQS, particularly for near-field regulatory applications of less than 50 kilometers for simple and complex terrain.[75] Because there is concern about the near-field impacts from NO_2 concentrations from the coal mines, it is important that the appropriate modeling methodology is used in order to assess predicted impacts. The BLM must use AERMOD to demonstrate the NO_2 impacts in the Powder River Basin.

In 2010 EPA issued guidance on combining modeled results and monitored background concentrations to determine compliance with the 1-hour NO_2 NAAQS;[76] the BLM must adhere to this guidance. When determining compliance with the 1-hour NAAQS, the BLM should add the overall highest hourly representative background concentration to the modeled design value that is based on the form of the standard (*i.e.*, the 98th percentile of the annual distribution of daily maximum 1-hour concentrations averaged across the number of years modeled). EPA's guidance for NO_2 modeling states that:

> …the modeled contribution to the cumulative ambient impact assessment for the 1-hour NO2 standard should follow the form of the standard based on the 98th percentile of the annual distribution of daily maximum 1-hour concentrations averaged across the number of years modeled. A "first tier" assumption that may be applied without further justification is to add the overall highest hourly background NO2 concentration from a

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[73] BLM, Red Cliff Coal Mine Project Draft EIS, Appendix H: Air Quality Analysis Modeling Report, 6 January 2009, H-1, http://www.blm.gov/co/st/en/BLM_Programs/land_use_planning/rmp/red_cliff_mine/documents.html and BLM, White River Oil and Gas Development Draft RMPA/EIS, 30 August 2012, 4-18, http://www.blm.gov/co/st/en/BLM_Programs/land_use_planning/rmp/white_river/ogdraftrmpa.html

[74] EPA, Memorandum from Tyler Fox, Leader, Air Quality Modeling Group to Regional Air Division Directors, "Applicability of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard", 28 June 2010, 16.

[75] EPA, Memorandum from Richard Wayland, Director, Air Quality Assessment Group, to Regional Air Division Directors, "Clarification of Regulatory Status of CALPUFF for Near-field Applications," 13 August 2008, 1, http://www.epa.gov/ttn/scram/guidance/clarification/clarification%20of%20regulatory%20status%20of%20calpuff.pdf.

[76] EPA Memorandum, "Applicability of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard", June 28, 2010 at 18.

> representative monitor to the modeled design value, based on the form of the standard, for comparison to the NAAQS.[77]

However, the NO_2 modeling in the Coal Review is lacking in any meaningful analysis of air quality impacts, especially given the fact the CAMx is not the correct model to use for this type of analysis and NO_X emissions in the Powder River Basin are largely under-estimated.

Unfortunately, there is currently a lack of data showing the NO_2 concentrations from coal mine blasting, which is a large source of the NO_X emissions from the Coal Mines. But given the fact that school bus stops, houses and businesses are near or on the coal mine permit boundaries and have been affected by the NO_X clouds, the BLM, WDEQ and MDEQ should find a way to more accurately characterize the emissions in order to keep the public safe.[78] A more accurate modeling analysis, following EPA's guidance, using AERMOD would help achieve this important goal.

The 2010 Wright Area EIS cites a Thunder Basin Coal Company study conducted during 2002 to evaluate the NO_2 levels during blasting at the Black Thunder Mine. For this study, monitors were placed inside the permit boundary at the mine to monitor the short-term NO_X levels during blasting. Data showed NO_X levels ranging from non-detectable to 21.4 parts per million (ppm) (measured 361 feet from the blast).[79] For comparison, the level of the 1-hour NO_2 NAAQS is 100 ppb while these short-term study results at Black Thunder Mine were 21,400 ppb (21.4 ppm). Further data, from the Office of Surface Mining Reclamation and Enforcement, shows that nitrogen dioxide levels in the orange clouds in Wyoming can be as high as 30 ppm or 30,000 ppb.[80] And in fact, once the orange cloud is visible, the NO_2 levels are already well above the level of the 1-hour NO_2 NAAQS; the threshold at which the concentrations of NO_2 become visible is considered to be 2.5 ppm or 2,500 ppb.[81]

According to the Wright Area EIS, the background NO_2 concentrations used for both the Black Thunder permit and the Jacobs Ranch permit modeling were 14 micrograms per cubic meter ($\mu g/m^3$) and the background concentration used for the North Antelope Rochelle permit modeling was 20 $\mu g/m^3$.[82] The 2010 Black Thunder permit modeling also used 14 $\mu g/m^3$ as the background NO_2 concentration and explains that this was taken from the Belle Ayr monitoring site data.[83]

