Appendix A – List of Western Energy's Area F Permit (C2011003F) Application Documents

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Appendix A – List of Western Energy's Area F Permit (C2011003F) Application Package Documents

Table 1. Area F Permit (C2011003F) MSUMRA Completeness and Acceptability Review Documents

Document Name[1]	Date	Author
Permit Application Package (PAP)	11/02/11	Western Energy
Completeness Deficiency	01/10/12	DEQ
Completeness Deficiency Response	05/07/12	Western Energy
Completeness Determination	08/01/12	DEQ
1st Round Acceptability Deficiency	11/29/12	DEQ
1st Round Acceptability Deficiency Response	02/11/14	Western Energy
2nd Round Acceptability Deficiency	06/09/14	DEQ
2nd Round Acceptability Deficiency Response	07/10/15	Western Energy
3rd Round Acceptability Deficiency	11/06/15	DEQ
3rd Round Acceptability Deficiency Response	02/29/16	Western Energy
4th Round Acceptability Deficiency	6/27/2016	DEQ
4th Round Acceptability Deficiency Response	8/29/2016	Western Energy
5th Round Acceptability Deficiency	12/23/2016	DEQ
5th Round Acceptability Deficiency Response	05/05/2017	Western Energy
6th Round Acceptability Deficiency	06/07/2017	DEQ
5th Round Acceptability Deficiency Response	07/26/2017	Western Energy

[1] ***All permit documents are available for download as PDF files:*** http://deq.mt.gov/Public/ea/coal

Table 2. Area F Permit (C2011003F) Permit Application Package (PAP) Documents	
PAP Component	**Contents**
Permit (Note: Permit subchapters correspond to subchapters of MSUMRA's implementing regulations, ARM 17.24.301-1309)	
Subchapter 3	Definitions and Strip Mine Permit Application Requirements
Subchapter 4	Mine Permit and Test Pit Prospecting Permit Procedures
Subchapter 5	Backfilling and Grading Requirements
Subchapter 6	Transportation Facilities, Use of Explosives and Hydrology
Subchapter 7	Topsoiling, Revegetation, and Protection of Wildlife and Air Resources
Subchapter 8	Alluvial Valley Floors, Prime Farmlands, Alternate Reclamation and Auger Mining
Subchapter 9	Underground Coal and Uranium Mining
Subchapter 10	Prospecting
Subchapter 11	Bonding, Insurance, Reporting, and Special Areas
Subchapter 12	Special Departmental Procedures and Programs
Subchapter 13	Miscellaneous Provisions
Appendices	
Appendix A	Cultural Resources A-1: Area F - Class III Cultural & Paleontological Resource Inventory 2010-10 A-2: Additional Area - Class III Cultural & Paleontological Resource Inventory 2012-01 A-3: Area F NRHP report 46 Archaeological Properties 2013-11
Appendix B	Hydrology
Appendix C	Climatology
Appendix D	Overburden Quality
Appendix E	Baseline Vegetation Report and Wetland Delineation Report E-1: Area F – 2006 Baseline Vegetation Survey E-2: Area F – 2013 Rosebud Mine Wetlands Delineation Maps
Appendix F	Wildlife
Appendix G	Baseline Soils
Appendix H	Leases (Confidential)
Appendix I	Groundwater Model I-A: Rosebud Mine Groundwater model I-B: Area F Groundwater Model
Appendix J	Protection of the Hydrologic Balance
Appendix K	Geology
Appendix L	Well Logs
Appendix M	Facilities Sampling Plan
Appendix N	Fish and Wildlife N-1: Fish and Wildlife Report
Appendix O	Probable Hydrologic Consequences (PHC) O-1: Sediment Yield Modeling
Appendix P	Monitoring and Quality Assurance Plan

Table 2. Area F Permit (C2011003F) Permit Application Package (PAP) Documents	
PAP Component	**Contents**
Appendix Q	Alluvial Valley Floors (AVF) Q-1: Baseline Evaluation for Alluvial Valley Floor Determination Q-2: Alluvial Valley Floor Determination
Appendix R	Aquatic Survey
Appendix S	Steep Slope Inventory
Appendix T	Pond Designs and As-Builts
Appendix U	Sediment Yield Monitoring
Exhibits	
A	Approximate Mine Plan
B	Approximate Postmine Topography with Drainage Basins (500 scale)
C	Approximate Revegetation and Wildlife Enhancement Plan
D	Approximate Hydrologic Control Plan
E	Premine Vegetation Survey
F	Cultural Resource Sites (Confidential)
G1, G2, G3, G4, and G5	Reclamation Bond and Bond Calculations
H	Surface and Groundwater Monitoring Sites
I and I1	Reclamation Cross Sections and Locations
J	Approximate Reclamation Plan
K	Aerial Photograph
L1 and L2	Surface and Mineral Ownership Maps
M	Coal Conservation Plan Map
N1 and N2	Premine and Postmine Drainage Profiles
O	Haul Road Design Plan, Profile, and Details
P1 and P2	Phase I and Phase II County Road Relocations
Q1, Q2, and Q3	Drill Hole and Geological Cross Sections and Locations
R1, R2, R3, R4, and R5	Overburden Isopach, Rosebud Coal Isopach and Bottom Elevation, and McKay Coal Isopach and Bottom Elevation
S	Surface Geology
T1 and T2	Premine and Postmine Slope Histogram and Slope Aspect Wire Diagram
U and U1	Premine Topography with Drainage Basins (1000 scale and 5000 scale)

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Appendix B – DEQ's Sixth Round Acceptability Deficiency Letter to Western Energy

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DEQ
Montana Department of Environmental Quality

June 7, 2017

Sent via electronic mail

Dicki Peterson
Western Energy Company
Rosebud Coal Mine Area F
P.O. Box 99
138 Rosebud Lane
Colstrip, MT 59323

Permit ID: C2011003F
Revision Type: N/A
Permitting Action: Deficiency
Subject: Sixth Round Acceptability Deficiency

Dear Dicki:

The Department of Environmental Quality (DEQ) has completed its acceptability review regarding Western Energy Company's application for SMP C2011003F. The following deficiencies must be adequately addressed before DEQ can determine the application acceptable:

ARM 17.24.303: In the 5th round deficiency responses, Western Energy submitted a revised Table 303-2 indicating the estimated annual production and acres disturbed over the life of the permit amendment. Up until this revision, Table 303-2 was based on the estimated production and acres of disturbance relative to Area F, taking into consideration the effect that mining in previously approved mine areas would have on the estimated production and acres of disturbance in Area F. The revised Table 303-2, however, also took into account the effect that proposed mining in Area B AM5 may have on the annual production and acres disturbed relative to Area F. While an amendment application seeking approval to mine in Area B AM5 has been submitted to DEQ, DEQ has not approved the mining in Area B AM5. Therefore, any approval of Area F based on the revised Table 303-2 would be premised on DEQ's future approval of Area B AM5 and would be predecisional. DEQ must retain complete discretion to approve or deny Area B AM5 based on the merits of that amendment application. Therefore, DEQ believes that Table 303-2 as it existed before the 5th round of deficiencies accurately reflects the estimated annual production and acres of disturbance relative to Area F at this point in the permitting process.

Please work with DEQ staff to verify the production numbers on Table 303-2 and the years of mining on the mine life maps and are reclamation maps.

ARM 17.24.312(1)(d): Appendix N-1 presented a conceptual approach to developing mitigation options for impacted wetlands at a future date, informed by the results of functional wetland assessments. Those assessments have now been completed and Appendix N-1 has been updated. Appendix N-1 does not have all wildlife data included in regards to species of concern in the area. Specifically, bats identified in Area F (Hoary Bat *Lasiurus cinereus* and Little Brown Myotis *Myotis lucifugus)* have not been included. Please ensure this information is checked against the

Rosebud wildlife monitoring and baseline information and is consistent with the monitoring results.

ARM 17.24.312(1)(d): Appendix R provides baseline information regarding aquatic surveys conducted on 10 wetlands within and adjacent to the proposed Area F permit boundary. The cover page for Appendix S is the cover page for Appendix R. Please update Appendix S to have the correct cover page.

ARM 17.24.313(1)(c): The following deficiencies must be addressed.

1. In accordance with the time curves for the 777D trucks, a 1.7 minute cycle time for a 2,965' long, -3.2% grade is conservatively high for the haul and return times. Using a 0% rolling resistance (there are no negative rolling resistances depicted on the graph) it appears the haul time would be between 1.1 and 1.2 minutes. The empty return time with a 7.2% rolling resistance would take ~1.4 minutes.
2. The number of trucks required should drop if the above haul and return time assumptions are correct. If when rounding to the next whole number of trucks is three, then the truck hours must be 3 times the loader hours.
3. The hour column for Loader/Truck Fleet on page G-3 of the bond did not update and thus the costs are not correct.
4. Please update the date of revision on all pages of Exhibit G – 3.

ARM 17.24.313(1)(c): The costs listed in Exhibit G, on page 10, for groundwater and surface water monitoring are inadequate. These costs should represent the cost, by a third party consultant, to conduct all of the monitoring listed in the proposed MQAP in Appendix P for a period of 12 years (2 years to complete reclamation plus 10-year responsibility period). Applying WECo's current method for estimating vegetation and wildlife monitoring costs using a 3-year average of actual costs would be an appropriate method to also use for groundwater and surface water monitoring; however, the updated Exhibit G did not use this method for surface water and groundwater monitoring costs.

MPDES monitoring cost were recalculated using the 3-year average method; however, the old method of calculation for MPDES monitoring was not removed from Exhibit G. Please remove the old MPDES monitoring calculation (Subtotal $26,590). Using the timeframe of 12 years for MPDES monitoring may overestimate MPDES monitoring costs. WECo may make a reasonable assumption that MPDES monitoring will cease when outfalls achieve western alkaline status.

The costs for monitoring well plugging should be based on the cost per linear foot for the total linear feet of the monitoring wells listed in Appendix P (including inactive wells which have not been plugged) and the costs to remove equipment at surface water stations should include all of the stations listed in Appendix P (including any inactive stations where equipment has not been removed). These cost estimates were not modified in response to the last deficiency.

The calculations for cost estimates for vegetation monitoring, wildlife monitoring, noxious weed management, and MPDES monitoring include a breakout of "permitted acreage" for Area G. The acreage listed is not permitted, and is proposed as an amendment to Area B, not a separate mine area. The Area G acreage should not be included in these calculations.

ARM 17.24.314(2)(a): Exhibit D does not indicate how drainage will be controlled on the portion of the F4 ramp road which crosses the eastern tributary of Donley Creek (DCT-1). Please clarify

how drainage in this area will be controlled by indicating on Exhibit D the direction of water routing and ditches along this ramp crossing.

ARM 17.24.314(2)(d): In Appendix P, Table P-1, footnote (a) states: "The official stream classification is C-3, however the streams can be classified as ephemeral." The ephemeral condition of the streams in the area is not a classification. Please change this note to read: "The official stream classification is C-3; however, the typical flow condition at most of the stations is ephemeral."

ARM 17.24.314(2)(d): Appendix P, Appendix P-8, Section 1.4.1 on page 4 states that Spring 5 is located in the Robbie Creek drainage. Please correct this to the Donley Creek drainage.

ARM 17.24.314(2)(d): In Appendix P, Table P-4, please change the frequency of laboratory water quality sampling and field parameter sampling for well WM-208 to annual.

ARM 17.24.314(3): In Appendix O, Section 3.3.2 on page 24, the second bullet from the bottom of the page refers to the A/D coal. Please revise this bullet to be relevant to the geologic units present in Area F.

ARM 17.24.314(3): In Appendix O, Section 3.2.2 page 16 states sediment modeling results are in Appendix V. Please change this to the correct reference, Appendix U.

ARM 17.24.314(3): In Appendix O, Section 3.4.3 does not discuss the potential for impacts to Wetland F061. This wetland is located in the area identified in Figure O-6 where reduced flow to the alluvium from bounding strata is most likely. Please include a description of the potential impacts to wetland F061, or the rationale why no impacts are anticipated. Appendix N-1 also discusses wetland F061. Please ensure that permit material is consistent between the PHC and Appendix N-1.

ARM 17.24.314(3): Appendix O, Section 6.3 on page 64 refers to measurements of water depth in wetlands using units of feet. The ERM 2015 report cited by this section uses units of meters. Please correct this discussion to use the correct units.

ARM 17.24.314(3): In Appendix O, Table O-3, several comments under Rationale refer to Table O-6 for spring impacts. Please correct these references to point to Table O-7, Springs – Impact Assessment.

ARM 17.24.314(3): In Appendix O, Figure O-3, the permitted mine cuts are not accurate. These mine cuts should be updated to include changes to the mine plan approved for Area A (MR84), Area B (MR76), and Area C (MR129).

ARM 17.24.314(3): Appendix O, Figure O-4 does not match Exhibit A. Please correct this figure to match the currently proposed mine plan. Please also update the mining footprint in Figure O-5, and the mine passes and disturbance boundary in Figure O-7 and Figure O-8.

ARM 17.24.315(1)(a): In Appendix T, several pond designs do not reflect changes made to drainage control structures in response to comments on Exhibit D. The previous disturbance boundary is shown on the designs for ponds F-2, F-3, F-4, F-5, F-6, F-9, F-13, F-21, F-24, F-29, and F-30. Trap TA-F1 was eliminated but still appears on the designs for ponds F-2 and F-3. Trap TA-F11 was eliminated but still appears on the designs for ponds F-5 and F-6. Trap TA-F37 was eliminated, but still appears on the designs for ponds F-29 and F-30. The previous location of trap TC-F27 and

culvert C&L-14 are shown on the design for ponds F-17, F-25, and F-27. The previous location of trap TA-F8 is shown on the design for Pond F-3. The previous locations of traps TA-F9 and TA-F10 are shown on the design for Pond F-4. The designs for ponds F-2 and F-6 still show the previous orientation of culvert F-HR-2. The design for Pond F-7 shows the previous orientation of culvert F-HR-4. The pond F-4 and F-6 designs show the previous PMT. Please update these pond designs to be consistent with Exhibit D.

ARM 17.24.321(1)(a): Exhibit O and Exhibit P2 show the previous disturbance boundary. Please correct these exhibits.

Appendix G

Selenium was suspect in the original test results for the soil baseline study. This has been determined to be due to laboratory error. With the reduced selenium hazard a lengthy discussion in the baseline survey is confusing and not necessary.

Please update the selenium section of the baseline study to match the more current data. Reduce the discussion of the laboratory error to simply note the process occurred.

Upon receipt of satisfactory responses to these deficiencies, DEQ will determine the application to be acceptable.

Please feel free to contact Robert D. Smith at 406-444-7444 with questions regarding this letter.

Sincerely,

Chris Yde, Supervisor
Coal Section
Coal and Opencut Mining Bureau
Phone: 406-444-4967
Fax: 406-444-4988
Email: CYde@mt.gov

C: Jeff Fleischman, Office of Surface Mining
Lauren Mitchell, Office of Surface Mining

FC: 620.169

Gilbert, Sharona

Sent:
To:
Cc:

Subject:
Attachments:

Please see attached electronic correpsondence. Have a great day!

Sharona Gilbert
Administrative Assistant
Coal Section
Coal and Opencut Mining Bureau
Ph: 444-4966
Fax: 444-4988

The best laid schemes o' Mice an' Men,
Gang aft agley ~Robert Burns

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Appendix C – Seed Mixtures

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TABLE 313-2. Lowland Mixture

SCIENTIFIC NAME	COMMON NAME	PERCENT PLS RANGE
COOL SEASON :		70 – 80
Agropyron riparium	Streambank wheatgrass	5 – 15
Agropyron smithii	Western wheatgrass	30 – 40
Agropyron trachycaulum	Slender wheatgrass	5 – 15
Poa canbyi	Canby bluegrass	5 – 15
Poa pratensis	Kentucky bluegrass	5 – 15
WARM SEASON:		10 – 20
Panicum virgatum	Switchgrass	10 -20
PERENNIAL FORB:		5-15
Achillia millefolium	Common yarrow	1-5
Echinacea angustifolia	Narrowleaf purple coneflower	1-5
Linum lewisii	Perennial Flax	1-5
Dalea purpureum	Purple prairie coneflower	1-5
	Minimum Seeding Rate =	10 PLS lbs/acre

LOWLAND MIXTURE - SUBSTITUTE SPECIES

SCIENTIFIC NAME	COMMON NAME
COOL SEASON:	
Phalaris arundinacea	Reed canarygrass
Phragmites communis	Common reed
Scirpus maritimus	Alkali bulrush
Agropyron dasystachyum	Thickspike wheatgrass
Elymus canadensis	Canada wildrye
Poa compressa	Canada Bluegrass
WARM SEASON:	
Andropogon hallii	Sand bluestem
Distichlis stricta	Inland saltgrass
Andropogon gerardii	Big bluestem
PERENNIAL FORB:	
Heterotheca villosa	Hairy golden aster
Psoralea argophylla	Silverleaf scurf-pea
Liatria punctata	Dotted gayfeather
Aster falcatus	Prairie aster
Gallardia aristata	Common gaillardia
Sphaeralcea coccinea	Scarlet globemallow

TABLE 313-3. Upland Mixture

SCIENTIFIC NAME	COMMON NAME	PERCENT PLS RANGE
COOL SEASON:		45 – 55
Agropyron dasytachyum	Thickspike wheatgrass	1 – 10
Agropyron smithii	Western wheatgrass	5 – 15
Agropyron spicatum	Bluebunch wheatgrass	1 – 10
Koeleria cristata	Prairie junegrass	1 – 10
Oryzopsis hymenoides	Indian ricegrass	5 – 15
Stipa viridula	Green needlegrass	5 – 15
WARM SEASON:		35 – 45
Bouteloua gracilis	Blue grama	5 - 15
Bouteloua curtipendula	Side-oats grama	5 – 15
Calamovilfa longifolia	Prairie sandreed	1 – 10
Panicum virgatum	Switchgrass	1 – 10
Sporobolus cryptandrus	Sand dropseed	5 - 15
PERENNIAL FORB:		5-15
Achillia millefolium	Common yarrow	1 – 5
Echinacea angustifolia	Narrowleaf purple coneflower	1 – 5
Linum lewisii	Perennial flax	1 – 5
Dalea purpureum	Purple prairie clover	1 – 5
Ratibida columnifera	Prairie coneflower	1 – 5
Sphaeralcea munroana	Munro globemallow	1 - 5
SHRUB:		1-5
Artemisia cana	Silver sagebrush	1-5
Artemisia tridentata	Big Sagebrush	1-5
	Minimum Seeding Rate =	10 PLS lbs/acre

UPLAND MIXTURE - SUBSTITUTE SPECIES

SCIENTIFIC NAME	COMMON NAME
COOL SEASON:	
Elymus Canadensis	Canada wildrye
Elymus cinereus	Basin wildrye
Festuca idahoensis	Idaho fescue
Poa sandbergii	Sandberg bluegrass
Stipa comata	Needleandthread
Koeleria cristata	Prairie junegrass
WARM SEASON:	
Andropogon scoparius	Little bluestem
Muhlenbergia cuspidate	Plains muhly
Sporobolus cryptandrus	Sand dropseed
PERENNIAL FORB:	
Heterotheca villosa	Hairy golden aster
Psoralea argophylla	Silverleaf scurf-pea
Liatria punctata	Dotted gayfeather
Aster falcatus	Prairie aster
Gaillardia aristata	Common gaillardia
Sphaeralcea coccinea	Scarlet globemallow
Krascheninnikovia lanata	Winterfat
SHRUB:	
Atriplex canescens	Fourwing saltbush
Chrysothamnus nauseosus	Rubber rabbitbrush

TABLE 313-4. Conifer Mixture

SCIENTIFIC NAME	COMMON NAME	PERCENT PLS RANGE
COOL SEASON:		10 – 20
Agropyron smithii	Western wheatgrass	1 – 10
Agropyron spicatum	Bluebunch wheatgrass	1 – 10
Oryzopsis hymenoides	Indian ricegrass	1 – 10
WARM SEASON:		80 – 90
Andropogon hallii	Sand bluestem	15 – 25
Andropogon scoparius	Little bluestem	20 – 30
Bouteloua curtipendula	Side-oats grama	15 – 25
Calamovilfa longifolia	Prairie sandreed	15 – 25
PERENNIAL FORB:		1 – 10
Echinacea angustifolia	Narrowleaf purple coneflower	1 - 10
Ratibida columnifera	Prairie coneflower	1 – 10
Krascheninnikovia lanata	Winterfat	1 – 5
SHRUB:		1 – 5
Artemisia tridentata	Big sagebrush	1 – 5
Rhus trilobata	Skunkbush sumac	1 – 5
	Minimum Seeding Rate =	10 PLS lbs/acre

CONIFER MIXTURE - SUBSTITUTE SPECIES

SCIENTIFIC NAME	COMMON NAME
COOL SEASON:	
Agropyron trachycaulum	Slender wheatgrass
Stipa viridula	Green needlegrass
Poa sandbergii	Sandberg bluegrass
WARM SEASON:	
Bouteloua gracilis	Blue grama
Sporobolus airoides	Alkali sacaton
Sporobolus cryptandrus	Sand dropseed
PERENNIAL FORB:	
Heterotheca villosa	Hairy golden aster
Psoralea argophylla	Silverleaf scurf-pea
Liatria punctata	Dotted gayfeather
Aster falcatus	Prairie aster
Gaillardia aristata	Common gaillardia
Sphaeralcea coccinea	Scarlet globemallow
SHRUB:	
Chrysothamnus nauseosus	Rubber rabbitbrush
Artemisia cana	Silver sagebrush

TABLE 313-4A. Mixed Shrub-Grass Mixture

SCIENTIFIC NAME	COMMON NAME	PERCENT PLS RANGE
COOL SEASON:		
Elymus cinereus	Basin wildrye	10 – 20
Agropyron spicatum	Bluebunch wheatgrass	10 – 20
Oryzopsis hymenoides	Indian ricegrass	10 – 20
Stipa viridula	Green needlegrass	10 – 20
WARM SEASON:		25-35
Andropogon scoparius	Little bluestem	10 – 20
Bouteloua curtipendula	Side-oats grama	10 – 20
	Minimum Seeding Rate =	15 PLS lbs/acre

MIXED SHRUB-GRASS MIXTURE - SUBSTITUTE SPECIES

SCIENTIFIC NAME	COMMON NAME
COOL SEASON:	
Agropyron trachycaulum	Slender wheatgrass
Elymus cinereus	Basin wildrye
Poa canbyi	Canby bluegrass
Poa sandbergii	Sandberg bluegrass
WARM SEASON:	
Calamovilfa longifolia	Prairie sandreed
Bouteloua gracilis	Blue grama
Sporobolus airoides	Alkali sacaton
Sporobolus cryptandrus	Sand dropseed

TABLE 313-4B. Mixed Shrub – Forb and Shrub Mixture

SCIENTIFIC NAME	COMMON NAME	PERCENT PLS RANGE
PERENNIAL FORB:		5 – 15
Artemisia ludoviciana	Prairie sagewort	1 – 5
Eriogonum umbellatum	Sulphur buckwheat	5 – 15
Artemisia frigida	Fringed sagewort	1 – 5
Krascheninnikovia lanata	Winterfat	5 – 15
SHRUBS:		85 – 95
Artemisia cana	Silver sagebrush	5 – 15
Artemisia tridentate	Big sagebrush	60 – 70
Chrysothamnus nauseosus	Rubber Rabbitbrush	1 – 10
	Minimum Seeding Rate =	15 PLS lbs/acre