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[77] EPA, Memorandum from Tyler Fox, Leader, Air Quality Modeling Group to Regional Air Division Directors, "Applicability of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard", 28 June 2010, 5.
[78] BLM, Final EIS for Wright Area Coal Lease Applications, July 2010, ES-41-46.
[79] BLM, Final Wright Area EIS, 3-82.
[80] Office of Surface Mining Reclamation and Enforcement, "Annual Evaluation Summary Report for the Regulatory Program Administered by the Land Quality Division for the Wyoming Department of Environmental Quality for Evaluation Year 2000," Dec. 7, 2000.
[81] Queensland Government Department of Employment, Economic Development and Innovation, "Coal Mine Workers Fact Sheet: Avoiding exposure to oxides of nitrogen (NOx) fumes from surface blasts."
[82] BLM, Wright Area EIS, 3-82.
[83] WDEQ Air Quality Division, Permit Application Analysis AP-10986, 15 December 2010, 34.

Tables 3-3 and 3-6 of the Task 3A Report show the results of the CAMx modeled 2020 and 2030 concentrations for criteria pollutants at Class I and sensitive Class II assessment areas. The 1-hour NO_2 concentrations in the tables are mainly 0-3 ppb and only go as high as 8 ppb for the 2020 values and 5 ppb for 2030. These levels are exceedingly low, considering that there are recorded 1-hr NO_2 exceedances in recent years at several Montana monitors and all of the 98th percentiles for the Wyoming NO_2 monitors are mainly well above these concentrations (See Table 1 above). These low modeled concentrations are undoubtedly due to the fact that CAMx was used for NO_2 modeling, rather than the recommended AERMOD.

D. The Coal Review Must Follow EPA Modeling Guidelines for Ozone and $PM_{2.5}$ Demonstrations

EPA's "Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$ and Regional Haze" explains the criteria that should be met for ozone and $PM_{2.5}$ modeling analyses. EPA explains that,

> At a minimum, four criteria should be used to select time periods which are appropriate to model:
> 1) Simulate a variety of meteorological conditions:
> a) 8-Hour Ozone- Choose time periods which reflect a variety of meteorological conditions which frequently correspond with observed 8-hour daily maxima > [84][84] ppb at multiple monitoring sites.
> b) 24-Hour $PM_{2.5}$- Choose time periods which reflect a variety of meteorological conditions which frequently correspond with observed 24-hour averages > [65][85] ug/m3 at violating monitoring sites…
> …2) Model time periods in which observed concentrations are close to the appropriate baseline design value or visibility impairment.
> 3) Model periods for which extensive air quality/meteorological data bases exist.
> 4) Model a sufficient number of days so that the modeled attainment test applied at each monitor violating the NAAQS is based on multiple days...[86]

The Coal Review does not appear to have met most of these criteria. The BLM should re-evaluate its modeling demonstration in order use representative data for each pollutant.

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[84] This guidance document reflects the older version of the ozone standard, which has since been revised to now 75 ppb.
[85] This guidance document reflects the older version of the 24-hr $PM_{2.5}$ standard, which has since been revised to 35 $\mu g/m^3$.
[86] EPA, "Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$ and Regional Haze," EPA-454/B-07-002, April 2007, 140.

1. Ozone Modeling

Tables 3-5 and 3-8 of Task 3A shows the results of the Modeled Attainment Test 8-hour design values for the 2008 base year and 2020 and 2030 future years at all the ozone monitoring sites in the 12-km grid. However, because there were not many ozone monitoring sites operating during 2008 in the Powder River Basin, there are only a few monitors for the area represented in these data and there are no Montana monitors included in the analysis. The Coal Review should be updated to include more ozone monitors in the area that are now operational. See Table 2 above for a list of all the ozone monitors operating in recent years in the Powder River Basin.

There are 10 monitors in both Table 3-5 and 3-8 that show exceedances of the 8-hour ozone NAAQS for the 2008 design value, but none of monitors' 2020 and 2030 design values exceed the current 8-hour ozone standard. But, as explained above, the 8-hour ozone standard is expected to be revised imminently, in which case the design values in this analysis that range between 60 and 70 ppb should be considered as significant. Additionally, the fact that the modeling analysis is based on greatly under-represented NO_X emissions overshadows the entire modeling analysis.

The Coal Review explains that, "…the model over-predicted values in the range of 0 to 20 ppb throughout the year and under-predicted the frequency of elevated winter values."[87] However, in light of the under-predictions, BLM should acknowledge that the CAMx model is not designed to be conservative and it does not represent worst-case scenarios.

Tables 3-3 and 3-6 of the Task 3A Report show the results of the CAMx modeled 2020 and 2030 concentrations for criteria pollutants at Class I and sensitive Class II assessment areas. All but a few of the modeled 8-hour ozone concentrations are above 0.060 ppm (60 ppb) and some show exceedances for both the 2020 and 2030 modeled scenarios. This is especially concerning considering that 1) the modeling analysis is based on seriously underestimated NO_X emissions data, and 2) EPA is expected to lower the 8-hour ozone NAAQS to be somewhere in the range of 60-70 ppb and therefore, the modeling would predict many exceedances.

2. $PM_{2.5}$ Modeling

EPA's modeling guidance makes it clear that $PM_{2.5}$ modeling is more difficult than ozone modeling and that modeling analyses need to consider seasonal differences in $PM_{2.5}$ concentrations, which differ from the seasonal differences with ozone concentrations. Thus, $PM_{2.5}$ analyses should, "model a variety of days with varying emissions and meteorological conditions."[88] To achieve this, EPA recommends modeling every day for a full year, or multiple years. "This is recommended for both dispersion modeling of primary $PM_{2.5}$ components and photochemical modeling of secondary and primary

[87] BLM, Task 1A Report, 2-11

[88] EPA, "Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$ and Regional Haze," EPA-454/B-07-002, April 2007, 10.

components."[89] Alternatively, EPA recommends modeling episodes when high $PM_{2.5}$ concentrations occur. EPA explains that, "Similar to ozone, episodes should be selected where $PM_{2.5}$ concentrations are greater than the NAAQS…and are close to the baseline design value. Similar to ozone, data analyses can be completed to help select a variety of meteorological episodes which lead to high $PM_{2.5}$ concentrations."[90]

BLM has not conducted a $PM_{2.5}$ modeling analysis that meets EPA's criteria. For the $PM_{2.5}$ demonstration, AECOM's Impact Assessment Suite (IAS) was used in order to post-process the CAMx results. The TSD describes the process used for the IAS where the 98th percentile 24-hour concentrations are calculated for the assessment area but this analysis does not appear to have included developing $PM_{2.5}$ design values for the monitoring sites. Under EPA's guidance for the 24-hour $PM_{2.5}$ NAAQS, the design value is the 98th percentile concentration of 24-hour $PM_{2.5}$ values, averaged over three years. This test must be applied at all monitoring sites.[91] The BLM should develop the design value concentrations for all the $PM_{2.5}$ monitoring sites in the Powder River Basin in order to show the future impacts to the $PM_{2.5}$ NAAQS. Again, the fact that the modeling analysis is based on greatly underestimated NO_X emissions overshadows the entire modeling analysis.

Tables 3-3 and 3-6 of the Task 3A Report show the results of the CAMx modeled 2020 and 2030 concentrations for criteria pollutants at Class I and sensitive Class II assessment areas. For $PM_{2.5}$, the modeled concentrations are all well below the level of the 24-hour and annual $PM_{2.5}$ NAAQS, with the exception of a few elevated values that are due to wildfire, according to the BLM. However, the $PM_{2.5}$ modeling demonstration does not meet EPA's criteria and therefore, should not be relied on to assure that air pollution sources in the Powder River Basin will not cause elevated $PM_{2.5}$ concentrations in the future. As Table 3 above shows, current $PM_{2.5}$ monitoring data in the Powder River Basin already shows concentrations that are mainly higher than the modeled future concentrations presented in Task 3A. With increasing development in the Powder River Basin, it is not clear how the future values would be expected to be lower than current $PM_{2.5}$ monitoring data.

IV. Conclusion

In conclusion, there are numerous problems with the air quality analysis conducted for the revised Coal Review, namely the monitoring data presented in the Coal Review does not include all of the currently operating monitoring sites in the Powder River Basin, and as a result, elevated pollutant concentrations are not disclosed, the NO_X emissions inventory underestimates current emissions by at least 25,000 tons per year, the modeling analysis under-predicts impacts due to massively underestimated NO_X emissions, EPA

[89] EPA, "Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$ and Regional Haze," EPA-454/B-07-002, April 2007, 147.
[90] Ibid.
[91] EPA, "Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$ and Regional Haze," EPA-454/B-07-002, April 2007, 21.

has already commented to BLM that the modeling analysis is seriously flawed, the modeling analysis does not follow EPA's modeling criteria for ozone and $PM_{2.5}$ and the CAMx model used is not an acceptable method for modeling the NO_2 NAAQS; and greenhouse gas emissions are underestimated in the Coal Review.