MIXED SHRUB-FORB AND SHRUB MIXTURE - SUBSTITUTE SPECIES

SCIENTIFIC NAME	COMMON NAME
PERENNIAL FORB:	
Psoralea argophylla	Silverleaf scurf-pea
Gaillardia aristata	Common gaillardia
Balsamorhiza sagittata	Arrowleaf balsamroot
Echinacea angustifolia	Narrowleaf Purple coneflower
Heterotheca villosa	Hairy golden aster
SHRUB:	
Chrysothamnus viscidiflorus	Green rabbitbrush
Calylophus serrulatus	Shrubby evening primrose
Atriplex confertifolia	Shadscale saltbush

TABLE 313-4C. Shrub Complex Mixture

SCIENTIFIC NAME	COMMON NAME	PERCENT PLS RANGE
ANNUAL FORB:		1 – 15
Helianthus annus	Annual sunflower	1 – 10
PERENNIAL FORB:		1 – 15
Artemisia ludoviciana	Prairie sagewort	1 – 10
Echinacea angustifolia	Narrowleaf purple coneflower	1 – 10
Artemisia frigida	Fringed sagewort	1 – 15
Krascheninnikovia lanata	Winterfat	1 – 15
SHRUB:		85 – 99
Artemisia cana	Silver sagebrush	10 – 50
Artemisia tridentata	Big sagebrush	10 – 50
Atriplex canescens	Fourwing saltbush	5 – 30
Chrysothamnus nauseosus	Rubber rabbitbrush	1 – 15
	Minimum Seeding Rate =	5 PLS lbs/acre

SHRUB COMPLEX MIXTURE - SUBSTITUTE SPECIES

SCIENTIFIC NAME	COMMON NAME
ANNUAL FORB:	
Coreopsis tinctoria	Plains coreopsis
Cleome serrulata	Rocky Mountain beeplant
PERENNIAL FORB:	
Psoralea argophylla	Silverleaf scurf-pea
Gaillardia aristata	Common gaillardia
Balsamorhiza sagittata	Arrowleaf balsamroot
Heterotheca villosa	Hairy golden aster
Eriogonum umbellatum	Sulphur buckwheat
Calylophus serrulatus	Shrubby evening primrose
SHRUB:	
Atriplex confertifolia	Shadscale saltbush
Calylophus serrulatus	Shrubby evening primrose

TABLE 313-5A. Pasture Mixture

SCIENTIFIC NAME	COMMON NAME	PERCENT PLS RANGE
COOL SEASON:		40-50
Agropyron dasystachyum	Thickspike wheatgrass	5 – 15
Agropyron smithii	Western wheatgrass	5 – 15
Elymus junceus	Russian wildrye	5 – 15
Oryzopsis hymenoides	Indian ricegrass	5 - 15
Stipa comata	Needleandthread grass	5 - 15
WARM SEASON:		40 - 50
Bouteloua curtipendula	Side-oats grama	10 - 20
Bouteloua gracilis	Blue grama	10 - 20
Eragrostis trichodes	Sand lovegrass	10 - 20
PERENNIAL FORB:		5 - 15
Medicago sativa	Alfalfa	5 - 15
	Minimum Seeding Rate =	10 PLS lbs/acre

PASTURE MIXTURE - SUBSTITUTE SPECIES

SCIENTIFIC NAME	COMMON NAME
COOL SEASON:	
Agropyron trachycaulum	Slender wheatgrass
Elymus cinerius	Basin wildrye
Koeleria cristata	Prairie junegrass
Stipa viridula	Green needlegrass
WARM SEASON:	
Andropogon hallii	Sand bluestem
Calamovilfa longifolia	Prairie sandreed
Panicum virgatum	Switchgrass

TABLE 313-5B. Seed Rate PLS Formula

1. Species PLS = (Purity) X (Germination) X (100)

2. Bulk Seed Mix PLS% = [Σ(specie PLS%) X (# of species included)] / [total lbs of bulk seed mix] X 100%.

3. Bulk Seeding Rate, lbs/Acre = [desired total PLS lbs/acre] / [PLS% of bulk seed mix]

4. PLS Mix % (i.e. ratio of species in mix) = [(species PLS %) X (# of species)] / [(bulk seed mix PLS %) X (total lbs bulk seed mix)]

TABLE 313-6. Indigenous Trees and Shrubs for Revegetation*

Common Name	Scientific Name	Revegetation Type
Box Elder	*Acer negundo*	Lowland
Silver sagebrush	*Artemisia cana*	Lowland; Upland; Conifer; Mixed Shrub
Big sagebrush	*Artemisia tridentata*	Upland; Conifer; Mixed Shrub
Shadscale saltbush	*Atriplex confertifolia*	Mixed Shrub
Fourwing saltbush	*Atriplex canescens*	Mixed Shrub
Rubber rabbitbrush	*Chrysothamnus nauseosus*	Upland; Conifer; Mixed Shrub
Green rabbitbrush	*Chrysothamnus viscidiflorus*	Upland; Conifer
Fleshy hawthorn	*Crataegus succulenta*	Lowland
Silverberry	*Elaeagnus commutata*	Lowland; Upland
Green ash	*Fraxinus pennsylvanica*	Lowland
Rocky Mountain juniper	*Juniperus scopulorum*	Lowland; Conifer
Ponderosa pine	*Pinus ponderosa*	Conifer; Mixed Shrub
Narrowleaf cottonwood	*Populus angustifolia*	Lowland
Plains cottonwood	*Populus deltoids*	Lowland
American plum	*Prunus Americana*	Lowland; Mixed Shrub
Chokecherry	*Prunus virginiana*	Lowland; Mixed Shrub
Skunkbush sumac	*Rhus trilobata*	Upland; Conifer; Mixed Shrub
Golden current	*Ribes aureum*	Lowland; Upland; Conifer; Mixed Shrub
Squaw current	*Ribes cereum*	Lowland; Upland; Conifer; Mixed Shrub
Redshoot gooseberry	*Ribes setosum*	Lowland; Mixed Shrub
Woods rose	*Rosa woodsii*	Lowland; Mixed Shrub
Prairie rose	*Rosa arkansana*	Lowland; Mixed Shrub; Upland
Peachleaf willow	*Salix amygdaloides*	Lowland
Tealeaf willow	*Salix phylicifolia*	Lowland
Common snowberry	*Symphoricarpos albus*	Lowland; Upland; Mixed Shrub
Western snowberry	*Symphoricarpos occidentalis*	Lowland
Buffaloberry	*Sheperdia argentea*	Lowland

* When not commercially available, and when practical, seeds from native indigenous stands of the above species are collected on an annual basis. The seeds are sent to a greenhouse for propagation as containerized plants for use in reclamation. Transplanting densities and seeding rates for all species used in reclamation will be identified in the Annual Report.

TABLE 313-7. Indigenous Forbs and Half Shrubs for Revegetation*

Common Name	Scientific Name
Common yarrow	*Achillea millefolium*
Prairie onion	*Allium textile*
Leadplant	*Amorpha canescens*
Prickly poppy	*Argemone polyanthemos*
Fringed Sagewort**	*Artemisia frigida*
Prairie sagewort	*Artemisia ludoviciana*
Plains milkweed	*Asclepias pumila*
Groundplum milkvetch	*Astragalus crassicarpus*
Slender milkvetch	*Astragalus gracilis*
Missouri milkvetch	*Astragalus missouriensis*
Nuttall saltbush**	*Atriplex gardneri*
Arrowleaf balsamroot	*Balsamorhiza sagittata*
Sego (mariposa) lily	*Calochortius nuttallii*
Roundleaf harebell	*Campanula rotundifolia*
Shrubby evening primrose**	*Calylophus serrulata*
Downy Indian paintbrush	*Castilleja sessiliflora*
Rocky Mountain beeplant	*Cleome serrulata*
White prairie clover	*Dalea candida*
Purple prairie clover	*Dalea purpurea*
Narrowleaf purple coneflower	*Echinacea angustifolia*
Purple coneflower	*Echinacea purpurea*
Annual buckwheat	*Eriogonum annuum*
Sulphur buckwheat	*Erigonum umbellatum*
Western wallflower	*Erysimum asperum*
Common gaillardia	*Gaillardia aristata*
Broom snakeweed**	*Gutierrezia sarothrae*
Northern sweetvetch	*Hedysarum boreale*
White sweetvetch	*Hedysarum sulpherescens*
Prairie sunflower	*Helianthus petiolaris*
Hairy golden aster	*Heterotheca villosa*
Winterfat**	*Krascheninnikovia lanata*
Dotted gayfeather	*Liatris punctata*
Perennial flax	*Linum lewisii*
Narrowleaf gromwell	*Lithospermum incisum*
Oregon grape**	*Mahonia repens*
Tenpetal mentzelia	*Mentzelia decapetala*
Tufted evening primrose	*Oenothera cespitosa*
White penstemon	*Penstemon albidus*
Silverleaf scurf-pea	*Psoralea argophylla*
Breadroot scurf-pea	*Psoralea esculenta*
Prairie coneflower	*Ratibida columnifera*
Scarlet globemallow	*Sphaeralcea coccinea*
Munro globemallow	*Sphaeralcea munroana*
Prairie goldenpea	*Thermopsis rhombifolia*
American vetch	*Vicia americana*
Soapweed	*Yucca glauca*

These species may be utilized in conjunction with each of the seed mixes.

* When not commercially available, and when practical, seeds from native indigenous stands of the above species are collected and sent to a greenhouse for propagation as containerized plants for use in reclamation. Transplanting densities and seeding rates for all species used in reclamation will be identified in the Annual Report.

** Half Shrub species

Appendix D – Air Quality Permits and Monitoring Data

- D-1 Montana Air Quality Permit #1570-08 (Area C) and Montana Air Quality Permit #1570-07 Preliminary Determination (Areas C and F)
- D-2 Montana Air Quality Permit #1483-08 for Areas A/B/D/E
- D-3 County Level Monitoring Data
- D-4 Monitored Visibility Trends for IMPROVE sites
- D-5 Historic Deposition Trends
- D-6 Supplemental Information for Cumulative Effects for Air Quality

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APPENDIX D-1

Montana Air Quality Permit #1570-08 (Area C) and Montana Air Quality Permit #1570-07 Preliminary Determination (Areas C and F).

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Montana Department of
ENVIRONMENTAL QUALITY
Steve Bullock, Governor
Tracy Stone-Manning, Director
P. O. Box 200901 Helena, MT 59620-0901 (406) 444-2544 Website: www.deq.mt.gov

October 31, 2014

Richard Spang
Western Energy Company
P.O. Box 99
Colstrip, MT 59323

Dear Mr. Spang:

Montana Air Quality Permit #1570-08 is deemed final as of October 31, 2014, by the Department of Environmental Quality (Department). This permit is for a surface coal mine and associated equipment. All conditions of the Department's Decision remain the same. Enclosed is a copy of your permit with the final date indicated.

For the Department,

Julie Merkel
Air Permitting Program Supervisor
Air Resources Management Bureau
(406) 444-3626

Doug Kuenzli
Environmental Science Specialist
Air Resources Management Bureau
(406) 444-4267

JM:DCK
Enclosure

Montana Department of Environmental Quality
Permitting and Compliance Division

Montana Air Quality Permit #1570-08

Western Energy Company
P.O. Box 99
Colstrip, MT 59323

October 31, 2014

MONTANA AIR QUALITY PERMIT

Issued to: Western Energy Company
P.O. Box 99
Colstrip, MT 59323

MAQP: #1570-08
Application Complete: 08/18/2014
Preliminary Determination: 09/26/2014
Department's Decision Issued: 10/15/2014
Permit Final: 10/31/2014
AFS #: 087-0004

A Montana Air Quality Permit (MAQP), with conditions, is hereby granted to Western Energy Company (Western Energy), pursuant to Sections 75-2-204 and 211 of the Montana Code Annotated (MCA), as amended, and the Administrative Rules of Montana (ARM) 17.8.740 *et seq.,* as amended, for the following:

Section I: Permitted Facilities

A. Plant Location

Western Energy operates a surface coal mine and extraction facility located in Area C of the Rosebud Mine. The total estimated coal production for the life of the mine is 241,000,000 tons. Area C is located west of Colstrip in Sections 1-3 of Township 1 North, Range 39 East; Sections 34-36 of Township 2 North, Range 39 East; Sections 1-6, 8-12, and 13-17 of Township 1 North, Range 40 East; and Sections 28, 29, and 31-33 of Township 2 North, Range 40 East in Rosebud County. The list of permitted equipment can be found in Section I of the permit analysis.

B. Current Permit Action

On August 18, 2014, the Department of Environmental Quality (Department) received an application from Bison Engineering, Inc. (Bison), on behalf of Western Energy, for modification of Western Energy's air quality permit to authorize replacement of the particulate matter control technology on the secondary crushers and the transfer points on the overland conveyor. Western Energy currently employs mechanical local exhaust ventilation in conjunction with baghouse control for the capture and removal of airborne particulate matter from the referenced coal processing and handling equipment. Western Energy proposed the installation and operation of a foam dust suppression control system (FDSS) in the control of particulate matter in lieu of the currently installed negative pressure capture and baghouse removal systems. The current permit action authorizes the removal of the existing control equipment and accounts for the installation and operation of the FDSS on the secondary crushers and overland conveyor transfer points.

Section II: Conditions and Limitations

A. Emissions Limitations

1. The Area C primary crushers and coal handling facility, including the negative pressure system on the truck dump, shall be vented to and particulate matter controlled by a baghouse(s) (ARM.17.8.752).

2. A foam dust suppression system shall be installed and operated on the secondary crushers and each of three transfer points on the overland conveyor to control particulate matter emissions (ARM 17.8.752).

3. Western Energy shall not cause visible emissions of greater than 20% opacity to be discharged into the atmosphere from any coal handling, conveying, crushing, processing, storing or loading system averaged over 6 consecutive minutes (ARM 17.8.308, ARM 1.7.8.304, 340 and 40 CFR Part 60, Subpart Y).

4. Western Energy shall not cause or authorize the use of any street, road, or parking lot without taking reasonable precautions to control emissions of airborne particulate matter (ARM 17.8.308).

5. Western Energy shall treat all unpaved portions of the haul roads, access roads, parking lots, or general plant area with water and/or chemical dust suppression as necessary to maintain compliance with the reasonable precautions limitation in Section II.A.3 (ARM 17.8.749).

6. The following control measures shall be applied on an as necessary basis (ARM 17.8.752, ARM 17.8.749 and ARM 17.8.308):

    a. Chemically stabilize and maintain all active haul and access roads and supplement by watering;

    b. Apply water to temporary roads such as scraper travel areas;

    c. Adequately maintain open coal storage and minimize equipment activity on stockpiles;

    d. Minimize fall/drop distance on all coal and overburden handling activities;

    e. Minimize area of surface disturbance;

    f. Promptly revegetate exposed/disturbed areas, including temporary vegetative cover of topsoil stockpiles;

    g. Minimize emissions from coal and overburden drilling through the use of dust curtains, water sprays, dust collectors, or other appropriate techniques;

    h. Conduct blasting operations in such a manner as to minimize emissions, prevent overshooting, provide stemming of holes, and minimize area to be blasted;

    i. Extinguish areas of burning or smoldering coal;

    j. Restrict and maintain vehicle speeds on haul roads as necessary to minimize emissions; and,

    k. Other control practices which may be determined by the Department to be necessary.

7. Western Energy shall maintain a fugitive dust control plan. Elements of the plan shall include, but not be limited to, the conditions established within Section II.A.1 through II.A.5 (ARM 17.8.749 and 752).

8. Combined annual coal production from Areas C and F shall be limited to 8,000,000 tons per year (ARM 17.8.749).

9. Western Energy shall comply with all applicable standards and limitations, and the reporting, recordkeeping, testing, and notification requirements contained in 40 Code of Federal Regulations (CFR), Subpart Y, *Standards of Performance for Coal Preparation Plants and Processing Plants* (ARM 17.8.340 and 40 CFR 60, Subpart Y).

B. Testing Requirements

1. All compliance source tests shall conform to the requirements of the Montana Source Test Protocol and Procedures Manual (ARM 17.8.106).

2. The Department may require testing (ARM 17.8.105).

C. Operational Reporting Requirements

1. Western Energy shall supply the Department with annual production information for all emission points, as required by the Department in the annual emission inventory request. The request will include, but is not limited to, all sources of emissions identified in the emission inventory contained in the permit analysis and sources identified in Section I of the permit analysis.

   Production information shall be gathered on a calendar-year basis and submitted to the Department by the date required in the emission inventory request. The information shall include the following and shall be in the units required by the Department. This information may be used for calculating operating fees, based on actual emissions from the facility, and/or to verify compliance with permit limitations (ARM 17.8.505). Western Energy shall submit the following information annually to the Department by March 1, of each year; the information may be submitted along with the annual emission inventory (ARM 17.8.505).

2. Western Energy shall notify the Department of any construction or improvement project conducted pursuant to ARM 17.8.745 that would include the ***addition of a new emission unit***, change in control equipment, stack height, stack diameter, stack flow, stack gas temperature, source location, or fuel specifications, or would result in an increase in source capacity above its permitted operation. The notice must be submitted to the Department, in writing, 10 days prior to start up or use of the proposed de minimis change or as soon as reasonably practicable in the event of an unanticipated circumstance causing the de minimis change and must include the information requested in ARM 17.8.745 (l)(d) (ARM 17.8.745).

3. All records compiled in accordance with this permit must be maintained by Western Energy as a permanent business record for at least 5-years following the date of the measurement, must be available at the plant site for inspection by the department, and must be submitted to the department upon request (ARM 17.8.749).

D. Notification

Western Energy shall provide the Department with written notification of the actual date upon which the FDSS system is initially operated. The notice shall be postmarked or hand-delivered no later than 15 days after the actual operational commencement date (ARM 17.8.749).

E. Ambient Monitoring

1. Particulate matter within an aerodynamic diameter of ten microns or less (PM_{10}) data has been collected at the Western Energy mine since 1992. During the 1992-2000 period, the annual means at all sites were less than 28% of the annual standard. For the 24-hour PM_{10} concentrations, all of the annual, maximum 24-hour values were less than 53% of the 24-hour standard. Therefore, in accordance with the October 9, 1998, monitoring guidance statement developed by the Department, Western Energy may discontinue operation of their ambient air-monitoring network.

2. The Department may require Western Energy to conduct additional ambient air monitoring, if necessary (ARM 17.8.749).

Section III: General Conditions

A. Inspection – Western Energy shall allow the Department's representatives access to the source at all reasonable times for the purpose of making inspections or surveys, collecting samples, obtaining data, auditing any monitoring equipment (Continuous Emission Monitoring Systems CEMS, Continuous Emission Rate Monitoring Systems (CERMS) or observing any monitoring or testing, and otherwise conducting all necessary functions related to this permit.

B. Waiver – The permit and all the terms, conditions, and matters stated herein shall be deemed accepted if Western Energy fails to appeal as indicated below.

C. Compliance with Statutes and Regulations - Nothing in this permit shall be construed as relieving Western Energy of the responsibility for complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.740, *et seq.* (ARM 17.8.756).

D. Enforcement – Violations of limitations, conditions and requirements contained herein may constitute grounds for permit revocation, penalties or other enforcement as specified in Section 75-2-401 *et seq.*, MCA.

E. Appeals – Any person or persons jointly or severally adversely affected by the Department's decision may request, within 15 days after the Department renders its decision, upon affidavit setting forth the grounds therefore, a hearing before the Board of Environmental Review (Board). A hearing shall be held under the provisions of the Montana Administrative Procedures Act. The filing of a request for a hearing does not stay the Department's decision unless the Board issues a stay upon receipt of a petition and a finding that a stay is appropriate under Section 75-2-211(11)(b), MCA. The issuance of a stay on a permit by the Board postpones the effective date of the Department's decision until conclusion of the hearing and issuance of a final decision by the Board. If a stay is not issued by the Board, the Department's decision on the application is final 16 days after the Department's decision is made.

F. Permit Inspection – As required by ARM 17.8.755, Inspection of Permit, a copy of the air quality permit shall be made available for inspection by Department personnel at the location of the permitted source.

G. Permit Fees – Pursuant to Section 75-2-220, MCA, as amended by the 1991 Legislature, failure to pay the annual operation fee by Western Energy may be grounds for revocation of this permit, as required by that section and rules adopted there under by the Board.

H. Duration of Permit – Construction or installation must begin or contractual obligations entered into that would constitute substantial loss within 3 years of permit issuance and proceed with due diligence until the project is complete or the permit shall expire (ARM 17.8.762).

Montana Air Quality Permit (MAQP) Analysis
Western Energy Company - Rosebud Mine
MAQP #1570-08

I. Introduction/Process Description

A. Permitted Equipment

Western Energy Company (Western Energy) operates the following equipment;

1. Coal handling facilities - include, but are not limited to:

   a. Truck dump with two 500-ton capacity dump hoppers.

   b. Two primary crushers with capacities of 1650 ton/hr each.

   c. Two secondary crushers with capacities of 1650 ton/hr each.

   d. One overland conveyor with a capacity of 1650 ton/hr, approximately 5 miles in length. . This conveyor transports coal from the Area C preparation facility to the Colstrip power plants, Units 3 and 4. The conveyor and transfer points are fully enclosed and utilize a foam dust suppression system (FDSS) in the control particulate matter.

   NOTE: Only one dump hopper, primary crusher and secondary crusher will operate at a time, with the other being a redundant system. The primary crushers and initial conveyors at the preparation facility are fully enclosed and vented to a central baghouse. The truck dump is equipped with a negative pressure system vented to the central baghouse.

2. Necessary auxiliaries include, but are not limited to: draglines, coal shovels, trucks, front-end loaders, graders, scrapers, dozers, other mobile units, auxiliary facilities, etc., as applicable.

B. Source Description

Western Energy operates a surface coal extraction facility and mine located in Area C of the Rosebud Mine. Area C is located west of Colstrip in Sections 1-3 of Township 1 North, Range 39 East; Sections 34-36 of Township 2 North, Range 39 East; Sections 1-6, 8-12, and 13-17 of Township 1 North, Range 40 East; and Sections 28, 29, and 31-33 of Township 2 North, Range 40 East of Rosebud County.

Western Energy has a combined maximum annual production limit of 8,000,000 tons of coal per year. The total projected coal production for the life of the mine is estimated at 241,000,000 tons. All Coal extracted from Area C will be transported by haul truck to the Area C or Area A truck dump for further processing.

C. Permit History

MAQP #1570 was originally issued to Western Energy for Area C of the Rosebud Mine on August 2, 1982. The coal processing facilities, with emissions controlled by baghouses, included primary and secondary crushers and conveyors. Area C coal was used exclusively at the local power generating facilities known as Colstrip Units 3 and 4. An overland conveyor, with baghouse controls at each transfer point, transported coal 5 miles from Area C to the power plants. The original permit contained a coal production limit of 5.6 million tons per year. Overburden was stripped using standard dragline practices and shovel and truck removed coal. Other mine related activities included topsoil handling (primarily with scrapers), drilling and blasting of overburden and coal, vehicle traffic, and reclamation/farming activities.

MAQP #1570A was a modification issued on January 6, 1986. The permit action discontinued ambient air monitoring for meteorological parameters and settled particulate matter (a.k.a. dustfall). Total suspended particulate (TSP) monitoring was still required; however, five TSP sites were discontinued, five existing TSP sites continued to operate, and two new TSP sites were added. MAQP #1570A replaced MAQP #1570.

MAQP #1570B was a modification issued on December 22, 1988. The annual coal production limit was increased from 5.6 to 6.5 million tons per year. No changes were made to the coal mining methods or coal handling procedures. MAQP #1570B replaced MAQP #1570A.

MAQP #1570C was a modification issued on March 22, 1990, that dealt only with ambient air monitoring. A new particulate matter-monitoring site was required near Castle Rock Lake Drive. The description of monitoring sites #12 & #13 were revised to correct a transposition error from an earlier permitting action. Clarifying language was added that explained the Department of Environmental Quality's (Department) policy for future ambient PM_{10} monitoring requirements. Lastly, the ambient air monitoring requirements were removed from the body of the permit and placed in an attachment to the main permit (hereafter referred to as Attachment 1). MAQP #1570C replaced MAQP #1570B.

MAQP #1570-04 was a modification issued on September 1, 1994. The annual coal production limit was increased from 6.5 to 7.5 million tons per year. No other operational changes were made. MAQP #1570-04 replaced MAQP #1570C.

MAQP #1570-05 was a modification issued on June 15, 2000. The permit action was an administrative change requested by Western Energy on March 30, 2000. Western Energy requested corrections to the site location description in their permit. Additionally, the permit was updated to reflect the current format and language used in permits. MAQP #1570-05 replaced MAQP **#**1570-04.

MAQP #1570-06 was a modification issued on July 19, 2001. The Department received a letter, dated April 27, 2001, from Western Energy requesting termination of the ambient air-monitoring network. Following the October 9, 1998, permitting guidance statement, the Department reviewed the ambient air monitoring data. In a letter dated May 23, 2001, the Department agreed to Western Energy's request to terminate their ambient monitoring program, effective July 1, 2001. The permit action updated the monitoring requirements to reflect the termination of the ambient air-monitoring network. MAQP **#**1570-06 replaced MAQP **#**1570-05.

On April 18, 2013, the Department received an initial application from Bison Engineering, Inc. (Bison), on behalf of Western Energy, for modification of Western Energy's air quality permit to allow expansion to the geographic extent of the mine. The existing MAQP explicitly defined the physical area in which mining activities are permitted. As such, the application requests an expansion of this physical boundary into a new area designated as Area F. No additional coal production capacity was requested, the objective of the expansion is to further extend the life of the mine by replacing areas from which coal has been extracted. Supplemental information and data was received by the Department on June 12, 2013. The current permit action provides for an expansion of the mines operational boundary. No additional stationary or portable equipment are proposed.

This permit action also incorporates a de minimis action approved by the Department on July 20, 2013, which increased the annual production capacity limit by 500,000 tons to a total of 8.0 million tons per year. In addition this permit action updates permit language and rule references used by the Department, as well as updates the emission inventory. **MAQP #1570-07** is pending until issuance of the final Environmental Impact Statement.

D. Current Permit Action

On August 18, 2014, the Department received an application from Bison Engineering, Inc. (Bison), on behalf of Western Energy, for modification of Western Energy's air quality permit to authorize replacement of the particulate matter control technology on the secondary crushers and the transfer sites on overland conveyor. Western Energy currently employs mechanical local exhaust ventilation in conjunction with baghouse control for the capture and removal of airborne particulate matter from the referenced coal processing and handling equipment. Western Energy proposed the installation and operation of a foam suppression dust control system (FDSS) in the control of particulate matter in lieu of the currently installed negative pressure capture and baghouse removal systems. The current permit action authorizes the removal of the existing control equipment and accounts for the installation and operation of the FDSS on the secondary crushers and overland conveyor transfer points. **MAQP #1570-08** replaces MAQP #1570-06.

E. Additional Information

Additional information, such as applicable rules and regulations, Best Available Control Technology (BACT)/Reasonably Available Control Technologies (RACT) determinations, air quality impacts, and environmental assessments, is included in the analysis associated with each change to the permit.

II. Applicable Rules and Regulations

The following are partial explanations of some applicable rules and regulations that apply to the facility. The complete rules are stated in the Administrative Rules of Montana (ARM) and are available upon request from the Department. Upon request, the Department will provide references for locations of complete copies of all applicable rules and regulations or copies where appropriate.

A. ARM 17.8, Subchapter 1 - General Provisions, including, but not limited to:

1. ARM 17.8.101 Definitions: This rule includes a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.

2. ARM 17.8.105 Testing Requirements. Any person or persons responsible for the emission of any air contaminant into the outdoor atmosphere shall, upon written request of the Department, provide the facilities and necessary equipment (including instruments and sensing devices) and shall conduct tests, emission or ambient, for such periods of time as may be necessary using methods approved by the Department.

3. ARM 17.8.106 Source Testing Protocol. The requirements of this rule apply to any emission source testing conducted by the Department, any source, or other entity as required by any rule in this chapter, or any permit or order issued pursuant to this chapter, or the provisions of the Clean Air Act of Montana, 75-2-101, *et seq*., Montana Code Annotated (MCA).

   Western Energy shall comply with the requirements contained in the Montana Source Test Protocol and Procedures Manual, including, but not limited, using the proper test methods and supplying the required reports. A copy of the Montana Source Test Protocol and Procedures Manual is available from the Department upon request.

4. ARM 17.8.110 Malfunctions. (2) The Department must be notified promptly by telephone whenever a malfunction occurs that can be expected to create emissions in excess of any applicable emission limitation, or to continue for a period greater than 4 hours.

5. ARM 17.8.111 Circumvention. (1) No person shall cause or permit the installation or use of any device or any means which, without resulting in reduction in the total amount of air contaminant emitted, conceals or dilutes an emission of air contaminant which would otherwise violate an air pollution control regulation. (2) No equipment that may produce emissions shall be operated or maintained in such a manner that a public nuisance is created.

B. ARM 17.8, Subchapter 2 - Ambient Air Quality, including, but not limited to:

1. ARM 17.8.204 Ambient Air Monitoring
2. ARM 17.8.210 Ambient Air Quality Standards for Sulfur Dioxide (SO_2)
3. ARM 17.8.211 Ambient Air Quality Standards for Nitrogen Dioxide (NO_2)
4. ARM 17.8.212 Ambient Air Quality Standards for Carbon Monoxide (CO)
5. ARM 17.8.213 Ambient Air Quality Standards for Ozone (O_3)
6. ARM 17.8.214 Ambient Air Quality Standard for Hydrogen Sulfide (H_2S)
7. ARM 17.8.220 Ambient Air Quality Standard for Settled Particulate Matter (PM)
8. ARM 17.8.221 Ambient Air Quality Standard for Visibility
9. ARM 17.8.222 Ambient Air Quality Standards for Lead
10. ARM 17.8.223 Ambient Air Quality Standard for Particulate Matter with an Aerodynamic Diameter of Ten Microns or Less (PM_{10})

Western Energy must maintain compliance with the applicable ambient air quality standards.

C. ARM 17.8, Subchapter 3 - Emission Standards, including, but not limited to:

1. ARM 17.8.304 Visible Air Contaminants. This rule requires that no person may cause or authorize emissions to be discharged into the outdoor atmosphere from any source installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes.

2. ARM 17.8.308, Particulate Matter Airborne. (1) This rule requires an opacity limitation of 20% for all fugitive emission sources and that reasonable precautions are taken to control emissions of airborne particulate matter. (2) Under this rule, Western Energy shall not cause or authorize the use of any street, road or parking lot without taking reasonable precautions to control emissions of airborne particulate matter.

3. ARM 17.8.309 Particulate Matter Fuel Burning Equipment. This rule requires that no person shall cause, allow or permit to be discharged into the atmosphere particulate matter caused by the combustion of fuel in excess of the amount determined by this rule.

4. ARM 17.8.310 Particulate Matter Industrial Processes. This rule requires that no person shall cause, suffer, allow, or permit to be discharged into the outdoor atmosphere from any operation, process or activity, particulate matter in excess of the amount shown in this rule.

5. ARM 17.8.322, Sulfur Oxide Emissions-Sulfur in Fuel. This rule requires that no person shall cause, allow or permit to be discharged into the atmosphere particulate matter in excess of the amount set forth in this rule

6. ARM 17.8.324(3) Hydrocarbon Emissions--Petroleum Products. No person shall load or permit the loading of gasoline into any stationary tank with a capacity of 250 gallons or more from any tank truck or trailer, except through a permanent submerged fill pipe, unless such tank is equipped with a vapor loss control device as described in (1) of this rule

7. ARM 17.8.340 Standard of Performance for New Stationary Sources. This rule incorporates, by reference, 40 CFR Part 60, Standards of Performance for New Stationary Sources (NSPS). The owner and operator of any stationary source or modification, as defined and applied in 40 CFR Part 60, shall comply with the NSPS.

   a. 40 CFR Part 60, Subpart A – General Provisions apply to all equipment or facilities subject to an NSPS Subpart as listed below:

   b. 40 CFR Part 60, Subpart Y – Standards of Performance for Coal Preparation Plants and Processing Plants. Process operations at this facility that meet the definition of affected facilities include any coal processing and conveying equipment, coal storage systems, or coal transfer and loading systems.

8. ARM 17.8.342 Emission Standards for Hazardous Air Pollutants for Source Categories. This rule incorporates, by reference, 40 CFR Part 63, National Emission Standards for Hazardous Air Pollutants (NESHAPs) for Source Categories. Western Energy shall comply with the requirements of 40 CFR Part 63, as applicable.

D. ARM 17.8, Subchapter 5 - Air Quality Permit Application, Operation and Open Burning Fees, including but not limited to:

1. ARM 17.8.504 Air Quality Permit Application Fees. This rule requires that an applicant submit an air quality permit application fee concurrent with the submittal of an MAQP application. A permit application is incomplete until the proper application fee is paid to the Department. Western Energy submitted the appropriate permit application fee for the current permit action.

2. ARM 17.8.505, Air Quality Operation Fees. An annual air quality operation fee must, as a condition of continued operation, be submitted to the Department by each source of air contaminants holding an MAQP (excluding an open burning permit) issued by the Department. The air quality operation fee is based on the actual or estimated actual amount of air pollutants emitted during the previous calendar year.

   An air quality operation fee is separate and distinct from an air MAQP application fee. The annual assessment and collection of the air quality operation fee, described above, shall take place on a calendar-year basis. The Department may insert into any final permit issued after the effective date of these rules, such conditions as may be necessary to require the payment of an air quality operation fee on a calendar year basis, including provisions that prorate the required fee amount.

E. ARM 17.8, Subchapter 7 - Permit, Construction and Operation of Air Contaminant Sources, including but not limited to:

1. ARM 17.8.740 Definitions. This rule is a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.

2. ARM 17.8.743 Montana Air Quality Permits--When Required. This rule requires a person to obtain an MAQP or permit modification to construct, modify, or use any air contaminant sources that have the potential to emit (PTE) greater than 25 tons per year of any pollutant. Western Energy has a PTE greater than 25 tons per year of PM, PM_{10}, Volatile Organic Compounds (VOC); therefore, an MAQP is required.

3. ARM 17.8.744 Montana Air Quality Permits--General Exclusions. This rule identifies the activities that are not subject to the MAQP program.

4. ARM 17.8.745 Montana Air Quality Permits--Exclusion for De Minimis Changes. This rule identifies the de minimis changes at permitted facilities that do not require a permit under the MAQP Program.

5. ARM 17.8.748 New or Modified Emitting Units--Permit Application Requirements. (1) This rule requires that a permit application be submitted prior to installation, modification, or use of a source. Western Energy submitted the required permit application for the current permit action. (7) This rule requires that the applicant notify the public by means of legal publication in a newspaper of general circulation in the area affected by the application for a permit. Western Energy submitted an affidavit of publication of public notice for the August 7, 14, and 21, 2014, issue of the *Independent Press*, a newspaper of general circulation in the City of Forsyth in Rosebud County, as proof of compliance with the public notice requirements.

6. ARM 17.8.749 Conditions for Issuance or Denial of Permit. This rule requires that the permits issued by the Department must authorize the construction and operation of the facility or emitting unit subject to the conditions in the permit and the requirements of this subchapter. This rule also requires that the permit must contain any conditions necessary to assure compliance with the Federal Clean Air Act (FCAA), the Clean Air Act of Montana, and rules adopted under those acts.

7. ARM 17.8.752 Emission Control Requirements. This rule requires a source to install the maximum air pollution control capability that is technically practicable and economically feasible, except that BACT shall be utilized. The required BACT analysis is included in Section III of this permit analysis.

8. ARM 17.8.755 Inspection of Permit. This rule requires that MAQPs shall be made available for inspection by the Department at the location of the source.

9. ARM 17.8.756 Compliance with Other Requirements. This rule states that nothing in the permit shall be construed as relieving Western Energy of the responsibility for complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.740, *et seq*.

10. ARM 17.8.759 Review of Permit Applications. This rule describes the Department's responsibilities for processing permit applications and making permit decisions on those permit applications that do not require the preparation of an environmental impact statement.

11. ARM 17.8.762 Duration of Permit. An MAQP shall be valid until revoked or modified, as provided in this subchapter, except that a permit issued prior to construction of a new or modified source may contain a condition providing that the permit will expire unless construction is commenced within the time specified in the permit, which in no event may be less than 1 year after the permit is issued.

12. ARM 17.8.763 Revocation of Permit. An MAQP may be revoked upon written request of the permittee, or for violations of any requirement of the Clean Air Act of Montana, rules adopted under the Clean Air Act of Montana, the FCAA, rules adopted under the FCAA, or any applicable requirement contained in the Montana State Implementation Plan (SIP).

13. ARM 17.8.764 Administrative Amendment to Permit. An MAQP may be amended for changes in any applicable rules and standards adopted by the Board of Environmental Review (Board) or changed conditions of operation at a source or stack that do not result in an increase of emissions as a result of those changed conditions. The owner or operator of a facility may not increase the facility's emissions beyond permit limits unless the increase meets the criteria in ARM 17.8.745 for a de minimis change not requiring a permit, or unless the owner or operator applies for and receives another permit in accordance with ARM 17.8.748, ARM 17.8.749, ARM 17.8.752, ARM 17.8.755, and ARM 17.8.756, and with all applicable requirements in ARM Title 17, Chapter 8, Subchapters 8, 9, and 10.

14. ARM 17.8.765 Transfer of Permit. This rule states that an MAQP may be transferred from one person to another if written notice of intent to transfer, including the names of the transferor and the transferee, is sent to the Department.

F. ARM 17.8, Subchapter 8 – Prevention of Significant Deterioration (PSD) of Air Quality, including but not limited to:

1. ARM 17.8.801 Definitions. This rule is a list of applicable definitions used in this subchapter.

2. ARM 17.8.818 Review of Major Stationary Sources and Major Modifications--Source Applicability and Exemptions. The requirements contained in ARM 17.8.819 through 17.8.827 shall apply to any major stationary source and any major modification, with respect to each pollutant subject to the Federal Clean Air Act (FCAA) that it would emit, except as this subchapter would otherwise allow.

   This facility is not a major stationary source since this facility is not a listed source and the source's potential to emit (excluding fugitive emissions) is below 250 tons per year of any pollutant.

G. ARM 17.8. Subchapter 12 – Operating Permit Program Applicability, including, but not limited to:

1. ARM 17.8.1201 Definitions. (23) Major Source under Section 7412 of the FCAA is defined as any source having:

   a. Potential to emit (PTE) > 10 ton/year of any single Hazardous Air Pollutant (HAP), PTE > 25 ton/year of total combined HAPs, or lesser quantity as the Department may establish by rule;

   b. PTE > 100 ton/year of any pollutant; or

   c. Sources with the PTE > 70 ton/year of PM_{10} in a serious PM_{10} non-attainment area.

2. ARM 17.8.1204 Air Quality Operating Permit Program. (1) Title V of the FCAA amendments of 1990 requires that all sources, as defined in ARM 17.8.1204(1), obtain a Title V Operating Permit. In reviewing and issuing MAQP #1570-08 for Western Energy, the following conclusions were made:

   a. The facility's PTE is less than 100 ton/year for any pollutant, excluding fugitives.

   b. The facility's PTE is less than 10 tons/year for any single HAP and less than 25 ton/year of combined HAPs.

   c. This source is not located in a serious PM_{10} non-attainment area.

   d. This facility is subject to NSPS 40 CFR 60 Subpart Y

   e. This facility is not subject to any current NESHAP standards.

f. This source is not a Title IV affected source, nor a solid waste combustion unit.

g. This source is not an EPA designated Title V sources.

Based on these conclusions, the Department has determined that Western Energy will be a minor source of emissions as defined under Title V. Therefore, a Title V operating permit is not required. However, if minor sources subject to NSPS are required to obtain a Title V Operating Permit, Western Energy will be required to obtain a Title V Operating Permit.

III. BACT Determination

A BACT determination is required for each new or modified source. Western Energy shall install on the new or modified source the maximum air pollution control capability that is technically practicable and economically feasible, except that BACT shall be utilized.

On behalf of Western Energy, Bison provided a BACT analysis for the control of fugitive particulate emission associated with the proposed project. The BACT document analyzed available methods for controlling fugitive particulate emissions from the processing, handling and transfer of coal related to the proposed project and subsequent justification for selection of the proposed option as BACT. The elements of this BACT analysis are as follows:

A. Identification of Control Options

In the consideration for BACT, Western Energy, identified and evaluated the follow available control options for the proposed project.

Best Operating Practices (BOPs)	BOPs include practices such as minimizing drop heights for transfers and minimizing turbulence in the process stream. BOPs were the base case control for the BACT analysis.
Enclosure	Enclosures function as control techniques by employing structures or underground placement to shelter material from wind entrainment. Enclosures can fully or partially surround the source.
Passive Enclosure Containment System (PEC)	PECs are a special class of enclosure control designed into the transfer and conveyance structure to limit the amount of turbulence and impacts to materials as it passes through a system. PECs are also designed to limit air pressure differences that would force particulate laden air from the transfer process.
Wet Dust Suppression (Water Spray)	Wet dust suppression methods apply water to materials in a bulk processing and/or transfer system generally b spray application. Emissions are prevented through agglomerate formation by combining small dust particles with larger aggregate or with liquid droplets. Water retained by sprayed material reduces emissions in downstream transfers.
Fogging Dust Suppression System	Fogging systems work on the same principle as wet dust suppression. Fogging systems create a fine mist of micron-sized water droplets in an area above an emission point. As fine particles are emitting into the fog they impact water droplets and agglomerate with other wetted particle and drop from suspension.

Foam Dust Suppression System (FDSS)	Like wet fogging systems, FDSSs are a specialized type of wet dust suppression system that incorporates a chemical foaming agent and surfactant. Relatively small amounts of chemical and water are mixed in a controlled ratio and then atomized with compressed air to create a large volume of stiff foam. The foam is then mixed into the bulk material stream where it wets fine particles and facilitates agglomeration that prevents escape to the atmosphere.
Wet Particulate Scrubber	Wet scrubbers typically use water to impact, intercept, or diffuse particulate in a waste gas stream. Particulate material is accelerated and impacted onto a solid surface or into a liquid droplet through devices such as a venture and spray chamber. The wet slurry material that is generated is typically stored in an on-site waste impoundment.
Electrostatic Precipitator (ESP)	An ESP uses electrical forces to move entrained particles onto a collection surface. Periodically the collection surface must be cleaned to remove dust cake, which drops into a collection hopper.
Fabric Filter Dust Collector (Baghouse)	Baghouses direct particulate laden exhaust through fine mesh fabric which traps particulate by sieving or filtration. Filters are intermittently cleaned by shaking, air pulsing (reverse jet) or reversed airflow direction

B. Control Technology Selection

As part of the analysis, Western Energy evaluated each identified method for technical practicability and the ability to provide a maximum degree of control of fugitive particulate emissions. Of the identified control technologies selected, only ESP was determined not to be technically practicable due to performance limitations. The other identified methods were determined to provide comparable control efficiencies depending upon certain operating variables and environmental conditions. Economic feasibility was not specifically addressed as the identified control technologies presented comparable costs.

Western Energy concluded that installation and operation of an FDSS constitutes BACT in the control of particulate matter, as this technology is capable of providing an effective means of particulate control for the material processing and transfer operations associated with this proposed project.

The Department concurs with this this BACT determination, as the control option selected achieves equivalent pollution control levels and costs comparable to other recently permitted similar sources and is capable of achieving the appropriate emission standards. FDSS technology performs well within a broad spectrum of operating conditions and has been employed in the control of particulate emissions from operating coal mines located within the western United States.

As part of the change Western Energy will remove the baghouses from each of the overland conveyor transfer points and isolate the secondary crushers from the main baghouse. However, the enclosures around the equipment will be maintained and retrofitted to accept the FDSS system. Upon consideration, the Department has concluded that maintenance of the existing source enclosures and installation and operation of FDSS on the secondary crushers and overland conveyor transfer points constitutes BACT in this application.

IV. Emission Inventory

A complete emission inventory is available from the Department.

Area C - Potential Emissions Summary

Fugitive Emissions							
Emission Source(s)	PM	PM_{10}	$PM_{2.5}$	CO	NO_x	SO_2	VOC
Topsoil Removal	74.93	37.46	3.75	--	--	--	--
Topsoil Dumping	2.85	1.35	0.2	--	--	--	--
Overburden Drilling	4.22	0.52	0.05	--	--	--	--
Overburden Blasting Cast Blasting	110.95	57.69	3.33	--	--	--	--
Overburden Removal - Dragline	623.78	120.22	10.6	--	--	--	--
Overburden Handling - Truck/Shovel	250.88	188.16	4.77	--	--	--	--
Overburden Dumping	2.85	1.35	0.2	--	--	--	--
Overburden Handling - Bulldozer	97.8	18.57	10.27	--	--	--	--
Haul Roads - Travel	852.27	227.09	22.57	--	--	--	--
Access Roads - Unpaved	374	101.56	10.16	--	--	--	--
Coal Drilling	0.71	0.09	0.01	--	--	--	--
Coal Blasting	40.67	21.15	1.22	--	--	--	--
Coal Removal	0.33	0.11	0.02	--	--	--	--
Explosive Detonation (ANFO)	--	--	--	577.04	146.41	17.23	--
Disturbed Acres - Complete (< 2 yrs.)	39.79	19.89	1.99	--	--	--	--
Disturbed Acres - Partial (< 1 yrs.)	134.06	67.03	6.7	--	--	--	--
Disturbed Acres - Partial (> 1 yrs.)	119.51	59.76	5.98	--	--	--	--
Disturbed Acres - Pits, Peaks, Soil Stripping	1066.13	533.06	53.31	--	--	--	--
Coal Crushing (secondary)	2.0	0.60	0.06				
Overland Conveyor	0.15	0.07	0.01				
TOTAL FUGITIVE EMISSIONS ▶	3797.88	1455.73	135.20	577.04	146.41	17.23	0

Stationary Source Emissions (Non-Fugitive)							
Emission Source(s)	PM	PM_{10}	$PM_{2.5}$	CO	NO_x	SO_2	VOC
Truck Dump – Coal	0.27	0.1	0.01	--	--	--	--
Primary Coal Crusher	0.8	0.24	0.02	--	--	--	--
TOTAL NON-FUGITIVE EMISSIONS ▶	1.07	0.34	0.03	0	0	0	0

V. Existing Air Quality

The Rosebud Mine is located in areas designated as unclassifiable/attainment for all National Ambient Air Quality Standards (NAAQS) pollutants and attainment for all Montana Ambient Air Quality Standards (MAAQS) pollutants. .