EPA's conclusion regarding the modeling analysis used in the Coal Review largely discredits the results and cautions the BLM against the use of the model in future plans. EPA states:

> Given our concerns with the model's performance, we do not feel confident that the model platform and predicted air quality impacts (NAAQS, visibility, deposition) are reliable and defensible. Therefore, we recommend that future projects planning to rely on this model platform and predicted air quality impacts commit to (a) improving the model performance and (b) vetting the air quality modeling activities through the air quality technical workgroup. We also request that our concerns with the air quality model be documented in these reports (e.g., TSD and Task 1A and Task 3A reports). If future projects plan or intended to utilize the air quality model products developed and created from this project, we recommend the following:
>
> > a. Improve the model performance.
> > b. Complete the MPE analyses outlined above and ensure the performance of the models for the non-winter seasons are acceptable, and then use CALPUFF for AQRVs and visibility.
> > c. Require additional mitigation or change project development to prevent substantial emissions increases alleviating the need for a modeling assessment.
> > d. Rely on the 2011 modeling from the 3-State Air Quality Study, upon successful completion.[92]

The BLM must acknowledge the existing air quality concerns in the Powder River Basin and recognize that increased mining activities in the area will result in unhealthy increases in nitrogen dioxide, ozone, and particulate pollution that have significant detrimental effects on human health and the environment. The issues highlighted in these comments and the issues that EPA has already commented on must be remedied for the purpose of ensuring that future environmental planning documents include adequate and meaningful analyses of the air quality impacts from air pollution sources in the Powder River Basin.

[92] EPA Air Program, Powder River Basin Coal Review – Air Quality Effects, Summary of Comments, November 13, 2013, 3.

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FOCUS AREA

Outstanding background in environmental policy and regulation with a focus on air quality and climate change and extensive experience with air pollution reduction control strategies and scenarios.

SKILLS

Over 15 years of experience working on air quality issues

Technical and Policy areas of expertise

- Analyzing and characterizing air emissions from a variety of air pollution sources
- Determining air emissions reduction potentials from control technology scenarios
- Reviewing new, existing and modified state air quality regulations and plans to determine if they meet federal Clean Air Act requirements
- Reviewing proposed federal and state air quality rules, policy and plans to determine if they are as rigorous and stringent as possible
- Thorough experience with the requirements of particulate matter control through state implementation plan requirements under the Clean Air Act
- Thorough experience in reviewing federal and state rules and plans regarding oil and gas development with respect to nitrous oxide, particulate, volatile organic compounds, hazardous air pollutant and methane emissions

Communication skills

- Numerous presentations made to state and tribal air quality officials
- Extensive experience in negotiations over highly technical and politicized issues
- Experienced and thorough in writing both technical and policy documents
- Testified at hearings for federal and state rulemakings
- Experience with press statements and presentations
- Preparing briefings for high level management

EXPERIENCE

Environmental Consultant. (January 2006-present)

- Extensive policy and technical analyses of federal and state actions concerning air quality and climate
- Represent environmental groups at stakeholder meetings

Program Associate. Environmental Defense, Boulder, Colorado (March 2004-

September 2005)
- Assisted with a variety of policy and technical air quality reviews
- Coordinated and contributed to official organization reports on air quality and climate
- Represented organization in state stakeholder and rulemaking processes
- Authored extensive regulatory and technical letters commenting on EPA and state actions
- Testified at state and federal regulatory hearings on proposed rule changes

Teaching Assistant. University of Colorado, Boulder, Colorado (Spring Semester 2003)
- Instructed two undergraduate sections of a weather lab
- Graded student work products

Environmental Protection Specialist. U.S. Environmental Protection Agency, Region 8, Denver, Colorado (January 1998-August 2002)
- Acted as the Environmental Protection Agency Region 8 Particulate Matter Program Manager
- Participated in development of air pollution control regulations for Colorado, Montana, Utah, Wyoming, North Dakota, South Dakota and local Tribal governments
- Represented all EPA Regions as the Regional lead on particulates and collaborated with the EPA's headquarters office on policy development and implementation
- Received the **EPA Bronze medal award** for being the lead program person on the redesignation of the Denver PM_{10} nonattainment area to attainment/maintenance
- Presented information updates and issues to State and Tribal environmental divisions, including State Air Directors and State Air Quality Boards
- Presented public outreach on outdoor air, indoor air, and asthma
- Reviewed, evaluated and approved state air quality plan revisions
- Responded to state, local and private inquiries to requirements and implementation of the Clean Air Act
- Coordinated and conducted internal and external meetings to evaluate, resolve, and implement solutions to issues with technical, legal, and managerial personnel
- Served on the EPA Region 8 agricultural task team

EDUCATION

Master of Science. University of Colorado Environmental Studies Program (2004)
Thesis: Facing Climate Change in New Mexico
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Major: Politics
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