VI. Air Quality Impact Analysis

The current permit action allows for a minor increase in potential emissions from the Rosebud mine complex. The allowable PTE increase is below levels which would otherwise meet the definition of a de minimis change, therefore the Department believes it will not cause or contribute to a violation of any ambient air quality standards.

VII. Taking or Damaging Implication Analysis

As required by 2-10-105, MCA, the Department conducted the following private property taking and damaging assessment.

YES	NO	
✓		1. Does the action pertain to land or water management or environmental regulation affecting private real property or water rights?
	✓	2. Does the action result in either a permanent or indefinite physical occupation of private property?
	✓	3. Does the action deny a fundamental attribute of ownership? (ex.: right to exclude others, disposal of property)
	✓	4. Does the action deprive the owner of all economically viable uses of the property?
	✓	5. Does the action require a property owner to dedicate a portion of property or to grant an easement? [If no, go to (6)].
		5a. Is there a reasonable, specific connection between the government requirement and legitimate state interests?
		5b. Is the government requirement roughly proportional to the impact of the proposed use of the property?
	✓	6. Does the action have a severe impact on the value of the property? (consider economic impact, investment-backed expectations, character of government action)
	✓	7. Does the action damage the property by causing some physical disturbance with respect to the property in excess of that sustained by the public generally?
	✓	7a. Is the impact of government action direct, peculiar, and significant?
	✓	7b. Has government action resulted in the property becoming practically inaccessible, waterlogged or flooded?
	✓	7c. Has government action lowered property values by more than 30% and necessitated the physical taking of adjacent property or property across a public way from the property in question?
	✓	Takings or damaging implications? (Taking or damaging implications exist if YES is checked in response to question 1 and also to any one or more of the following questions: 2, 3, 4, 6, 7a, 7b, 7c; or if NO is checked in response to questions 5a or 5b; the shaded areas)

Based on this analysis, the Department determined there are no taking or damaging implications associated with this permit action.

VIII. Environmental Assessment

An environmental assessment, required by the Montana Environmental Policy Act, was completed for this project. A copy is attached.

DEPARTMENT OF ENVIRONMENTAL QUALITY
Permitting and Compliance Division
Air Resources Management Bureau
P.O. Box 200901, Helena, Montana 59620
(406) 444-3490

FINAL ENVIRONMENTAL ASSESSMENT (EA)

Issued To: Western Energy Company
P.O. Box 99
Colstrip, MT 59323

Montana Air Quality Permit (MAQP): 1570-08
Preliminary Determination Issued: 09/26/2014
Department Decision Issued: 10/15/2014
Permit Final: 10/31/2014

1. *Legal Description of Site*: Area C is located west of Colstrip in Sections 1-3 of Township 1 North, Range 39 East; Sections 34-36 of Township 2 North, Range 39 East; Sections 1-6, 8-12, and 13-17 of Township 1 North, Range 40 East; and Sections 28, 29, and 31-33 of Township 2 North, Range 40 East in Rosebud County. The list of permitted equipment can be found in Section I of the permit analysis.

2. *Description of Project*: Western Energy Company (Western Energy) proposed the installation and operation of a foam suppression dust control system (FDSS) in the control of particulate matter in lieu of the currently installed negative pressure capture and baghouse removal systems. No additional coal production capacity or coal processing equipment are proposed.

3. *Objectives of Project*: the objective of the expansion project is to further extend the life of the mine by expanding areas from which coal will be extracted.

4. *Alternatives Considered*: In addition to the proposed action, the Montana Department of Environmental Quality – Air Resources Management Bureau (Department) considered the "no-action" alternative. The "no-action" alternative would deny issuance of the air quality preconstruction permit to the proposed facility. However, the Department does not consider the "no-action" alternative to be appropriate because Western Energy demonstrated compliance with all applicable rules and regulations as required for permit issuance. Therefore, the "no-action" alternative was eliminated from further consideration.

5. *A Listing of Mitigation, Stipulations, and Other Controls*: A list of enforceable conditions, including a Best Available Control Technology (BACT) analysis, would be included in MAQP #1570-08.

6. *Regulatory Effects on Private Property*: The Department considered alternatives to the conditions imposed in this permit as part of the permit development. The Department determined that the permit conditions are reasonably necessary to ensure compliance with applicable requirements and demonstrate compliance with those requirements and do not unduly restrict private property rights.

7. *The following table summarizes the potential physical and biological effects of the proposed project on the environment. The "no-action" alternative was discussed previously.*

Potential Physical and Biological Effects							
Item	Description	Major	Moderate	Minor	None	Unknown	Comments Included
A	Terrestrial and Aquatic Life and Habitats				✓		yes
B	Water Quality, Quantity, and Distribution			✓			yes
C	Geology and Soil Quality, Stability, and Moisture				✓		yes
D	Vegetation Cover, Quantity, and Quality				✓		yes
E	Aesthetics				✓		yes
F	Air Quality			✓			yes
G	Unique Endangered, Fragile, or Limited Environmental Resource			✓			yes
H	Demands on Environmental Resource of Water, Air, and Energy			✓			yes
I	Historical and Archaeological Sites				✓		yes
J	Cumulative and Secondary Impacts			✓			yes

SUMMARY OF COMMENTS ON POTENTIAL PHYSICAL AND BIOLOGICAL EFFECTS: The following comments have been prepared by the Department.

A. Terrestrial and Aquatic Life and Habitats

Air quality impacts from the current permit action would be negligible as the proposed action would lead to a marginal potential increase in air emissions. This emissions increase under this proposed action would be less than those allowed under the de minimis rule provisions of Administrative Rules of Montana 17.8.745. As such Department has determined that any additional impact to terrestrial and aquatic life and habitats related to the current permit action would not likely occur.

B. Water Quality, Quantity and Distribution

This project would expect to have a little additional effect on the water quality, quantity, and distribution due to the use of water for FDSS. Any increase in particulate matter emissions would be negligible and not likely to impact water quality. Water would be required for the FDSS, however any volumes necessary for foam generation would not likely impact the quantity and distribution of water. Therefore, the Department has determined that the impacts to the water quality, quantity, and distribution would likely be minor.

C. Geology and Soil Quality, Stability and Moisture

This project would expect to have a little additional effect on geology and soil quality, stability and moisture due to the employment of the FDSS. Any increase in particulate matter emissions would be negligible and not likely to impact these aspects. Therefore, the Department has determined that any additional impacts to the geology and soil quality, stability, and moisture related to the current permit action would likely not occur.

D. Vegetation Cover, Quantity, and Quality

The particulate matter emissions increase from this project would be expected to present no additional impact on the surrounding vegetation with respect to cover, quantity and quality. Any potential increase in emissions would be negligible; therefore, the Department has determined that any additional impacts to the vegetation cover, quantity, and quality related to the current permit action would not likely occur.

E. Aesthetics

There will be no additional equipment added to the mine site and activity levels, including noise, would be consistent with existing coal mine operations. There are visual emissions associated with the proposed action would be representative of current conditions. Therefore, Department has determined that the additional impacts to the aesthetics related to the current permit action would not likely occur.

F. Air Quality

The area surrounding the proposed project is unclassifiable/attainment for all NAAQS criteria air pollutants. The Department believes that current concentrations of criteria pollutants in the area are at or near background levels and well below any NAAQS levels. The proposed project would not create any additional impact to receptors and resources within the proposed project area due to this slight increase in fugitive emissions of particulate matter.

The Department has determined that the amount of increased particulate emissions resulting from the proposed project would not create additional degradation and any such impact to air quality from the proposed project would be to be minor.

G. Unique Endangered, Fragile, or Limited Environmental Resources

The current permit action would occur within the previously disturbed industrial site at the mine. As part of the MEPA analysis on initial mine development, assessments of potential impacts to unique endangered, fragile, or limited environmental resources were done by the Department, including contact with the Montana Natural Heritage Program – Natural Resource Information System (NRIS) to identify species of special concern at the mine site. Due to the location of the sources within the existing mine and the negligible amount of increase in potential emissions, the Department determined that impacts to unique endangered, fragile, or limited environmental resources associated with the current permit action would be expected minor as a result of this permit action.

H. Demands on Environmental Resource of Water, Air and Energy

The current permitting action would have a minor impact to the demand on environmental resources of water, air, and energy. Additional demand for water and energy will be required for the production of foam and operation of the FDSS. However, with the removal of the exhaust fans associated with the baghouse installations, the net result may likely be a reduction in these aspects. Any demands are expected to be equally representative of current levels. Further, emissions generated from the proposed permit action would place limited demands on air because of the conditions placed in MAQP

#1570-08. Overall, the Department determined that the demands on the environmental resource of water, air, and energy related to the current permit action would be expected to be minor.

I. Historical and Archaeological Sites

The current permit action would occur within the previously disturbed industrial site at the mine. According correspondence from the Montana State Historic Preservation Office, there is low likelihood of adverse disturbance to any known archaeological or historic site because of previous industrial disturbances. Therefore, the Department determined that the likelihood that the current permit action would have an impact on historical or archaeological sites would likely not exist.

J. Cumulative and Secondary Impacts

The cumulative and secondary impacts from the proposed project on physical and biological receptors in the immediate area due to an increase in emissions from the proposed project would be expected to be minor. Air pollution from the facility would be controlled by Department-determined BACT, as discussed in Section III of the permit analysis, along with the limitations and conditions in MAQP #1570-08. The Department believes that this facility could be expected to operate in compliance with all applicable rules and regulations as outlined within the air quality permit.

8. *The following table summarizes the potential economic and social effects of the proposed project on the human environment. The "no-action" alternative was discussed previously.*

Potential Social and Economic Effects							
Item	Description	Major	Moderate	Minor	None	Unknown	Comments Included
A	Social Structures and Mores				✓		yes
B	Cultural Uniqueness and Diversity				✓		yes
C	Local and State Tax Base and Tax Revenue				✓		yes
D	Agricultural or Industrial Production				✓		yes
E	Human Health			✓			yes
F	Access to and Quality of Recreational and Wilderness Activities				✓		yes
G	Quantity and Distribution of Employment				✓		yes
H	Distribution of Population				✓		yes
I	Demands for Government Services			✓			yes
J	Industrial and Commercial Activity				✓		yes
K	Locally Adopted Environmental Plans and Goals				✓		yes
L	Cumulative and Secondary Impacts			✓			yes

SUMMARY OF COMMENTS ON POTENTIAL ECONOMIC AND SOCIAL EFFECTS: The following comments have been prepared by the Department.

A. Social Structures and Mores

The current permitting action would not create additional disruption to any native or traditional lifestyles or communities (social structures or mores) in the area as the project will occur within the boundary of the existing mine and only a negligible increase in emissions is expected. The Department is not aware of any current utilization by native or traditional communities. Therefore no known impact to social structures and mores would be expected.

B. Cultural Uniqueness and Diversity

The Department determined that the current permit action would not have any additional impact on the cultural uniqueness and diversity of this area of operation because the proposed project would occur within the previously disturbed industrial area. The surrounding area would remain unchanged as a result of the proposed project.

C. Local and State Tax Base and Tax Revenue

The current permit action will not have an the impact on the local and state tax base and tax revenue due to this permit action as no additional coal production will result and no new employees are planned as a result of this project. Therefore the cumulative impact to the tax base and revenue will not result.

D. Agricultural or Industrial Production

No additional agricultural or industrial production will occur as a result of this permit action. Therefore, the overall impacts to agricultural or industrial production would not likely occur.

E. Human Health

The proposed project would result in a negligible increase in emissions due to the proposed project. Further MAQP #1570-09 contains limitations and conditions including, but not limited to, the BACT requirements discussed in Section III of the permit analysis, to ensure that the operations would maintain compliance with all applicable rules and standards. These rules and standards are designed to be protective of human health. Therefore any impact to human health from the proposed project would be expected to be minor.

F. Access to and Quality of Recreational and Wilderness Activities

The current permit action would occur within the existing mine boundary and would not impact access to recreational and wilderness activities. Emissions from the proposed project would be negligible and will not likely present any additional impacts to the quality of recreational activities. No designated wilderness areas would be impacted by the project. Therefore, the associated impacts on the access to and quality of recreational and wilderness activities would likely not occur.

G. Quantity and Distribution of Employment

According to Western Energy the proposed project would not necessitate the hiring of additional employees; therefore no effect on the quantity and distribution of employment would be expected as a result of the expansion.

H. Distribution of Population

No full time or permanent employees would be added as a result of proposed project. Therefore the distribution of population in the area would not be impacted as a result of the current permit action.

I. Demands for Government Services

Government services would be required for acquiring the appropriate permits from government agencies and for ongoing interaction with Western Energy. The proposed project would not likely increase the need for government service resources beyond the current capacity. As a result of this project any addition demands for government services would be expected to be minor.

J. Industrial and Commercial Activity

The proposed project would not result in an increase in production from the mine site, the industrial activity would be commensurate with current operations, and no additional coal processing or handling equipment or manpower would be requirement. As such, no additional increases to industrial and commercial activity would be expected to occur.

K. Locally Adopted Environmental Plans and Goals

The Department is not aware of any locally adopted environmental plans or goals that would be affected by the proposed project.

L. Cumulative and Secondary Impacts

Overall, cumulative and secondary impacts from this project would result in only minor impacts to the social and economic aspects addressed. The Department believes Western Energy would be expected to operate in compliance with all applicable rules and regulations as outlined in MAQP #1570-08.

Recommendation: No Environmental Impact Statement (EIS) is required.

If an EIS is not required, explain why the EA is an appropriate level of analysis: The current permitting action is for a proposed replacement of the control technology on the secondary coal crusher and overland conveyor which results in only minor impacts to items addressed within this EA. MAQP #1570-08 includes conditions and limitations to ensure the facility will operate in compliance with all applicable rules and regulations. In addition, there are no significant impacts associated with this proposal.

Other groups or agencies contacted or which may have overlapping jurisdiction: Montana Historical Society – State Historic Preservation Office, Natural Resource Information System – Montana Natural Heritage Program

Individuals or groups contributing to this EA: Department of Environmental Quality – Air Resources Management Bureau

EA prepared by: D. Kuenzli
Date: September 24, 2014

Montana Department of
ENVIRONMENTAL QUALITY
Steve Bullock, Governor
Tracy Stone-Manning, Director
P. O. Box 200901 Helena, MT 59620-0901 (406) 444-2544 Website: www.deq.mt.gov

PRELIMINARY DETERMINATION
ON PERMIT APPLICATION

Date of Mailing: July 22, 2013

Name of Applicant: Western Energy Company

Source: Surface Coal Mine and Extraction Facility

Proposed Action: The Department of Environmental Quality (Department) proposes to issue a permit, with conditions, to the above-named applicant. The application was assigned Montana Air Quality Permit Application Number 1570-07.

Proposed Conditions: See attached.

Public Comment: Any member of the public desiring to comment must submit such comments in writing to the Air Resources Management Bureau (Bureau) of the Department at the above address. Comments may address the Department's analysis and determination, or the information submitted in the application. In order to be considered, comments on this Preliminary Determination are due by August 6, 2013. Copies of the application and the Department's analysis may be inspected at the Bureau's office in Helena. For more information, you may contact the Department.

Departmental Action: The Department intends to make a decision on the application after expiration of the Public Comment period described above. A copy of the decision may be obtained at the above address. The permit shall become final on the date stated in the Department's Decision on this permit, unless an appeal is filed with the Board of Environmental Review (Board).

Procedures for Appeal: Any person jointly or severally adversely affected by the final action may request a hearing before the Board. Any appeal must be filed by the date stated in the Department's Decision on this permit. The request for a hearing shall contain an affidavit setting forth the grounds for the request. Any hearing will be held under the provisions of the Montana Administrative Procedures Act. Submit requests for a hearing in triplicate to: Chairman, Board of Environmental Review, P.O. Box 200901, Helena, MT 59620.

For the Department,

Julie A Merkel

Julie Merkel
Air Permitting Program Supervisor
Air Resources Management Bureau
(406) 444-3626

Doug Kuenzli
Environmental Science Specialist
Air Resources Management Bureau
(406) 444-4267

JM:DCK
Enclosure

MONTANA AIR QUALITY PERMIT

Issued to: Western Energy Company
P.O. Box 99
Colstrip, MT 59323

MAQP: #1570-07
Application Complete: 04/22/2013
Preliminary Determination: 07/22/2013
Department's Decision Issued:
Permit Final:
AFS #: 087-0004

A Montana Air Quality Permit (MAQP), with conditions, is hereby granted to Western Energy Company (Western Energy), pursuant to Sections 75-2-204 and 211 of the Montana Code Annotated (MCA), as amended, and the Administrative Rules of Montana (ARM) 17.8.740 *et seq.,* as amended, for the following:

Section I: Permitted Facilities

A. Plant Location

Western Energy operates a surface coal mine and extraction facility located in Area C and Area F of the Rosebud Mine. The total estimated coal production for the life of the mine is 241,000,000 tons. Area C is located west of Colstrip in Sections 1-3 of Township 1 North, Range 39 East; Sections 34-36 of Township 2 North, Range 39 East; Sections 1-6, 8-12, and 13-17 of Township 1 North, Range 40 East; and Sections 28, 29, and 31-33 of Township 2 North, Range 40 East in Rosebud County. Area F is located in Sections 3-6, Township 1 North, Range 40 East in Rosebud County, Sections 19, 20, and 27-34 in Township 2 North, Range 40 East in Rosebud County, and Sections 12-14 and 23-25, Township 2 North, Rage 39 East in Treasure County. The list of permitted equipment can be found in Section I of the permit analysis.

B. Current Permit Action

On April 18, 2013, the Department of Environmental Quality (Department) received an initial application from Bison Engineering, Inc. (Bison), on behalf of Western Energy, for modification of Western Energy's air quality permit to allow expansion to the geographic extent of the mine. The existing MAQP explicitly defined the physical area in which mining activities are permitted. As such, the application requests an expansion of this physical boundary into a new area designated as Area F. No additional coal production capacity was requested, the objective of the expansion is to further extend the life of the mine by replacing areas from which coal has been extracted. Supplemental information and data was received by the Department on June 12, 2013. The current permit action provides for an expansion of the mines operational boundary, incorporates a single de minimis action, updates permit language and rule references used by the Department, and updates the emission inventory.

Section II: Conditions and Limitations

A. Emissions Limitations

1. All emissions at the Area C crusher and coal handling facility, including the negative pressure system on the truck dump, shall be vented to a common baghouse. Each of the three transfer points on the overland conveyor shall be controlled by a baghouse (ARM 17.8.340 and 40 CFR Part 60, Subpart Y).

2. Western Energy shall not cause visible emissions of greater than 20% opacity to be discharged into the atmosphere from any coal handling, conveying, crushing, processing, storing or loading system averaged over 6 consecutive minutes (ARM 17.8.308, 304, 340 and 40 CFR Part 60, Subpart Y).

3. Western Energy shall not cause or authorize the use of any street, road, or parking lot without taking reasonable precautions to control emissions of airborne particulate matter (ARM 17.8.308).

4. Western Energy shall treat all unpaved portions of the haul roads, access roads, parking lots, or general plant area with water and/or chemical dust suppression as necessary to maintain compliance with the reasonable precautions limitation in Section II.A.3 (ARM 17.8.749).

5. The following control measures shall be applied on an as necessary basis (ARM 17.8.752, 749 and 308):

    a. Chemically stabilize and maintain all active haul and access roads and supplement by watering;

    b. Apply water to temporary roads such as scraper travel areas;

    c. Adequately maintain open coal storage and minimize equipment activity on stockpiles;

    d. Minimize fall/drop distance on all coal and overburden handling activities;

    e. Minimize area of surface disturbance;

    f. Promptly revegetate exposed/disturbed areas, including temporary vegetative cover of topsoil stockpiles;

    g. Minimize emissions from coal and overburden drilling through the use of dust curtains, water sprays, dust collectors, or other appropriate techniques;

    h. Conduct blasting operations in such a manner as to minimize emissions, prevent overshooting, provide stemming of holes, and minimize area to be blasted;

    i. Extinguish areas of burning or smoldering coal;

    j. Restrict and maintain vehicle speeds on haul roads as necessary to minimize emissions; and,

    k. Other control practices which may be determined by the department to be necessary.

6. Western Energy shall maintain a fugitive dust control plan. Elements of the plan shall include, but not be limited to, the conditions established within Section II.A.1 through II.A.5 (ARM 17.8.749 and 752).

7. Combined annual coal production from Areas C and F shall be limited to 8,000,000 tons per year (ARM 17.8.749).

8. Annual coal production from Area F shall be limited to 4,000,000 tons per year (ARM 17.8.749).

9. Western Energy shall comply with all applicable standards and limitations, and the reporting, recordkeeping, testing, and notification requirements contained in 40 Code of Federal Regulations (CFR), Subpart Y, *Standards of Performance for Coal Preparation Plants and Processing Plants* (ARM 17.8.340 and 40 CFR 60, Subpart Y).

B. Testing Requirements

1. All compliance source tests shall conform to the requirements of the Montana Source Test Protocol and Procedures Manual (ARM 17.8.106).

2. The Department may require testing (ARM 17.8.105).

C. Operational Reporting Requirements

1. Western Energy shall supply the Department with annual production information for all emission points, as required by the Department in the annual emission inventory request. The request will include, but is not limited to, all sources of emissions identified in the emission inventory contained in the permit analysis and sources identified in Section I of the permit analysis.

   Production information shall be gathered on a calendar-year basis and submitted to the Department by the date required in the emission inventory request. The information shall include the following and shall be in the units required by the Department. This information may be used for calculating operating fees, based on actual emissions from the facility, and/or to verify compliance with permit limitations (ARM 17.8.505). Western Energy shall submit the following information annually to the Department by March 1, of each year; the information may be submitted along with the annual emission inventory (ARM 17.8.505).

2. Western Energy shall notify the Department of any construction or improvement project conducted pursuant to ARM 17.8.745 that would include the ***addition of a new emission unit***, change in control equipment, stack height, stack diameter, stack flow, stack gas temperature, source location, or fuel specifications, or would result in an increase in source capacity above its permitted operation. The notice must be submitted to the Department, in writing, 10 days prior to start up or use of the proposed de minimis change or as soon as reasonably practicable in the event of an unanticipated circumstance causing the de minimis change and must include the information requested in ARM 17.8.745 (l)(d) (ARM 17.8.745).

3. All records compiled in accordance with this permit must be maintained by Western Energy as a permanent business record for at least 5-years following the date of the measurement, must be available at the plant site for inspection by the department, and must be submitted to the department upon request (ARM 17.8.749).

D. Notification

Western Energy shall provide the Department with written notification of the actual date upon which mining operations commence in the Area F expansion. The notice shall be postmarked or hand-delivered no later than 15 days after the actual operational commencement date of the Area F expansion (ARM 17.8.749).

E. Ambient Monitoring

1. Particulate matter within an aerodynamic diameter of ten microns or less (PM_{10}) data has been collected at the Western Energy mine since 1992. During the 1992-2000 period, the annual means at all sites were less than 28% of the annual standard. For the 24-hour PM_{10}

concentrations, all of the annual, maximum 24-hour values were less than 53% of the 24-hour standard. Therefore, in accordance with the October 9, 1998, monitoring guidance statement developed by the Department, Western Energy may discontinue operation of their ambient air-monitoring network.

2. The Department may require Western Energy to conduct additional ambient air monitoring, if necessary (ARM 17.8.749).

Section III: General Conditions

A. Inspection – Western Energy shall allow the Department's representatives access to the source at all reasonable times for the purpose of making inspections or surveys, collecting samples, obtaining data, auditing any monitoring equipment (Continuous Emission Monitoring Systems CEMS, Continuous Emission Rate Monitoring Systems (CERMS) or observing any monitoring or testing, and otherwise conducting all necessary functions related to this permit.

B. Waiver – The permit and all the terms, conditions, and matters stated herein shall be deemed accepted if Western Energy fails to appeal as indicated below.

C. Compliance with Statutes and Regulations - Nothing in this permit shall be construed as relieving Western Energy of the responsibility for complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.740, *et seq*. (ARM 17.8.756).

D. Enforcement – Violations of limitations, conditions and requirements contained herein may constitute grounds for permit revocation, penalties or other enforcement as specified in Section 75-2-401 *et seq.*, MCA.

E. Appeals – Any person or persons jointly or severally adversely affected by the Department's decision may request, within 15 days after the Department renders its decision, upon affidavit setting forth the grounds therefore, a hearing before the Board of Environmental Review (Board). A hearing shall be held under the provisions of the Montana Administrative Procedures Act. The filing of a request for a hearing does not stay the Department's decision unless the Board issues a stay upon receipt of a petition and a finding that a stay is appropriate under Section 75-2-211(11)(b), MCA. The issuance of a stay on a permit by the Board postpones the effective date of the Department's decision until conclusion of the hearing and issuance of a final decision by the Board. If a stay is not issued by the Board, the Department's decision on the application is final 16 days after the Department's decision is made.

F. Permit Inspection – As required by ARM 17.8.755, Inspection of Permit, a copy of the air quality permit shall be made available for inspection by Department personnel at the location of the permitted source.

G. Permit Fees – Pursuant to Section 75-2-220, MCA, as amended by the 1991 Legislature, failure to pay the annual operation fee by Western Energy may be grounds for revocation of this permit, as required by that section and rules adopted there under by the Board.

H. Duration of Permit – Construction or installation must begin or contractual obligations entered into that would constitute substantial loss within 3 years of permit issuance and proceed with due diligence until the project is complete or the permit shall expire (ARM 17.8.762).

Montana Air Quality Permit (MAQP) Analysis
Western Energy Company - Rosebud Mine
MAQP #1570-07

I. Introduction/Process Description

A. Permitted Equipment

Western Energy Company (Western Energy) operates the following equipment at Area C and Area F of the Rosebud Mine.

1. "Coal handling facilities" include, but are not limited to:

   a. Truck dump with two 500-ton capacity dump hoppers.

   b. Two primary crushers with capacities of 1650 ton/hr each.

   c. Two secondary crushers with capacities of 1650 ton/hr each.

   NOTE: Only one dump hopper, primary crusher and secondary crusher will operate at a time, with the other being a redundant system. The crushers and conveyors at the preparation facility are fully enclosed and vented to a central baghouse. The truck dump is equipped with a negative pressure system vented to the central baghouse.

   d. One overland conveyor with a capacity of 1650 ton/hr, approximately 5 miles in length. The conveyor and transfer points are fully enclosed and vented to baghouses. This conveyor transports coal from the Area C preparation facility to the Colstrip power plants, Units 3 and 4.

2. Necessary auxiliaries include, but are not limited to: draglines, coal shovels, trucks, front-end loaders, graders, scrapers, dozers, other mobile units, auxiliary facilities, etc., as applicable.

B. Source Description

Western Energy operates a surface coal extraction facility and mine located in Area C and Area F of the Rosebud Mine. Area C is located west of Colstrip in Sections 1-3 of Township 1 North, Range 39 East; Sections 34-36 of Township 2 North, Range 39 East; Sections 1-6, 8-12, and 13-17 of Township 1 North, Range 40 East; and Sections 28, 29, and 31-33 of Township 2 North, Range 40 East of Rosebud County. Area F is located immediately west of Area C within Sections 3-6, Township 1 North, Range 40 East in Rosebud County, Sections 19, 20, and 27-34 in Township 2 North, Range 40 East in Rosebud County, and Sections 12-14 and 23-25, Township 2 North, Rage 39 East in Treasure County

Areas C and F have a combined maximum annual production limit of 8,000,000 tons of coal per year. Annual coal production from Area F is limited to 4,000,000 tons. The total projected coal production for the life of the mine is estimated at 241,000,000 tons. All Coal extracted from Area F will be transported by haul truck to the Area C or Area A truck dump for further processing.

C. Permit History

MAQP #1570 was originally issued to Western Energy for Area C of the Rosebud Mine on August 2, 1982. The coal processing facilities, with emissions controlled by baghouses, included primary and secondary crushers and conveyors. Area C coal was used exclusively at the local power generating facilities known as Colstrip Units 3 and 4. An overland conveyor, with baghouse controls at each transfer point, transported coal 5 miles from Area C to the power plants. The original permit contained a coal production limit of 5.6 million tons per year. Overburden was stripped using standard dragline practices and shovel and truck removed coal. Other mine related activities included topsoil handling (primarily with scrapers), drilling and blasting of overburden and coal, vehicle traffic, and reclamation/farming activities.

MAQP #1570A was a modification issued on January 6, 1986. The permit action discontinued ambient air monitoring for meteorological parameters and settled particulate matter (a.k.a. dustfall). Total suspended particulate (TSP) monitoring was still required; however, five TSP sites were discontinued, five existing TSP sites continued to operate, and two new TSP sites were added. MAQP #1570A replaced MAQP #1570.

MAQP #1570B was a modification issued on December 22, 1988. The annual coal production limit was increased from 5.6 to 6.5 million tons per year. No changes were made to the coal mining methods or coal handling procedures. MAQP #1570B replaced MAQP #1570A.

MAQP #1570C was a modification issued on March 22, 1990, that dealt only with ambient air monitoring. A new particulate matter-monitoring site was required near Castle Rock Lake Drive. The description of monitoring sites #12 & #13 were revised to correct a transposition error from an earlier permitting action. Clarifying language was added that explained the Department of Environmental Quality's (Department) policy for future ambient PM_{10} monitoring requirements. Lastly, the ambient air monitoring requirements were removed from the body of the permit and placed in an attachment to the main permit (hereafter referred to as Attachment 1). MAQP #1570C replaced MAQP #1570B.

MAQP #1570-04 was a modification issued on September 1, 1994. The annual coal production limit was increased from 6.5 to 7.5 million tons per year. No other operational changes were made. MAQP #1570-04 replaced MAQP #1570C.

MAQP #1570-05 was a modification issued on June 15, 2000. The permit action was an administrative change requested by Western Energy on March 30, 2000. Western Energy requested corrections to the site location description in their permit. Additionally, the permit was updated to reflect the current format and language used in permits. MAQP #1570-05 replaced MAQP #1570-04.

MAQP #1570-06 was a modification issued on July 19, 2001. The Department received a letter, dated April 27, 2001, from Western Energy requesting termination of the ambient air-monitoring network. Following the October 9, 1998, permitting guidance statement, the Department reviewed the ambient air monitoring data. In a letter dated May 23, 2001, the Department agreed to Western Energy's request to terminate their ambient monitoring program, effective July 1, 2001. The permit action updated the monitoring requirements to reflect the termination of the ambient air-monitoring network. MAQP #1570-06 replaced MAQP #1570-05.

D. Current Permit Action

On April 18, 2013, the Department received an initial application from Bison Engineering, Inc. (Bison), on behalf of Western Energy, for modification of Western Energy's air quality permit to allow expansion to the geographic extent of the mine. The existing MAQP explicitly defined the physical area in which mining activities are permitted. As such, the application requests an expansion of this physical boundary into a new area designated as Area F. No additional coal production capacity was requested, the objective of the expansion is to further extend the life of the mine by replacing areas from which coal has been extracted. Supplemental information and data was received by the Department on June 12, 2013. The current permit action provides for an expansion of the mines operational boundary. No additional stationary or portable equipment are proposed.

This permit action also incorporates a de minimis action approved by the Department on July 20, 2013, which increased the annual production capacity limit by 500,000 tons to a total of 8.0 million tons per year. In addition this permit action updates permit language and rule references used by the Department, as well as updates the emission inventory. **MAQP #1570-07** replaces MAQP #1570-06

E. Additional Information

Additional information, such as applicable rules and regulations, Best Available Control Technology (BACT)/Reasonably Available Control Technologies (RACT) determinations, air quality impacts, and environmental assessments, is included in the analysis associated with each change to the permit.

II. Applicable Rules and Regulations

The following are partial explanations of some applicable rules and regulations that apply to the facility. The complete rules are stated in the Administrative Rules of Montana (ARM) and are available upon request from the Department. Upon request, the Department will provide references for locations of complete copies of all applicable rules and regulations or copies where appropriate.

A. ARM 17.8, Subchapter 1 - General Provisions, including, but not limited to:

1. ARM 17.8.101 Definitions: This rule includes a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.

2. ARM 17.8.105 Testing Requirements. Any person or persons responsible for the emission of any air contaminant into the outdoor atmosphere shall, upon written request of the Department, provide the facilities and necessary equipment (including instruments and sensing devices) and shall conduct tests, emission or ambient, for such periods of time as may be necessary using methods approved by the Department.

3. ARM 17.8.106 Source Testing Protocol. The requirements of this rule apply to any emission source testing conducted by the Department, any source, or other entity as required by any rule in this chapter, or any permit or order issued pursuant to this chapter, or the provisions of the Clean Air Act of Montana, 75-2-101, *et seq.*, Montana Code Annotated (MCA).

Western Energy shall comply with the requirements contained in the Montana Source Test Protocol and Procedures Manual, including, but not limited, using the proper test methods and supplying the required reports. A copy of the Montana Source Test Protocol and Procedures Manual is available from the Department upon request.

4. ARM 17.8.110 Malfunctions. (2) The Department must be notified promptly by telephone whenever a malfunction occurs that can be expected to create emissions in excess of any applicable emission limitation, or to continue for a period greater than 4 hours.

5. ARM 17.8.111 Circumvention. (1) No person shall cause or permit the installation or use of any device or any means which, without resulting in reduction in the total amount of air contaminant emitted, conceals or dilutes an emission of air contaminant which would otherwise violate an air pollution control regulation. (2) No equipment that may produce emissions shall be operated or maintained in such a manner that a public nuisance is created.

B. ARM 17.8, Subchapter 2 - Ambient Air Quality, including, but not limited to:

1. ARM 17.8.204 Ambient Air Monitoring
2. ARM 17.8.210 Ambient Air Quality Standards for Sulfur Dioxide (SO_2)
3. ARM 17.8.211 Ambient Air Quality Standards for Nitrogen Dioxide (NO_2)
4. ARM 17.8.212 Ambient Air Quality Standards for Carbon Monoxide (CO)
5. ARM 17.8.213 Ambient Air Quality Standards for Ozone (O_3)
6. ARM 17.8.214 Ambient Air Quality Standard for Hydrogen Sulfide (H_2S)
7. ARM 17.8.220 Ambient Air Quality Standard for Settled Particulate Matter (PM)
8. ARM 17.8.221 Ambient Air Quality Standard for Visibility
9. ARM 17.8.222 Ambient Air Quality Standards for Lead
10. ARM 17.8.223 Ambient Air Quality Standard for Particulate Matter with an Aerodynamic Diameter of Ten Microns or Less (PM_{10})

Western Energy must maintain compliance with the applicable ambient air quality standards.

C. ARM 17.8, Subchapter 3 - Emission Standards, including, but not limited to:

1. ARM 17.8.304 Visible Air Contaminants. This rule requires that no person may cause or authorize emissions to be discharged into the outdoor atmosphere from any source installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes.

2. ARM 17.8.308, Particulate Matter Airborne. (1) This rule requires an opacity limitation of 20% for all fugitive emission sources and that reasonable precautions are taken to control emissions of airborne particulate matter. (2) Under this rule, Western Energy shall not cause or authorize the use of any street, road or parking lot without taking reasonable precautions to control emissions of airborne particulate matter.

3. ARM 17.8.309 Particulate Matter Fuel Burning Equipment. This rule requires that no person shall cause, allow or permit to be discharged into the atmosphere particulate matter caused by the combustion of fuel in excess of the amount determined by this rule.

4. ARM 17.8.310 Particulate Matter Industrial Processes. This rule requires that no person shall cause, suffer, allow, or permit to be discharged into the outdoor atmosphere from any operation, process or activity, particulate matter in excess of the amount shown in this rule.

5. ARM 17.8.322, Sulfur Oxide Emissions-Sulfur in Fuel. This rule requires that no person shall cause, allow or permit to be discharged into the atmosphere particulate matter in excess of the amount set forth in this rule

6. ARM 17.8.324(3) Hydrocarbon Emissions--Petroleum Products. No person shall load or permit the loading of gasoline into any stationary tank with a capacity of 250 gallons or more from any tank truck or trailer, except through a permanent submerged fill pipe, unless such tank is equipped with a vapor loss control device as described in (1) of this rule

7. ARM 17.8.340 Standard of Performance for New Stationary Sources. This rule incorporates, by reference, 40 CFR Part 60, Standards of Performance for New Stationary Sources (NSPS). The owner and operator of any stationary source or modification, as defined and applied in 40 CFR Part 60, shall comply with the NSPS.

    a. 40 CFR Part 60, Subpart A – General Provisions apply to all equipment or facilities subject to an NSPS Subpart as listed below:

    b. 40 CFR Part 60, Subpart Y – Standards of Performance for Coal Preparation Plants and Processing Plants. Process operations at this facility that meet the definition of affected facilities include any coal processing and conveying equipment, coal storage systems, or coal transfer and loading systems.

8. ARM 17.8.342 Emission Standards for Hazardous Air Pollutants for Source Categories. This rule incorporates, by reference, 40 CFR Part 63, National Emission Standards for Hazardous Air Pollutants (NESHAPs) for Source Categories. Western Energy shall comply with the requirements of 40 CFR Part 63, as applicable.

D. ARM 17.8, Subchapter 5 - Air Quality Permit Application, Operation and Open Burning Fees, including but not limited to:

1. ARM 17.8.504 Air Quality Permit Application Fees. This rule requires that an applicant submit an air quality permit application fee concurrent with the submittal of an MAQP application. A permit application is incomplete until the proper application fee is paid to the Department. Western Energy submitted the appropriate permit application fee for the current permit action.

2. ARM 17.8.505, Air Quality Operation Fees. An annual air quality operation fee must, as a condition of continued operation, be submitted to the Department by each source of air contaminants holding an MAQP (excluding an open burning permit) issued by the Department. The air quality operation fee is based on the actual or estimated actual amount of air pollutants emitted during the previous calendar year.

   An air quality operation fee is separate and distinct from an air MAQP application fee. The annual assessment and collection of the air quality operation fee, described above, shall take place on a calendar-year basis. The Department may insert into any final permit issued after the effective date of these rules, such conditions as may be necessary to require the payment of an air quality operation fee on a calendar year basis, including provisions that prorate the required fee amount.

E. ARM 17.8, Subchapter 7 - Permit, Construction and Operation of Air Contaminant Sources, including but not limited to:

1. ARM 17.8.740 Definitions. This rule is a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.

2. ARM 17.8.743 Montana Air Quality Permits--When Required. This rule requires a person to obtain an MAQP or permit modification to construct, modify, or use any air contaminant sources that have the potential to emit (PTE) greater than 25 tons per year of any pollutant. Western Energy has a PTE greater than 25 tons per year of PM, PM_{10}, Volatile Organic Compounds (VOC); therefore, an MAQP is required.

3. ARM 17.8.744 Montana Air Quality Permits--General Exclusions. This rule identifies the activities that are not subject to the MAQP program.

4. ARM 17.8.745 Montana Air Quality Permits--Exclusion for De Minimis Changes. This rule identifies the de minimis changes at permitted facilities that do not require a permit under the MAQP Program.

5. ARM 17.8.748 New or Modified Emitting Units--Permit Application Requirements. (1) This rule requires that a permit application be submitted prior to installation, modification, or use of a source. Western Energy submitted the required permit application for the current permit action. (7) This rule requires that the applicant notify the public by means of legal publication in a newspaper of general circulation in the area affected by the application for a permit. Western Energy submitted an affidavit of publication of public notice for the April 18, 2013, issue of the *Independent Press*, a newspaper of general circulation in the City of Forsyth in Rosebud County, as proof of compliance with the public notice requirements.

6. ARM 17.8.749 Conditions for Issuance or Denial of Permit. This rule requires that the permits issued by the Department must authorize the construction and operation of the facility or emitting unit subject to the conditions in the permit and the requirements of this subchapter. This rule also requires that the permit must contain any conditions necessary to assure compliance with the Federal Clean Air Act (FCAA), the Clean Air Act of Montana, and rules adopted under those acts.

7. ARM 17.8.752 Emission Control Requirements. This rule requires a source to install the maximum air pollution control capability that is technically practicable and economically feasible, except that BACT shall be utilized. The required BACT analysis is included in Section III of this permit analysis.

8. ARM 17.8.755 Inspection of Permit. This rule requires that MAQPs shall be made available for inspection by the Department at the location of the source.

9. ARM 17.8.756 Compliance with Other Requirements. This rule states that nothing in the permit shall be construed as relieving Western Energy of the responsibility for complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.740, *et seq*.

10. ARM 17.8.759 Review of Permit Applications. This rule describes the Department's responsibilities for processing permit applications and making permit decisions on those permit applications that do not require the preparation of an environmental impact statement.

11. ARM 17.8.762 Duration of Permit. An MAQP shall be valid until revoked or modified, as provided in this subchapter, except that a permit issued prior to construction of a new or modified source may contain a condition providing that the permit will expire unless construction is commenced within the time specified in the permit, which in no event may be less than 1 year after the permit is issued.

12. ARM 17.8.763 Revocation of Permit. An MAQP may be revoked upon written request of the permittee, or for violations of any requirement of the Clean Air Act of Montana, rules adopted under the Clean Air Act of Montana, the FCAA, rules adopted under the FCAA, or any applicable requirement contained in the Montana State Implementation Plan (SIP).

13. ARM 17.8.764 Administrative Amendment to Permit. An MAQP may be amended for changes in any applicable rules and standards adopted by the Board of Environmental Review (Board) or changed conditions of operation at a source or stack that do not result in an increase of emissions as a result of those changed conditions. The owner or operator of a facility may not increase the facility's emissions beyond permit limits unless the increase meets the criteria in ARM 17.8.745 for a de minimis change not requiring a permit, or unless the owner or operator applies for and receives another permit in accordance with ARM 17.8.748, ARM 17.8.749, ARM 17.8.752, ARM 17.8.755, and ARM 17.8.756, and with all applicable requirements in ARM Title 17, Chapter 8, Subchapters 8, 9, and 10.

14. ARM 17.8.765 Transfer of Permit. This rule states that an MAQP may be transferred from one person to another if written notice of intent to transfer, including the names of the transferor and the transferee, is sent to the Department.

F. ARM 17.8, Subchapter 8 – Prevention of Significant Deterioration (PSD) of Air Quality, including but not limited to:

1. ARM 17.8.801 Definitions. This rule is a list of applicable definitions used in this subchapter.

2. ARM 17.8.818 Review of Major Stationary Sources and Major Modifications--Source Applicability and Exemptions. The requirements contained in ARM 17.8.819 through 17.8.827 shall apply to any major stationary source and any major modification, with respect to each pollutant subject to the Federal Clean Air Act (FCAA) that it would emit, except as this subchapter would otherwise allow.

   This facility is not a major stationary source since this facility is not a listed source and the source's potential to emit (excluding fugitive emissions) is below 250 tons per year of any pollutant.

G. ARM 17.8. Subchapter 12 – Operating Permit Program Applicability, including, but not limited to:

1. ARM 17.8.1201 Definitions. (23) Major Source under Section 7412 of the FCAA is defined as any source having:

   a. Potential to emit (PTE) > 10 ton/year of any single Hazardous Air Pollutant (HAP), PTE > 25 ton/year of total combined HAPs, or lesser quantity as the Department may establish by rule;

b. PTE > 100 ton/year of any pollutant; or

c. Sources with the PTE > 70 ton/year of PM_{10} in a serious PM_{10} non-attainment area.

2. ARM 17.8.1204 Air Quality Operating Permit Program. (1) Title V of the FCAA amendments of 1990 requires that all sources, as defined in ARM 17.8.1204(1), obtain a Title V Operating Permit. In reviewing and issuing MAQP #1570-07 for Western Energy, the following conclusions were made:

   a. The facility's PTE is less than 100 ton/year for any pollutant, excluding fugitives.

   b. The facility's PTE is less than 10 tons/year for any single HAP and less than 25 ton/year of combined HAPs.

   c. This source is not located in a serious PM_{10} non-attainment area.

   d. This facility is subject to NSPS 40 CFR 60 Subpart Y

   e. This facility is not subject to any current NESHAP standards.

   f. This source is not a Title IV affected source, nor a solid waste combustion unit.

   g. This source is not an EPA designated Title V sources.

   Based on these conclusions, the Department has determined that Western Energy will be a minor source of emissions as defined under Title V. Therefore, a Title V operating permit is not required.

III. BACT Determination

A BACT determination is required for each new or modified source. Western Energy shall install on the new or modified source the maximum air pollution control capability that is technically practicable and economically feasible, except that BACT shall be utilized.

The expansion of mining activities into Area F will result in an increase in fugitive dust from light vehicle and heavy truck traffic. Coal extraction techniques employed within Area F will remain the same as with the rest of the mine. An increase in coal production capacities will not result from this action and the area of disturbed acres from the stages of mining will be equivalent to past activity. As such, emissions from topsoil removal, overburden, removal, coal extraction, coal processing, and reclaim activities are accounted for within the current emission inventory. Coal extracted from Area F will be transported via haul truck to the Area C or Area A truck dump for further processing. Additional activity presented by the Area F expansion is limited the extended access roads distance within the expansion boundary and the haul roads to the existing coal handing facilities at Area C and Area A. Therefore, the only increase in emissions as result of this permit action is that from coal haul trucks and light duty support vehicle traffic.

The following BACT analysis addresses available and proposed methods for controlling fugitive particulate emissions from haul roads and access roads. The Department presents the following BACT determinations.

The application of water and/or chemical dust suppressants represent the most common and readily available method for controlling fugitive dust from haul roads. These practices are addressed within the existing MAQP covering Area C mining activities. Further Western Energy is required to comply with the reasonable precaution requirements prescribed within ARM 17.8.308 for minimizing particulate emissions from access roads, haul roads, and general mine areas.

Western Energy currently maintains a Fugitive Dust Control Plan in accordance to ARM 17.24.761and the work practice standards established within MAQP, which includes elements utilized in the control of dust from haul roads. Specific elements of the plan which address haul roads include;

- All unpaved roads will be watered or a dust palliative used as needed to reduce fugitive dust.
- Vehicle speeds will be restricted on haul roads to reduce the amount of fugitive dust.
- Unpaved haul and access roads will be chemically stabilized with nontoxic soil cement or dust palliatives mixed into the upper 1 to 2 inches of road surface as necessary.
- All roads will be routinely maintained by means such as, but not limited to, wetting, scraping or surfacing, chemical dust suppression addition, sanding, and replacement of surfacing materials.

Western Energy proposes the ongoing maintenance and implementation of a dust control plan, which includes the aforementioned techniques as BACT for the control of fugitive particulate matter. The control options selected contain control equipment and control costs comparable to other recently permitted similar sources and are capable of achieving the appropriate emission standards. The Department determined that implementation and maintenance an of an formal dust control plan, which includes using water and/or chemical dust suppressant to ensure compliance with the opacity requirements and reasonable precaution limitations, constitutes BACT.

IV. Emission Inventory

The following table presents the total emissions from Area C and the proposed Area F expansion. As a result of this permit action the emission inventory for Area C was updated to reflect emission factors and estimation methods currently employed by the Department. All mining activity, coal extraction, and coal processing are accounted for under the Area C emission inventory. A complete emission inventory is available from the Department.

Area C - Potential Emissions Summary

Fugitive Emissions							
Emission Source(s)	PM	PM_{10}	$PM_{2.5}$	CO	NO_x	SO_2	VOC
Topsoil Removal	74.93	37.46	3.75	--	--	--	--
Topsoil Dumping	2.85	1.35	0.2	--	--	--	--
Overburden Drilling	4.22	0.52	0.05	--	--	--	--
Overburden Blasting Cast Blasting	110.95	57.69	3.33	--	--	--	--
Overburden Removal - Dragline	623.78	120.22	10.6	--	--	--	--
Overburden Handling - Truck/Shovel	250.88	188.16	4.77	--	--	--	--
Overburden Dumping	2.85	1.35	0.2	--	--	--	--
Overburden Handling - Bulldozer	97.8	18.57	10.27	--	--	--	--
Haul Roads - Travel	852.27	227.09	22.57	--	--	--	--
Access Roads - Unpaved	374	101.56	10.16	--	--	--	--

Area C - Potential Emissions Summary

Fugitive Emissions							
Emission Source(s)	PM	PM_{10}	$PM_{2.5}$	CO	NO_x	SO_2	VOC
Coal Drilling	0.71	0.09	0.01	--	--	--	--
Coal Blasting	40.67	21.15	1.22	--	--	--	--
Coal Removal	0.33	0.11	0.02	--	--	--	--
Explosive Detonation (ANFO)	--	--	--	577.04	146.41	17.23	--
Disturbed Acres - Complete (< 2 yrs.)	39.79	19.89	1.99	--	--	--	--
Disturbed Acres - Partial (< 1 yrs.)	134.06	67.03	6.7	--	--	--	--
Disturbed Acres - Partial (> 1 yrs.)	119.51	59.76	5.98	--	--	--	--
Disturbed Acres - Pits, Peaks, Soil Stripping	1066.13	533.06	53.31	--	--	--	--
TOTAL FUGITIVE EMISSIONS ►	3795.73	1455.06	135.13	577.04	146.41	17.23	0

Non-Fugitive Emissions							
Emission Source(s)	PM	PM_{10}	$PM_{2.5}$	CO	NO_x	SO_2	VOC
Truck Dump - Coal	0.27	0.1	0.01	--	--	--	--
Coal Crusher	0.8	0.24	0.02	--	--	--	--
Coal Conveyors	0.08	0.03	0.004	--	--	--	--
TOTAL NON-FUGITIVE EMISSIONS ►	1.15	0.37	0.034	0	0	0	0

Area F - Potential Emissions Summary

Fugitive Emissions							
Emission Source(s)	PM	PM_{10}	$PM_{2.5}$	CO	NO_x	SO_2	VOC
Haul Roads - Travel	309.51	82.47	8.2	--	--	--	--
Access Roads - Unpaved	36	9.78	0.98	--	--	--	--
TOTAL FUGITIVE EMISSIONS ►	345.51	92.25	9.18	0	0	0	0

V. Existing Air Quality

The Rosebud Mine is located in areas designated as attainment/unclassifiable for the PM_{10} National Ambient Air Quality Standard (NAAQS). MAQP #1570-07 contains emission limits and control measures to limit impacts to existing air quality.

VI. Air Quality Impact Analysis

Based upon an evaluation of historical data, consideration of the activities proposed, and limitations and control measures present within MAQP #1570-07, the Department has determined that impacts to ambient air quality from this permit action will be minor. Furthermore, the proposed expansion into Area F will not result in a violation of ambient air quality standards.

Historical data relates to past PM_{10} monitoring results and a review of available production data collected during the monitoring period. Pursuant to permit conditions, Western Energy was required to operate seven PM_{10} ambient air quality monitoring sites from 1992 through 2000. These sites were

situated throughout the entire Rosebud Mine complex. Monitoring during the period from 1992-2000 demonstrated that ambient concentrations of PM_{10} were well below the NAAQS and Montana Ambient Air Quality Standards (MAAQS). The highest 24-hour average PM_{10} concentration recorded from any individual station during the active monitoring period was 80 micrograms per cubic meter ($\mu g/m^3$). The next highest 24-hour average concentration reported was 78$\mu g/m^3$. In turn, the highest annual average PM_{10} concentration recorded from any individual site was 14 $\mu g/m^3$. The highest 24-hour and annual average PM_{10} are 53% and 28% of the respective ambient air quality standard. Based on an ongoing demonstration of compliance with the PM_{10} NAAQS and MAAQS, Western Energy requested authorization from the Department to discontinue ambient monitoring. The request was approved and monitoring ceased in 2001.

A review of production related data from the period in which monitoring was performed (1992-2000) indicates Area C mining activity was generally representative of current activity. Coal production for the years 1994 through 2000 (years of available data during the 1992-2000 monitoring time period) from Area C averaged 6.29 million tons per year, with a high production of 7.52 million tons in 1999. In comparison, coal production during the period 2008 through 2012 from Area C averaged 6.96 million tons per year, with a high production of 7.87 million tons in 2008. As a result, ambient PM_{10} concentrations produced during 1992 through 2000 should be representative of current and projected mine activity.

In considering the activities proposed under the current permit action. The expansion into Area F will encompass an additional 6,746 acres, bringing the combined extent addressed by MAQP #1570-07 to 12,817 acres. As proposed the expansion does not entail any additional mining activity or associated emission increase. Emissions concomitant with topsoil and overburden removal and handling, blasting, and coal extraction are accounted for with the existing emission inventory. A portion of this mining activity will be reallocated to the expansion site. Any new or increased sources of emissions will be limited to the extension of access and haul roads necessary to bring coal to the existing truck dump area located in Area C. MAQP #1570-07 will place a restriction on the amount of coal produced from Area F to 4.0 million tons per year. With the coal production limit of 4.0 million tons per year placed on Area F, the continuation of the existing permit-wide coal production limit of 8.0 million tons per year, as well as the effective expansion to the geographic extent of mining activities over a larger area; it is reasonable to consider impacts from this permit action will not create significant additional impacts to air quality.

Concerning particulate emission with an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$), the Department took derived PM_{10} ambient concentrations from past monitoring and applied given $PM_{2.5}$ to PM_{10} ratios. Several EPA referenced emission factors have been generated from test programs aimed to establish this correlation. Generally accepted estimates from such initiatives consistently present emission fractions of $PM_{2.5}$ at a range of 0.1 to 0.15 for unpaved roadways and 0.15 to 0.2 for wind erosion from industrial and construction sites. No specific data is available for western coal mines, however emission factors were developed from sources with similar characteristics, including; large open cut aggregate mines and large-scale construction projects.

Application of the highest $PM_{2.5}$ to PM_{10} ratio referenced, in conjunction with the highest 24-hour and annual average PM_{10} observed concentrations from the previously mention monitoring data, indicates expected $PM_{2.5}$ ambient concentration will be well below the prescribed NAAQS and MAAQS. Consequently $PM_{2.5}$ emissions resulting from this permit action will not significantly impact air quality.

Therefore, at this time the Department is not requiring Western Energy to present ambient air quality modeling or the operation of ongoing ambient air monitoring systems to demonstrate compliance with the NAAQS/MAAQS.

VII. Taking or Damaging Implication Analysis

As required by 2-10-105, MCA, the Department conducted the following private property taking and damaging assessment.

YES	NO	
✓		1. Does the action pertain to land or water management or environmental regulation affecting private real property or water rights?
	✓	2. Does the action result in either a permanent or indefinite physical occupation of private property?
	✓	3. Does the action deny a fundamental attribute of ownership? (ex.: right to exclude others, disposal of property)
	✓	4. Does the action deprive the owner of all economically viable uses of the property?
	✓	5. Does the action require a property owner to dedicate a portion of property or to grant an easement? [If no, go to (6)].
		5a. Is there a reasonable, specific connection between the government requirement and legitimate state interests?
		5b. Is the government requirement roughly proportional to the impact of the proposed use of the property?
	✓	6. Does the action have a severe impact on the value of the property? (consider economic impact, investment-backed expectations, character of government action)
	✓	7. Does the action damage the property by causing some physical disturbance with respect to the property in excess of that sustained by the public generally?
	✓	7a. Is the impact of government action direct, peculiar, and significant?
	✓	7b. Has government action resulted in the property becoming practically inaccessible, waterlogged or flooded?
	✓	7c. Has government action lowered property values by more than 30% and necessitated the physical taking of adjacent property or property across a public way from the property in question?
	✓	Takings or damaging implications? (Taking or damaging implications exist if YES is checked in response to question 1 and also to any one or more of the following questions: 2, 3, 4, 6, 7a, 7b, 7c; or if NO is checked in response to questions 5a or 5b; the shaded areas)

Based on this analysis, the Department determined there are no taking or damaging implications associated with this permit action.

VIII. Environmental Assessment

An environmental assessment, required by the Montana Environmental Policy Act, was completed for this project. A copy is attached.

DEPARTMENT OF ENVIRONMENTAL QUALITY
Permitting and Compliance Division
Air Resources Management Bureau
P.O. Box 200901, Helena, Montana 59620
(406) 444-3490

DRAFT ENVIRONMENTAL ASSESSMENT (EA)

Issued To: Western Energy Company
P.O. Box 99
Colstrip, MT 59323

Montana Air Quality Permit (MAQP): 1570-07
Preliminary Determination Issued: 07/22/2013
Department Decision Issued:
Permit Final:

1. *Legal Description of Site*: Area F is located in Sections 3-6, Township 1 North, Range 40 East in Rosebud County, Sections 19, 20, and 27-34 in Township 2 North, Range 40 East in Rosebud County, and Sections 12-14 and 23-25, Township 2 North, Rage 39 East in Treasure County. The list of permitted equipment can be found in Section I of the permit analysis.

2. *Description of Project*: Western Energy Company (Western Energy) proposed an expansion to the geographic extent of the mine. The existing air quality permit explicitly defined the physical area in which mining activities are permitted. As such, Western Energy requested an expansion of this physical boundary into a new area designated as Area F. No additional coal production capacity or stationary or portable equipment are proposed.

3. *Objectives of Project*: the objective of the expansion project is to further extend the life of the mine by expanding areas from which coal will be extracted.

4. *Alternatives Considered*: In addition to the proposed action, the Montana Department of Environmental Quality – Air Resources Management Bureau (Department) considered the "no-action" alternative. The "no-action" alternative would deny issuance of the air quality preconstruction permit to the proposed facility. However, the Department does not consider the "no-action" alternative to be appropriate because Western Energy demonstrated compliance with all applicable rules and regulations as required for permit issuance. Therefore, the "no-action" alternative was eliminated from further consideration.

5. *A Listing of Mitigation, Stipulations, and Other Controls*: A list of enforceable conditions, including a Best Available Control Technology (BACT) analysis, would be included in MAQP #1570-07.

6. *Regulatory Effects on Private Property*: The Department considered alternatives to the conditions imposed in this permit as part of the permit development. The Department determined that the permit conditions are reasonably necessary to ensure compliance with applicable requirements and demonstrate compliance with those requirements and do not unduly restrict private property rights.

7. *The following table summarizes the potential physical and biological effects of the proposed project on the environment. The "no-action" alternative was discussed previously.*

Potential Physical and Biological Effects							
		Major	Moderate	Minor	None	Unknown	Comments Included
A	Terrestrial and Aquatic Life and Habitats					✓	yes
B	Water Quality, Quantity, and Distribution			✓			yes
C	Geology and Soil Quality, Stability, and Moisture					✓	yes
D	Vegetation Cover, Quantity, and Quality					✓	yes
E	Aesthetics			✓			yes
F	Air Quality			✓			yes
G	Unique Endangered, Fragile, or Limited Environmental Resource					✓	yes
H	Demands on Environmental Resource of Water, Air, and Energy					✓	yes
I	Historical and Archaeological Sites					✓	yes
J	Cumulative and Secondary Impacts			✓			yes

SUMMARY OF COMMENTS ON POTENTIAL PHYSICAL AND BIOLOGICAL EFFECTS: The following comments have been prepared by the Department. Only off-site impacts created by the release of air pollutants are address. Some inferences are made to the potential physical and biological effects to receptors within the boundary of the project are address.

Department of Environmental Quality (DEQ) officials under the Montana Environmental Policy Act (MEPA), in conjunction with the United States Department of Interior – Office of Surface Mining, Reclamation, and Enforcement (OSMRE) are conducting a formal Environmental Impact Statement (EIS). Any conclusions present within this preliminary assessment are based information available to the Department as the time of this assessment. The conclusions of the EIS will supersede those presented within this draft EA. Department will update this section or provide reference at the time the EIS is final.

A. Terrestrial and Aquatic Life and Habitats:

The proposed expansion would result in increased emissions of fugitive dust and loss of terrestrial habitants by disturbances created by surface mining activities. Conditions which control fugitive dust would be required within MAQP #1570-07 to ensure significant air quality impacts would not occur. Such conditions would include; specific best management practices, requirement to maintain a fugitive dust control plan, as well as, inherit reasonable precautions requirements. No significant sources of surfaces waters are near the project site. Due to the proximity of surface waters to the Western Energy site, any impact to off-site aquatic life and habitant would be expect to be minor.

B. Water Quality, Quantity, and Distribution:

Emissions resulting from this permitting action would likely have a minor or limited effect on the water quality, water quantity, and distribution, as surface waters are not prevalent within the immediate area surrounding the mine site. Particulate matter emissions from disturbance of soils and coal deposits would be deposited at varying distance within the mine boundary or vicinity depending upon particle size, location of release, and wind affects. However, because of pollutant characteristics and generally good dispersion in the area, minor pollutant deposition on surface waters near the project area may occur from surface disturbances and roadways. Air emissions from this source would not likely impact groundwater. Therefore, fugitive dust emissions the project would be expected to have only minor impacts to water quality, quantity or distribution in the area.

C. Geology and Soil Quality, Stability, and Moisture:

This project would be expected to impact the geology and soil properties from land disturbances associated with mining operations and material handling activity. The air quality permit associated with this project would contain limitations and conditions to minimize the effect of the emissions to off-site aspects. However, the potential effects would be determined through the formal EIS.

D. Vegetation Cover, Quantity, and Quality:

The particulate matter, PM_{10}, and $PM_{2.5}$ emissions from this project would be expected to have an effect on the surrounding vegetation with respect to cover, quantity and quality; however, the air quality permit associated with this project would contain limitations to minimize the impact on the surrounding environment. Overall, this project would expect to have minor effects on the vegetation cover, quantity and quality. The formal EIS will address the overall impact, as well, as require reclamation step to ensure that native vegetation is returned to the site.

E. Aesthetics:

The expansion project would likely have minor impacts on the surrounding property from a visual perspective. However, activity within the expansion area would be similar to current mining operations located adjacent to the proposed project area. The degree of visual impact would be similar to existing impacts from current operations. In addition, depositions of particulate matter species would not likely have any significant impact to other aesthetic aspects of the surround area as only a minor increase in emission would occur as a result of this project. The Department determined minor changes in the aesthetic value of the site would be expected as a result of this project.

F. Air Quality:

The proposed expansion would impact receptors and resources within the proposed project area due to an increase in fugitive emissions of particulate matter, PM_{10}, and $PM_{2.5}$ from the expanded length of access and haul roads. Emissions of particulate matter from coal extraction and processing, as well as, related overburden and topsoil material handling are accounted for within the existing emission inventory and would not increase as a result the permit action. Emissions of nitrogen oxide (NO_x), carbon monoxide (CO), volatile organic compounds (VOC), sulfur dioxide (SO_2), and non-criteria pollutants, generated during blasting of various surface and subsurface layers, are also accounted for within the existing air quality permit and would not increase.

Based on ambient concentration determinations of past monitoring and modeling, the representativeness of the current, as well as, proposed mining activity, and the amount of emission increases from the expansion of the access and haul roads any impact is expected to be minor. The potential for impact is further mitigated when considering the dispersion characteristics of the locale, properties of pollutants, and the conditions established in MAQP #1570-07. The Department has determined that the amount of increased particulate emissions resulting from the proposed project would not cause a significant degradation and any impact to air quality from the proposed project would be expected to be minor as a result of the current permit action.

G. Unique Endangered, Fragile, or Limited Environmental Resources:

In an effort to identify any unique endangered, fragile, or limited environmental resources in the area, the Department contacted the Montana Natural Heritage Program, Natural Resource Information System (NRIS). In this case, the area was defined by the section, township, and range of the proposed location with an additional 1-mile buffer zone. Search results identified the following animal species of concern may be present within the search radius:

- Golden Eagle
- Greater Sage-Grouse
- Burrowing Owl
- Red-headed Woodpecker
- Pinyon Jay
- Hoary Bat
- Pallid Bat
- Greater Short-horned Lizard
- Western Hog-nosed Snake
- Milksnake

Based upon the limited information available at this time, the Department is unable to determine the extent of impacts to unique endangered, fragile, or limited environmental resources created by the proposed project. Upon the conclusion and release of the final EIS the impacts to unique endangered, fragile, or limited environmental will be established.

H. Demands on Environmental Resource of Water, Air, and Energy:

The proposed project would necessitate an increase in the demand for environmental resources of water, air, and energy. Based upon the limited information available at this time the Department is unable to determine the extent of additional demands for these elements. Upon completion of the formal EIS the demand impacts on environmental resources of water, air and energy will be addressed.

I. Historical and Archaeological Sites:

According to cultural resource file search conducted by the State Historic Preservation Office (SHPO), there are multiple recorded cultural sites and previously conducted cultural resource inventories. Based on the findings of the initial file search SHPO recommends that a cultural resource inventory be performed on the expansion site.

At this time the Department is not in the position to stipulate a position with respect to the impact of this project on historical and archaeological sites until a formal cultural resource inventory can be accomplished.

J. Cumulative and Secondary Impacts:

With the exception of any consideration to the impacts for which the Department has determined that insufficient information is available (terrestrial and aquatic life and habitats; geology and soil quantity, stability, and moisture; vegetation cover, quantity, and quality; unique endangered, fragile, or limited environmental resource; demands on historical and archaeological sites; environmental resource of water, air, and energy); the overall cumulative and secondary impacts from the proposed project to the physical and biological receptors in the immediate area due to increase emissions of particulate from the proposed expansion would be expected to be minor. Air pollution from the facility would be controlled by Department-determined BACT, as discussed in Section III of the permit analysis, along with the limitations and conditions in MAQP #1570-07. The Department believes that this facility could be expected to operate in compliance with all applicable rules and regulations as outlined within the air quality permit.

8. *The following table summarizes the potential economic and social effects of the proposed project on the human environment. The "no-action" alternative was discussed previous ly.*

Potential Social and Economic Effects							
		Major	Moderate	Minor	None	Unknown	Comments Included
A	Social Structures and Mores				✓		yes
B	Cultural Uniqueness and Diversity				✓		yes
C	Local and State Tax Base and Tax Revenue				✓		yes
D	Agricultural or Industrial Production			✓			yes
E	Human Health			✓			yes
F	Access to and Quality of Recreational and Wilderness Activities			✓			yes
G	Quantity and Distribution of Employment				✓		yes
H	Distribution of Population				✓		yes
I	Demands for Government Services			✓			yes
J	Industrial and Commercial Activity			✓			yes
K	Locally Adopted Environmental Plans and Goals				✓		yes
L	Cumulative and Secondary Impacts			✓			yes

SUMMARY OF COMMENTS ON POTENTIAL ECONOMIC AND SOCIAL EFFECTS: The Department has prepared the following comments.

A. Social Structures and Mores:

The proposed project would not expect a significant disruption to any native or traditional lifestyles or communities (social structures or mores) in the area because the proposed project area is currently undeveloped agricultural or livestock grazing land. Further the expansion area is predominately owned by private entities or individuals. The Department is not aware of any current utilization by native or traditional communities. Therefore no known impact to social structures and mores would be expected.

B. Cultural Uniqueness and Diversity:

As discussed within the aforementioned section the proposed project would not be expected to impact the cultural uniqueness and diversity of the area because the proposed project would be located within area which is currently undeveloped and for the most part under private ownership.

C. Local and State Tax Base and Tax Revenue:

The proposed expansion would not likely result in any increase in production capacity or a need for additional employees; therefore no effect on the local/state tax base or tax revenue would be expected.

D. Agricultural or Industrial Production:

The proposed project would likely displace or otherwise affect agricultural land or practices. Livestock grazing on private lands would require relocation; however, private owners would have understanding of this impact and would have willingly relinquished these rights under the lease contract. Therefore, impact on agricultural or industrial production as a result of the proposed project would be expected to be minor.

E. Human Health:

The proposed project would result in a minor increase in emissions the expansion project. However, MAQP #5707-07 contains limitations and conditions including, but not limited to, the BACT requirements discussed in Section III of the permit analysis, to ensure that the operations would maintain compliance with all applicable rules and standards. These rules and standards are designed to be protective of human health. Any impact to human health from the proposed project would be expected to be minor.

F. Access to and Quality of Recreational and Wilderness Activities:

The majority of the surface lands within the expansion area are under private ownership. A single section and two partial geographic sections are owned by the State of Montana. As a limited area of public land encompasses the mine expansion there would be some impact to access to recreational and wilderness activities. The public lands impacted do not appear to be designated recreational areas with state developed or maintained facilities such as, trails, campsites, day use areas, etc. However, these areas would not be available for public use during the time the area is occupied by Western Energy until completion of the reclamation process. Therefore, minor impacts to access to and quality of recreational and wilderness activities would be expected.

G. Quantity and Distribution of Employment:

According to Western Energy the proposed project would not necessitate the hiring of additional employees, therefore no effect on the quantity and distribution of employment would be expected as a result of the expansion.

H. Distribution of Population:

As no additional employees are expected from this project an impact on the distribution of population would not be expected.

I. Demands for Government Services:

Government services would be required for acquiring the appropriate permits from government agencies and for ongoing interaction with Western Energy. The expansion would not likely increase the need for government service resources beyond the current capacity. As a result of this project demands for government services would be expected to be minor.

J. Industrial and Commercial Activity:

The proposed project would not result in any increase in production from the Western Energy site; however, an expansion of the area of impact of industrial or commercial activity would occur. The geographic expansion into Area F would result in a disturbance of an additional 4,287 acres of land. However, as no additional production would result and any increase in air emissions would result from fugitive emissions from haul roads and access roads. As the majority of the land in under private ownership for which the land owners have willingly relinquished right to any impact to industrial and commercial activity would be expected to be minor as a result of this project.

K. Locally Adopted Environmental Plans and Goals:

The Department is not aware of any locally adopted environmental plans or goals. State and federal air quality standards and air quality plans would apply to proposed site.

L. Cumulative and Secondary Impacts:

Overall, cumulative and secondary impacts from this project would result in a minor to impacts to the economic and social environment in the immediate area. As previously stated, the proposed project would not result in any change to Western Energy personnel and would not result in any increase in ore production at the facility. The Department believes that Western Energy could be expected to operate in compliance with all applicable rules and regulations as outlined in MAQP #1570-07.

Recommendation: No Department-required EIS is recommended.

If an EIS is not required, explain why the EA is an appropriate level of analysis:

The DEQ and OSMRE are conducting a formal Environmental Impact Statement (EIS) for the proposed Western Energy expansion into Area F.

Other groups or agencies contacted or which may have overlapping jurisdiction: Montana Historical Society – State Historic Preservation Office, Natural Resource Information System – Montana Natural Heritage Program, DEQ – MEPA Office, and OSMRE.

Individuals or groups contributing to this EA: Department of Environmental Quality – Air Resources Management Bureau, Montana Historical Society – State Historic Preservation Office, Natural Resource Information System – Montana Natural Heritage Program, DEQ – MEPA

EA prepared by: D. Kuenzli
Date: July 18, 2013

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APPENDIX D-2

Montana Air Quality Permit #1483-08 for Areas A/B/D/E.

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Air Quality Permit

Issued to: Western Energy Company
P.O. Box 99
Colstrip, MT 59323

Permit #1483-08
Modification Request Received: 04/27/01
Department Decision on Modification: 10/05/01
Permit Final: 10/23/01
AFS #: 087-0004

An air quality permit, with conditions, is hereby granted to Western Energy Company (Western Energy), pursuant to Sections 75-2-204 and 211 of the Montana Code Annotated (MCA), as amended, and the Administrative Rules of Montana (ARM) 17.8.701 *et seq.,* as amended, for the following:

SECTION I: Permitted Facilities

A. Plant Location

Western Energy operates a surface coal mine and extraction facility located in Areas A, B, D, and E of the Rosebud Mine west of Colstrip, Montana. The coal handling facilities are located in Areas A and E. Area A is located in all or part of Sections 28-34 of Township 2 North, Range 41 East; Section 36 of Township 2 North, Range 40 East; Section 1 of Township 1 North, Range 40 East; and Sections 3-8 of Township 1 North, Range 41 East of Rosebud County. Area B is located in all or part of Sections 2-5, 7-11, and 17-18 of Township 1 North, Range 41 East and Sections 8-17 of Township 1 North, Range 40 East of Rosebud County. Area D is located in all or part of Sections 19, 29, and 30 of Township 2 North, Range 42 East and Sections 13-15, 22-27, and 34-36 of Township 2 North, Range 41 East of Rosebud County. Area E is located in all or part of Sections 34-35 of Township 2 North, Range 41 East; Section 7 of Township 1 North, Range 42 East; and Sections 1-3 and 11-13 of Township 1 North, Range 41 East of Rosebud County. The list of permitted equipment can be found in Section I of the permit analysis.

B. Current Permit Action

The current permit action is a modification of Permit #1483-07. The Department of Environmental Quality (Department) received a letter, dated April 27, 2001, from Western Energy requesting termination of their ambient air monitoring network. Following the October 9, 1998, permitting guidance statement, the Department reviewed the ambient air monitoring data. In a letter dated May 23, 2001, the Department agreed to Western Energy's request to terminate the ambient monitoring program, effective July 1, 2001. This permit action updates the permit language to reflect the termination of the ambient air monitoring network. Also, this permit action updates the permit format. Permit #1483-08 replaces Permit #1483-07.

SECTION II: Conditions and Limitations

A. Emissions Limitations

1. Annual coal production from Area D shall be limited to 5,900,000 tons per year. Annual coal production from Areas A, B, and D shall be limited to 13,000,000 tons per year (ARM 17.8.710).

2. Western Energy shall not cause visible emissions of greater than 20% opacity to be discharged into the atmosphere from any coal handling, conveying, crushing, processing, storing or loading system averaged over 6 consecutive minutes (ARM 17.8.340).

3. Western Energy shall install and operate a coal dust suppression system or equivalent at the truck dump (ARM 17.8.710).

4. Western Energy shall apply chemical stabilizer to all permanent haul roads. In addition, water sprinkling shall supplement stabilization when necessary (ARM 17.8.710).

5. Western Energy shall contour or shape, as necessary, all uncrushed coal piles in all areas in order to minimize wind erosion (ARM 17.8.710).

6. Western Energy shall revegetate all exposed areas as soon as practical or as required by the Department's Industrial and Energy Minerals Bureau (ARM 17.8.710).

7. Western Energy shall enclose all coal conveyor belts at all transfer points (Areas E and A facilities) except as necessary to allow for maintenance (ARM 17.8.710).

8. Western Energy shall continue the train loadout as presently employed unless Department inspections indicate a problem (ARM 17.8.710).

9. Western Energy shall treat the county road with dehydrated oil or equivalent for a distance of approximately 4 miles west of Highway 39 (ARM 17.8.710).

10. Western Energy shall maintain and operate its mine according to the "Minewide Dust Control Management Plan" except as required otherwise by the above conditions (ARM 17.8.710).

B. Testing Requirements

1. All compliance source tests shall conform to the requirements of the Montana Source Test Protocol and Procedures Manual (ARM 17.8.106).

2. The Department may require testing (ARM 17.8.105).

C. Operational Reporting Requirements

1. Western Energy shall supply the Department with annual production information for all emission points, as required by the Department in the annual emission inventory request. The request will include, but is not limited to, all sources of emissions identified in the emission inventory contained in the permit analysis.

   Production information shall be gathered on a calendar-year basis and submitted to the Department by the date specified in the emission inventory request. Information shall be in units as required by the Department. This information may be used to calculate operating fees, based on actual emissions from the facility, and/or to verify compliance with permit limitations. Western Energy shall submit the annual coal production to the Department by March 1 of each year or with the annual emission inventory (ARM 17.8.505).

2. Western Energy shall notify the Department of any construction or improvement project conducted pursuant to ARM 17.8.705(l)(r), that would include a change in control equipment, stack height, stack diameter, stack flow, stack gas temperature, source location or fuel specifications, or would result in an increase in source capacity above its permitted operation or the addition of a new emission unit.

   The notice must be submitted to the Department, in writing, 10 days prior to start up or use of the proposed de minimis change, or as soon as reasonably practicable in the event of an unanticipated circumstance causing the de minimis change, and must include the information requested in ARM 17.8.705(l)(r)(iv) (ARM 17.8.705).

3. All records compiled in accordance with this permit must be maintained by Western Energy as a permanent business record for at least 5 years following the date of the measurement, must be available at the plant site for inspection by the Department, and must be submitted to the Department upon request (ARM 17.8.710).

D. Ambient Monitoring

1. PM-10 data has been collected at the Western Energy mine since 1992. During the 1992-2000 period, the annual means at all sites were less than 28% of the annual standard. For the 24-hour concentrations, all of the annual, maximum 24-hour values were less than 53% of the 24-hour standard. Therefore, in accordance with the October 9, 1998, monitoring guidance statement developed by the Department, Western Energy may discontinue operation of their ambient air monitoring network.

2. The Department may require Western Energy to conduct additional ambient air monitoring, if necessary (ARM 17.8.710).

Section III: General Conditions

A. Inspection – Western Energy shall allow the Department's representatives access to the source at all reasonable times for the purpose of making inspections or surveys, collecting samples, obtaining data, auditing any monitoring equipment (CEMS, CERMS) or observing any monitoring or testing, and otherwise conducting all necessary functions related to this permit.

B. Waiver - The permit and all the terms, conditions, and matters stated herein shall be deemed accepted if Western Energy fails to appeal as indicated below.

C. Compliance with Statutes and Regulations - Nothing in this permit shall be construed as relieving Western Energy of the responsibility for complying with any applicable federal or Montana statute, rule or standard, except as specifically provided in ARM 17.8.701, *et seq*. (ARM 17.8.717).

D. Enforcement - Violations of limitations, conditions and requirements contained herein may constitute grounds for permit revocation, penalties or other enforcement as specified in Section 75-2-401, *et seq*., MCA.

E. Appeals - Any person or persons jointly or severally adversely affected by the Department's decision may request, within 15 days after the Department renders its decision, upon affidavit setting forth the grounds therefor, a hearing before the Board of Environmental Review (Board). A hearing shall be held under the provisions of the Montana Administrative Procedures Act. The Department's decision on the application is not final unless 15 days have elapsed and there is no request for a hearing under this section. The filing of a request for a hearing postpones the effective date of the Department's decision until the conclusion of the hearing and issuance of a final decision by the Board.

F. Permit Inspection - As required by ARM 17.8.716, Inspection of Permit, a copy of the air quality permit shall be made available for inspection by Department personnel at the location of the permitted source.

G. Permit Fees - Pursuant to Section 75-2-220, MCA, as amended by the 1991 Legislature, failure to pay the annual operation fee by Western Energy may be grounds for revocation of this permit, as required by that Section and rules adopted thereunder by the Board.

H. Construction Commencement - Construction must begin within 3 years of permit issuance and proceed with due diligence until the project is complete or the permit shall be revoked.

Permit Analysis
Western Energy Company - Rosebud Mine - Areas A, B, D and E
Permit #1483-08

I. Introduction/Process Description

A. Permitted Equipment

Western Energy Company (Western Energy) operates the following equipment at Areas A, B, D, and E of the Rosebud Mine.

1. "Coal handling facilities" include, but are not limited to:

   a. Truck dump with hopper at Areas A and E. Note: Mining operations have ended at Area E and the area has been reclaimed. However, the truck dump (tipple) is still located and operated at Area E but it processes coal from Area D.

   b. Three primary crushers with capacities of 1250 ton/hr each; two at Area A and one at Area E. Note: Mining operations have ended at Area E and the area has been reclaimed. However, the primary crusher is still located and operated at Area E but it processes coal from Area D.

   c. Three secondary crushers; two at Area A and one at Area E. Note: Mining operations have ended at Area E and the area has been reclaimed. However, the secondary crusher is still located and operated at Area E but it processes coal from Area D. The secondary crusher at Area E handles approximately 30% of the primary crushed coal that is either used by Colstrip Units 1 and 2 or sold on the spot market. The capacity of the secondary crushers at Area A is approximately the same as at Area E; however, the coal from the Area A is shipped to out-of-state customers.

   d. Partially enclosed conveyor system (Areas A and E). Note: Mining operations have ended at Area E and the area has been reclaimed. However, the conveyor system is still located and operated at Area E but it processes coal from Area D.

   e. One open coal storage pile of crushed coal at Area A, encompassing approximately 3.5 acres and containing an estimated maximum 96,000 tons.

   f. Train loadout facilities with retractable chute located at Areas A and E. The capacity at Area A is 4,000 ton/hr and at Area E it is 1,250 ton/hr. Note: Mining operations have ended at Area E and the area has been reclaimed. However, the train loadout facilities are still located and operated at Area E.

2. Necessary auxiliaries include, but are not limited to: draglines, coal shovels, trucks, front-end loaders, graders, scrapers, dozers, other mobile units, auxiliary and storage facilities, etc., as applicable.

B. Source Description

Western Energy has operated the Rosebud Mine at Colstrip since the late 1960's. Coal mining previously occurred in the area, primarily by the Northern Pacific Railroad. Air Quality Permit #1483 regulates mining operations in Areas A, B, D, and E of the Rosebud mine, while Permit #1570 pertains to Area C.

All areas use standard dragline overburden stripping practices, truck/shovel coal removal, soil salvage and replacement (primarily using scrapers,) overburden and coal drilling and blasting, and coal processing operations. Separate coal processing and handling facilities are located in Areas A and E and include primary and secondary crushing, conveying, and loadout facilities. Note: Mining operations have ended at Area E and the area has been reclaimed. However, the truck dump, primary and secondary crushers, conveyors and train loadout facilities are still located and operated at Area E but they process coal from Area D.

C. Permit History

Permit **#1483** was issued to Western Energy Company on November 22, 1980, for Areas A, B, and E of the Rosebud Mine at Colstrip, Montana.

Permit **#1483A** was issued on September 6, 1985, for the surface mining operations from the new Area D. The coal mining operations in Area D would eventually replace those in Area E. For Area D, Western Energy would maintain approximately the same production rate and serve the same customers as Area E. Area D was expected to have a mine life of 18 years with a total production of 68,500,000 tons. Area D was expected to have an annual production rate of 4,000,000 tons with a maximum of 5,900,000 tons.

Permit **#1483B** was issued on January 6, 1986, to consolidate Permits #1483 and #1483A. The permitting action also modified the ambient air monitoring requirements. Permit #1483B replaced Permits #1483 and #1483A.

Permit **#1483C** was issued on October 5, 1987, to include the advanced coal cleaning process (ACCP) facility. The ACCP facility was a 40 ton/hour demonstration coal drying plant that produced an enhanced fuel from sub-bituminous and lignite coals. Permit #1483C incorporated by reference the conditions and limitations contained in Permit #1483B.

Permit **#1483D** was issued on July 22, 1988, for changes to the ACCP facility. The major change allowed the use of a sulfur stripping system on the “make gas” (fuel gas) prior to combustion. The original process used a nahcolite dry injection (in-duct desulfurization) system. Also, the wet cooling towers replaced an ammonia cycle heat rejection system. Finally, the permit was updated to reflect the format and language used in permits at that time, that included moving the ambient air monitoring requirements from the body of the permit into an attachment to the main permit (thereafter referred to as Attachment 1). Permit #1483D replaced Permit #1483C.

Permit **#1483E** was issued on June 25, 1991, for changes to the ACCP operation. The main change allowed the use of a dry sorbent injection system for SO_2 control instead of the "make gas" (fuel gas) sulfur stripping system. The control efficiency of the dry sorbent injection system was less, so there was a minor increase in emissions. However, the coal input to the ACCP process was limited to 600,000 ton/year by a new permit condition. The emission inventory was re-calculated using updated emission factors. Clarifying language was added to Attachment 1 that required a changeover from TSP to PM-10 ambient monitoring by July 1, 1992. Permit #1483E replaced Permit #1483D.

Permit **#1483-06** was issued on August 1, 1995, for an alteration to the ACCP facility. The changes included the addition of a fines handling system and a truck loadout system. The equipment list, process description, and emission inventory were all updated. Overall, there was an estimated particulate matter increase of 3.4 ton/year. Permit #1483-06 replaced Permit #1483E.

Permit **#1483-07** was issued on November 2, 1996. Western Energy submitted a request on August 26, 1996, to discontinue the use of the dry sorbent injection system for SO_2 control at the ACCP facility. Based on the results of stack tests, Western Energy demonstrated uncontrolled SO_2 emissions were less than 2 ton/year. Western Energy also requested that the ACCP facility be separated from the coal mining operation and regulated under its own permit. Therefore, Western Energy was issued Permit # 2975-00 for the ACCP facility and the mining operation remained under Permit #1483. Permit #1483-07 replaced Permit #1483-06.

D. Current Permit Action

The current permit action is a modification of Permit #1483-07. The Department of Environmental Quality (Department) received a letter, dated April 27, 2001, from Western Energy requesting termination of the ambient air monitoring network. Following the October 9, 1998, permitting guidance statement, the Department reviewed the ambient air monitoring data. In a letter dated May 23, 2001, the Department agreed to Western Energy's request to terminate their ambient monitoring program, effective July 1, 2001. This permit action updates the permit language to reflect the termination of the ambient air monitoring network. Also, this permit action updates the permit format. Permit **#1483-08** replaces Permit #1483-07.

E. Additional Information

Additional information, such as applicable rules and regulations, Best Available Control Technology (BACT) determinations, air quality impacts, and environmental assessments is included in the analysis associated with each change to the permit.

II. Applicable Rules and Regulations

The following are partial explanations of some applicable rules and regulations that apply to the facility. The complete rules are stated in the Administrative Rules of Montana (ARM) and are available upon request from the Department. Upon request, the Department will provide references for locations of complete copies of all applicable rules and regulations or copies where appropriate.

A. ARM 17.8, Subchapter 1 - General Provisions, including, but not limited to:

1. ARM 17.8.101 Definitions: This rule includes a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.

2. ARM 17.8.105 Testing Requirements. Any person or persons responsible for the emission of any air contaminant into the outdoor atmosphere shall, upon written request of the Department, provide the facilities and necessary equipment (including instruments and sensing devices) and shall conduct tests, emission or ambient, for such periods of time as may be necessary using methods approved by the Department.

3. ARM 17.8.106 Source Testing Protocol. The requirements of this rule apply to any emission source testing conducted by the Department, any source, or other entity as required by any rule in this chapter, or any permit or order issued pursuant to this chapter, or the provisions of the Clean Air Act of Montana, 75-2-101, *et seq.*, Montana Code Annotated (MCA).

   Western Energy shall comply with the requirements contained in the Montana Source Test Protocol and Procedures Manual, including, but not limited, using the proper test methods and supplying the required reports. A copy of the Montana Source Test Protocol and Procedures Manual is available from the Department upon request.

4. ARM 17.8.110 Malfunctions. (2) The Department must be notified promptly by telephone whenever a malfunction occurs that can be expected to create emissions in excess of any applicable emission limitation, or to continue for a period greater than 4 hours.

5. ARM 17.8.111 Circumvention. (1) No person shall cause or permit the installation or use of any device or any means that, without resulting in reduction in the total amount of air contaminant emitted, conceals or dilutes an emission of air contaminant that would otherwise violate an air pollution control regulation. (2) No equipment that may produce emissions shall be operated or maintained in such a manner that a public nuisance is created.

B. ARM 17.8, Subchapter 2 - Ambient Air Quality, including, but not limited to:

1. ARM 17.8.204 Ambient Air Monitoring

2. ARM 17.8.210 Ambient Air Quality Standards for Sulfur Dioxide
3. ARM 17.8.211 Ambient Air Quality Standards for Nitrogen Dioxide
4. ARM 17.8.212 Ambient Air Quality Standards for Carbon Monoxide
5. ARM 17.8.213 Ambient Air Quality Standard for Ozone
6. ARM 17.8.214 Ambient Air Quality Standard for Hydrogen Sulfide
7. ARM 17.8.220 Ambient Air Quality Standard for Settled Particulate Matter
8. ARM 17.8.221 Ambient Air Quality Standard for Visibility
9. ARM 17.8.222 Ambient Air Quality Standard for Lead, and
10. ARM 17.8.223 Ambient Air Quality Standard for PM-10.

Western Energy must maintain compliance with the applicable ambient air quality standards.

C. ARM 17.8, Subchapter 3 - Emission Standards, including, but not limited to:

1. ARM 17.8.304 Visible Air Contaminants. This rule requires that no person may cause or authorize emissions to be discharged into the outdoor atmosphere from any source installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes.

2. ARM 17.8.308 Particulate Matter Airborne. (1) This rule requires an opacity limitation of 20% for all fugitive emission sources and that reasonable precautions be taken to control emissions of airborne particulate matter. (2) Under this rule, Western Energy shall not cause or authorize the use of any street, road or parking lot without taking reasonable precautions to control emissions of airborne particulate matter.

3. ARM 17.8.309 Particulate Matter Fuel Burning Equipment. This rule requires that no person shall cause, allow or permit to be discharged into the atmosphere particulate matter caused by the combustion of fuel in excess of the amount determined by this rule.

4. ARM 17.8.310 Particulate Matter Industrial Processes. This rule requires that no person shall burn liquid, solid, or gaseous fuel in excess of the amount shown in this rule.

5. ARM 17.8.322, Sulfur Oxide Emissions-Sulfur in Fuel. This rule requires that no person shall cause, allow or permit to be discharged into the atmosphere particulate matter in excess of the amount set forth in this rule.

6. ARM 17.8.324(3) Hydrocarbon Emissions--Petroleum Products. No person shall load or permit the loading of gasoline into any stationary tank with a capacity of 250 gallons or more from any tank truck or trailer, except through a permanent submerged fill pipe, unless such tank is equipped with a vapor loss control device as described in (1) of this rule.

7. ARM 17.8.340 Standard of Performance for New Stationary Sources. This rule incorporates, by reference, 40 CFR 60, Standards of Performance for New Stationary Sources (NSPS). Western Energy is an NSPS affected facility under 40 CFR 60 and is subject to the requirements of the following subparts.

   40 CFR Part 60, Subpart A General Provisions.

   40 CFR Part 60, Subpart Y Coal Preparation Plants. This subpart requires affected facilities with any emissions containing particulate matter to not exhibit greater than 20% opacity. Process operations at this facility that meet the definition of affected facilities include any coal processing and conveying equipment, coal storage systems, or coal transfer and loading systems.

8. ARM 17.8.341 Emissions Standards for Hazardous Air Pollutants. This source shall comply with the standards and provisions of 40 CFR Part 61, as appropriate.

D. ARM 17.8, Subchapter 5 - Air Quality Permit Application, Operation and Open Burning Fees, including but not limited to:

1. ARM 17.8.504 Air Quality Permit Application Fees. This rule requires that an applicant submit an air quality permit application fee concurrent with the submittal of an air quality permit application. A permit application is incomplete until the proper application fee is paid to the Department. The current permit modification is an administrative action; therefore, a permit application and fee were not required.

2. ARM 17.8.505 Air Quality Operation Fees. An annual air quality operation fee must, as a condition of continued operation, be submitted to the Department by each source of air contaminants holding an air quality permit (excluding an open burning permit) issued by the Department. The air quality operation fee is based on the actual or estimated actual amount of air pollutants emitted during the previous calendar year.

   An air quality operation fee is separate and distinct from an air quality permit application fee. The annual assessment and collection of the air quality operation fee, described above, shall take place on a calendar-year basis. The Department may insert into any final permit issued after the effective date of these rules, such conditions as may be necessary to require the payment of an air quality operation fee on a calendar-year basis, including provisions that prorate the required fee amount.

E. ARM 17.8, Subchapter 7 - Permit, Construction and Operation of Air Contaminant Sources, including but not limited to:

1. ARM 17.8.701 Definitions. This rule is a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.

2. ARM 17.8.704 General Procedures for Air Quality Preconstruction Permitting. This air quality preconstruction permit contains requirements and conditions applicable to

both construction and subsequent use of the permitted equipment.

3. ARM 17.8.705 When Permit Required--Exclusions. This rule requires a facility to obtain an air quality permit or permit alteration if they construct, alter or use any air contaminant sources that have the potential to emit greater than 25 tons per year of any pollutant. Western Energy has the potential to emit greater than 25 tons per year of PM, PM-10, NO_x, SO_2, and VOC; therefore, a permit is required.

4. ARM 17.8.706 New or Altered Sources and Stacks--Permit Application Requirements. This rule requires that a permit application be submitted prior to installation, alteration, or use of a source. The current permit modification is an administrative action; therefore, a permit application is not required.

5. ARM 17.8.707 Waivers. ARM 17.8.706 requires that a permit application be submitted 180 days before construction begins. This rule allows the Department to waive this time limit. The Department hereby waives this time limit.

6. ARM 17.8.710 Conditions for Issuance of Permit. This rule requires that Western Energy demonstrate compliance with applicable rules and standards before a permit can be issued. Also, a permit may be issued with such conditions as are necessary to ensure compliance with all applicable rules and standards. Western Energy demonstrated compliance with all applicable rules and standards as required for permit issuance.

7. ARM 17.8.715 Emission Control Requirements. This rule requires a source to install the maximum air pollution control capability that is technically practicable and economically feasible, except that BACT shall be utilized. The current permit modification is an administrative action that will not increase emissions at this facility and which will not add or alter any sources; therefore, a BACT analysis is not required.

8. ARM 17.8.716 Inspection of Permit. This rule requires that air quality permits shall be made available for inspection by the Department at the location of the source.

9. ARM 17.8.717 Compliance with Other Statutes and Rules. This rule states that nothing in the permit shall be construed as relieving Western Energy of the responsibility for complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.701, *et seq*.

10. ARM 17.8.720 Public Review of Permit Applications. This rule requires that the applicant notify the public by means of legal publication in a newspaper of general circulation in the area affected by the application for a permit. The current permit modification is an administrative action; therefore, a public notice is not required.

11. ARM 17.8.731 Duration of Permit. An air quality permit shall be valid until revoked or modified, as provided in this subchapter, except that a permit issued prior to construction of a new or altered source may contain a condition providing that the

permit will expire unless construction is commenced within the time specified in the permit, that in no event may be less than 1 year after the permit is issued.

12. ARM 17.8.733 Modification of Permit. An air quality permit may be modified for changes in any applicable rules and standards adopted by the Board of Environmental Review (Board) or changed conditions of operation at a source or stack that do not result in an increase of emissions as a result of those changed conditions. A source may not increase its emissions beyond those found in its permit unless the source applies for and receives another permit.

13. ARM 17.8.734 Transfer of Permit. This rule states that an air quality permit may be transferred from one person to another if written notice of Intent to Transfer, including the names of the transferor and the transferee, is sent to the Department.

F. ARM 17.8, Subchapter 8 - Prevention of Significant Deterioration of Air Quality, including, but not limited to:

1. ARM 17.8.801 Definitions. This rule is a list of applicable definitions used in this subchapter.

2. ARM 17.8.818 Review of Major Stationary Sources and Major Modifications--Source Applicability and Exemptions. The requirements contained in ARM 17.8.819 through 17.8.827 shall apply to any major stationary source and any major modification, with respect to each pollutant subject to regulation under the Federal Clean Air Act (FCAA) that it would emit, except as this subchapter would otherwise allow.

   This facility is not a major stationary source since this facility is not a listed source and the facility's potential to emit (excluding fugitive emissions) is below 250 tons per year of any pollutant.

G. ARM 17.8. Subchapter 12 - Operating Permit Program Applicability, including, but not limited to:

1. ARM 17.8.1201 Definitions. (23) Major Source under Section 7412 of the FCAA is defined as any source having:

   a. Potential to emit (PTE) > 100 ton/year of any pollutant;

   b. PTE > 10 ton/year of any one Hazardous Air Pollutant (HAP), PTE > 25 ton/year of a combination of all HAPs, or lesser quantity as the Department may establish by rule; or

   c. Sources with the PTE > 70 ton/year of PM-10 in a serious PM-10 non-attainment area.

2. ARM 17.8.1204 Air Quality Operating Permit Program. (1) Title V of the FCAA amendments of 1990 requires that all sources, as defined in ARM 17.8.1204(1), obtain a Title V Operating Permit. In reviewing and issuing Air Quality Permit #1483-08 for Western Energy, the following conclusions were made:

   a. The facility's PTE is less than 100 ton/year for any pollutant, excluding fugitives.

   b. The facility's PTE is less than 10 ton/year for any one HAP and less than 25 ton/year of all HAPs.

   c. This source is not located in a serious PM-10 non-attainment area.

   d. This facility is subject to a NSPS.

   e. This facility is not subject to any current NESHAP standards.

   f. This source is not a Title IV affected source, nor a solid waste combustion unit.

   g. This source is not an EPA designated Title V source.

   Therefore, a Title V operating permit is not required. However, if minor sources subject to a NSPS are required to obtain a Title V Operating Permit, Western Energy will be required to obtain an operating permit.

III. BACT Determination

A BACT determination is required for each new or altered source. Western Energy shall install on the new or altered source the maximum air pollution control capability that is technically practicable and economically feasible, except that Best Available Control Technology shall be utilized. There was no increase in emissions for the current permit modification and no sources were added or altered. Therefore, a BACT determination was not required.

IV. Emission Inventory

Table 1. Particulate Matter (PM) Emissions[1]

Emission Source	Emission Factor	Units	Control Measure	%Control	Controlled PM (ton/year)
Top Soil Removal	0.38	lb/yd^3	None	0	119.1
Overburden Drilling	1.5	lb/hole	None	0	7.4
Overburden Blasting	37.5	lb/blast	None	0	2.1
Overburden Removal	0.03	lb/yd^3	Minimize Fall Distance	0	883.6
Haul Roads	8	lb/vmt	Chemical Stabilization	85	180.3
Access Roads	3	lb/vmt	Chemical Stabilization	85	182.8
Wind Erosion	0.38	ton/acre-yr	Prompt Revegetation	0	266.0
Coal Drilling	0.22	lb/hole	None	0	3.2
Coal Blasting	26.25	lb/blast	None	0	4.3
Coal Removal	0.0021	lb/ton	Minimize Fall Distance	0	13.7
Coal Dumping	0.01275	lb/ton	Partial Enclosure	90	8.3
Coal Crushing	0.08	lb/ton	Enclosure	95	26.0
Conveyors	0.2	lb/ton	Partial Enclosure	90	130.0
Vehicle Exhaust – Diesel	30.1	lb/1000 gal	None	0	36.2
Vehicle Exhaust – Gas	6.06	lb/1000 gal	None	0	0.4
Total PM – Fugitive & Process					1,863.4

[1] Based on the annual coal production limit for the combined areas of 13,000,000 ton/year.

Table 2. Gaseous Emissions

Pollutant	Ton/Year - controlled
Oxides of Nitrogen	445
Sulfur Dioxide	48
Carbon Monoxide	793
Volatile Organic Compounds	37
The values shown are the total emissions from vehicle exhaust (diesel and gasoline) and explosives detonation. Emission factors and process rates are available from the Department.	

V. Existing Air Quality

Prior to this permitting action, the Department reviewed Western Energy's request, dated April 27, 2001, to terminate the ambient PM-10 monitoring program. The review followed the Department's October 1998 Monitoring Requirements Guidance Statement. The review analyzed the PM-10 data collected at 7 sites at Western Energy's operations since the changeover from TSP samplers in 1992 through 2000. During the 1992-2000 period, the annual means at all sites were less than 28% of the annual standard (50 μg/m^3). For the 24-hour concentrations, all of the annual, maximum 24-hour values were less than 53% of the 24-hour standard (150 μg/m^3). The data from Western Energy's air monitoring network indicates relatively low concentrations of PM-10 in the ambient air around their coal mining operation.

VI. Air Quality Impact Analysis

As discussed in Section V, the data from Western Energy's air monitoring network indicates relatively low concentrations of PM-10 in the ambient air around their coal mining operation. There was no increase in emissions for the current permit modification; therefore, modeling is not required for the current permitting action.

VII. Taking or Damaging Implication Analysis

As required by 2-10-101 through 105, MCA, the Department conducted a private property taking and damaging assessment and determined that there are no taking or damaging implications.

VIII. Environmental Assessment

An environmental assessment, required by the Montana Environmental Policy Act, is not required for the current permit modification because it is an administrative action.

Permit Analysis Prepared by: Robert K. Jeffrey
Date: October 2, 2001

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APPENDIX D-3 COUNTY LEVEL MONITORING DATA

Table D-3-1. Ambient criteria air pollutant monitoring sites within the air quality analysis area

Site ID	State	County	Lat.	Long.	Active Years	CO	NO_2	O_3	$PM_{2.5}$	PM_{10}	SO_2
30-027-0006	MT	Fergus	47.0485	-109.4553	12 - 16		X	X	X	X	
30-027-9000	MT	Fergus	47.5822	-108.7204	00 - 15						
30-031-0008	MT	Gallatin	45.7727	-111.1783	00 - 11				X		
30-031-0016	MT	Gallatin	44.6614	-111.1059	07 - 11				X		
30-031-0017	MT	Gallatin	44.6570	-111.0896	08 - 15	X					
30-031-0018	MT	Gallatin	45.7937	-111.1649	08 - 11				X		
30-049-9000	MT	Lewis and Clark	46.8261	-111.7116	00 - 15						
30-071-0010	MT	Phillips	48.3175	-107.8625	12 - 16		X	X	X	X	
30-075-0001	MT	Powder River	45.4403	-105.3703	10 - 16		X	X	X	X	
30-083-0001	MT	Richland	47.8034	-104.4856	08 - 16			X	X	X	X
30-085-9000	MT	Roosevelt	48.3079	-105.1029	02 - 15						
30-087-0001	MT	Rosebud	45.3662	-106.4898	10 - 16		X	X	X	X	
30-087-0307	MT	Rosebud	45.6233	-106.6686	97 - 16					X	
30-087-0760	MT	Rosebud	45.6681	-106.5195	81 - 15		X				X
30-087-0761	MT	Rosebud	45.6031	-106.4647	81 - 15		X				X
30-087-0762	MT	Rosebud	45.6483	-106.5572	02 - 15		X				X
30-091-9000	MT	Sheridan	48.4871	-104.4763	99 - 15						
30-111-0066	MT	Yellowstone	45.7866	-108.4588	81 - 16						X
30-111-0085	MT	Yellowstone	45.7804	-108.5115	04 - 11				X		
38-007-0002	ND	Billings	46.8943	-103.3785	99 - 15			X	X		X
38-013-0004	ND	Burke	48.6419	-102.4018	99 - 15		X	X	X	X	X
38-025-0003	ND	Dunn	47.3132	-102.5273	79 - 16		X	X	X	X	X
38-053-0002	ND	McKenzie	47.5812	-103.2995	01 - 16		X	X	X	X	X
38-053-0104	ND	McKenzie	47.5753	-103.9694	81 - 16						X
38-053-0111	ND	McKenzie	47.6056	-104.0177	98 - 16						X
38-105-0003	ND	Williams	48.1528	-103.6395	13 - 16			X	X	X	

Table D-3-1. Ambient criteria air pollutant monitoring sites within the air quality analysis area

Site ID	State	County	Lat.	Long.	Active Years	CO	NO_2	O_3	$PM_{2.5}$	PM_{10}	SO_2
38-105-0103	ND	Williams	48.4089	-102.9081	87 - 16						X
38-105-0105	ND	Williams	48.3927	-102.9107	87 - 16						X
46-033-0132	SD	Custer	43.5576	-103.4839	00 - 15			X	X	X	
46-071-0001	SD	Jackson	43.7456	-101.9412	88 - 15		X	X	X	X	X
46-093-0001	SD	Meade	44.1556	-103.3158	07 - 16			X		X	
46-103-0013	SD	Pennington	44.0835	-103.2696	92 - 13					X	
46-103-0020	SD	Pennington	44.0874	-103.2738	11 - 16		X		X	X	X
46-103-1001	SD	Pennington	44.0784	-103.2282	86 - 16				X	X	
56-003-0002	WY	Big Horn	44.2800	-108.0411	10 - 16			X			
56-003-0003	WY	Big Horn	44.8357	-108.3860	14 - 15		X	X	X	X	
56-005-0011	WY	Campbell	43.8403	-105.3596	12 - 15		X				
56-005-0084	WY	Campbell	43.6389	-105.3698	11 - 16					X	
56-005-0086	WY	Campbell	43.5718	-105.1540	11 - 16					X	
56-005-0087	WY	Campbell	43.6175	-105.1923	11 - 16					X	
56-005-0099	WY	Campbell	43.7578	-105.4914	10 - 16					X	
56-005-0123	WY	Campbell	44.6522	-105.2903	02 - 15		X	X			
56-005-0303	WY	Campbell	43.9010	-105.2505	12 - 16					X	
56-005-0456	WY	Campbell	44.1470	-105.5300	03 - 16		X	X		X	
56-005-0800	WY	Campbell	44.2658	-105.5042	11 - 12				X		
56-005-0802	WY	Campbell	44.1355	-105.4246	01 - 16					X	
56-005-0808	WY	Campbell	44.3944	-105.5304	02 - 16					X	
56-005-0826	WY	Campbell	44.4232	-105.4725	04 - 16					X	
56-005-0841	WY	Campbell	43.9872	-105.3037	08 - 16					X	
56-005-0857	WY	Campbell	44.2772	-105.3756	04 - 12						X
56-005-0869	WY	Campbell	43.5311	-105.2209	02 - 16					X	
56-005-0875	WY	Campbell	43.7022	-105.1992	01 - 16					X	
56-005-0884	WY	Campbell	44.4506	-105.5733	00 - 16					X	
56-005-0885	WY	Campbell	44.0322	-105.3212	91 - 16					X	

Table D-3-1. Ambient criteria air pollutant monitoring sites within the air quality analysis area

Site ID	State	County	Lat.	Long.	Active Years	CO	NO_2	O_3	$PM_{2.5}$	PM_{10}	SO_2
56-005-0886	WY	Campbell	44.1129	-105.3109	02 - 16					X	
56-005-0891	WY	Campbell	43.6483	-105.2133	02 - 16				X	X	
56-005-0892	WY	Campbell	44.0971	-105.3432	03 - 16		X		X	X	
56-005-0893	WY	Campbell	44.0702	-105.4699	08 - 16					X	
56-005-0895	WY	Campbell	44.4001	-105.4512	04 - 16					X	
56-005-0897	WY	Campbell	44.3155	-105.4386	12 - 16					X	
56-005-0898	WY	Campbell	44.1412	-105.4598	13 - 16					X	
56-005-0907	WY	Campbell	43.6233	-105.2133	01 - 13					X	
56-005-0908	WY	Campbell	44.1524	-105.3238	02 - 16					X	
56-005-1002	WY	Campbell	44.2880	-105.5170	10 - 16					X	
56-005-1003	WY	Campbell	44.0184	-105.4048	11 - 16					X	
56-005-1009	WY	Campbell	43.9571	-105.3482	11 - 16					X	
56-005-1877	WY	Campbell	43.6696	-105.2167	08 - 16					X	
56-005-1879	WY	Campbell	44.3781	-105.4214	08 - 16					X	
56-005-1899	WY	Campbell	44.5027	-105.5398	08 - 16				X	X	
56-005-1900	WY	Campbell	43.6142	-105.3868	08 - 16					X	
56-005-1906	WY	Campbell	44.4077	-105.5658	10 - 16					X	
56-005-1915	WY	Campbell	43.7140	-105.3913	08 - 16					X	
56-005-1917	WY	Campbell	43.7556	-105.2706	08 - 16					X	
56-005-2900	WY	Campbell	44.3376	-105.4940	08 - 16					X	
56-005-2901	WY	Campbell	44.3904	-105.5453	13 - 16					X	
56-005-5555	WY	Campbell	44.3437	-105.4033	12 - 16					X	
56-005-6666	WY	Campbell	44.2956	-105.3354	12 - 16					X	
56-009-0008	WY	Converse	42.7964	-105.3618	13 - 16		X	X			
56-009-0009	WY	Converse	43.4254	-105.3886	15 - 16		X		X	X	
56-009-0010	WY	Converse	43.1013	-105.4989	15 - 16		X	X		X	
56-009-0088	WY	Converse	43.4795	-105.2232	09 - 16					X	
56-009-0819	WY	Converse	43.4266	-105.3865	03 - 11				X	X	

Table D-3-1. Ambient criteria air pollutant monitoring sites within the air quality analysis area

Site ID	State	County	Lat.	Long.	Active Years	CO	NO_2	O_3	$PM_{2.5}$	PM_{10}	SO_2
56-009-0850	WY	Converse	43.4610	-105.3313	01 - 16					X	
56-009-0851	WY	Converse	43.4747	-105.3103	97 - 16					X	
56-009-0881	WY	Converse	43.4463	-105.3357	97 - 16					X	
56-013-0099	WY	Fremont	42.5300	-108.7200	07 - 16		X	X	X	X	
56-013-0232	WY	Fremont	43.0817	-107.5494	09 - 16		X	X	X	X	
56-013-0900	WY	Fremont	43.2586	-108.5789	11 - 12				X		
56-013-1003	WY	Fremont	42.8410	-108.7363	87 - 16				X	X	
56-013-6001	WY	Fremont	42.9944	-108.3703	13 - 15	X	X	X			X
56-025-0001	WY	Natrona	42.8511	-106.3251	10 - 16				X	X	
56-025-0100	WY	Natrona	42.8223	-106.3650	13 - 16		X	X			
56-025-2601	WY	Natrona	42.8608	-106.2359	11 - 16		X	X			X
56-029-0001	WY	Park	44.5324	-109.0730	10 - 16				X	X	
56-033-0002	WY	Sheridan	44.8151	-106.9559	85 - 16				X	X	
56-033-0003	WY	Sheridan	44.8055	-106.9762	05 - 12				X		
56-033-1003	WY	Sheridan	44.7955	-106.9586	12 - 16				X	X	
56-035-0097	WY	Sublette	42.9800	-110.3530	11 - 13			X	X	X	
56-035-0099	WY	Sublette	42.7190	-109.7530	05 - 16		X	X		X	
56-035-0100	WY	Sublette	42.7907	-110.0551	05 - 16		X	X		X	
56-035-0101	WY	Sublette	42.8698	-109.8708	09 - 16		X	X	X		
56-035-0700	WY	Sublette	42.4864	-110.0989	11 - 16		X	X	X	X	
56-035-0705	WY	Sublette	42.8705	-109.8610	05 - 12				X		
56-035-9991	WY	Sublette	42.9288	-109.7880	11 - 16			X			
56-039-0008	WY	Teton	43.6708	-110.5995	11 - 16			X			
56-039-1006	WY	Teton	43.4781	-110.7612	07 - 16				X	X	
56-039-1011	WY	Teton	44.5654	-110.4003	96 - 16			X			
56-039-1012	WY	Teton	44.4578	-110.8292	02 - 12	X					
56-039-1013	WY	Teton	44.3731	-110.8308	12 - 16	X					
56-045-0003	WY	Weston	43.8731	-104.1919	12 - 16			X			

Table D-3-1. Ambient criteria air pollutant monitoring sites within the air quality analysis area

Site ID	State	County	Lat.	Long.	Active Years	CO	NO_2	O_3	$PM_{2.5}$	PM_{10}	SO_2
56-045-0004	WY	Weston	43.8499	-104.2043	15 - 16			X	X	X	X
56-045-0800	WY	Weston	43.8454	-104.2051	05 - 16						X

Source: EPAEPA AQS 2016
[a] Only valid data that meets completeness requirements are shown.
Lat. = latitude; Long. = longitude.

Table D-3-2. CO Design Values by County for 2011-2015 [a]

State	County	Site ID	8-hour Design Value (ppm)					8-hour DV Meets NAAQS?	1-hour Design Value (ppm)					1-hour DV Meets NAAQS?
			2011	2012	2013	2014	2015		2011	2012	2013	2014	2015	
Montana	Gallatin	30-031-0017	—	—	—	—	0.6	Yes	—	—	—	—	1.2	Yes
Wyoming	Teton	56-039-1013	—	0.7	0.7	0.5	0.4	Yes	—	1.4	1.9	1	0.8	Yes

Source: EPA AQS 2016
[a] Only valid data that meets completeness requirements are shown.
ppm = parts per million
$\mu g/m^3$ = micrograms per cubic meter.

Table D-3-3. NO_2 Annual Monitoring Data and Design Values by County for 2011-2015 [a]

State	County	Site ID	98th Percentile of 1-hour daily maximum NO_2 (ppb)					2015 Valid 1-hour DV (ppb)	1-hour DV Meets NAAQS?	Annual Mean DV (ppb)					Annual DV Meets NAAQS?
			'11	'12	'13	'14	'15			'11	'12	'13	'14	'15	
Montana	Fergus	30-027-0006	—	16	14	13	12	—	—	—	—	1	1	1	Yes
Montana	Phillips	30-071-0010	—	9	6	8	6	—	—	—	—	—	1	1	Yes
Montana	Powder River	30-075-0001	15	10	9	11	9	—	—	—	—	1	—	1	Yes
Montana	Rosebud	30-087-0761	39	48	50	—	—	—	—	3	1	2	—	—	—
North Dakota	Burke	38-013-0004	14	15	13	14	11	—	—	2	2	2	2	2	Yes
North Dakota	Dunn	38-025-0003	8	13	10	11	12	11	Yes	1	2	2	2	2	Yes
North Dakota	McKenzie	38-053-0002	10	9	11	14	12	—	—	1	1	1	2	2	Yes
South Dakota	Jackson	46-071-0001	4	7	6	3	3	4	Yes	1	1	1	1	1	Yes
South Dakota	Pennington	46-103-0020	47	42	39	34	37	37	Yes	8	8	7	7	7	Yes
Wyoming	Big Horn	56-003-0003	—	—	—	32	24	—	—	—	—	—	—	—	—
Wyoming	Campbell	56-005-0011	—	46	52	55	41	49	Yes	—	—	9	10	7	Yes
Wyoming	Fremont	56-013-0099	4	5	5	4	5	5	Yes	1	1	1	1	1	Yes
Wyoming	Natrona	56-025-0100	—	—	34	38	42	—	—	—	—	3	4	5	Yes
Wyoming	Sublette	56-035-0101	31	26	17	21	20	19	Yes	3	3	1	1	1	Yes

Source: EPA AQS 2016
[a] Only valid data that meets completeness requirements are shown.
ppb = parts per billion.

Table D-3-4. O_3 Annual Monitoring Data and Design Values by County for 2011-2015 [a]

State	County	Site ID	4th highest daily maximum 8-hour concentration (ppm)					2015 DV (ppm)	DV Meets NAAQS?
			2011	2012	2013	2014	2015		
Montana	Fergus	30-027-0006	—	0.036	0.054	0.056	0.056	0.055	Yes
Montana	Phillips	30-071-0010	—	0.054	0.053	0.052	0.061	—	—
Montana	Powder River	30-075-0001	0.054	0.056	0.056	0.053	0.057	—	—
Montana	Richland	30-083-0001	—	—	0.056	0.051	0.058	0.055	Yes
Montana	Rosebud	30-087-0001	0.052	0.059	0.056	0.055	0.056	0.055	Yes
North Dakota	Billings	38-007-0002	0.057	0.057	0.057	0.055	0.064	0.058	Yes
North Dakota	Burke	38-013-0004	0.06	0.056	0.059	0.058	0.065	0.06	Yes
North Dakota	Dunn	38-025-0003	0.054	0.057	0.057	0.057	0.063	0.059	Yes
North Dakota	McKenzie	38-053-0002	0.059	0.057	0.059	0.056	0.061	0.058	Yes
North Dakota	Williams	38-105-0003	—	—	0.059	0.056	0.059	0.058	Yes
South Dakota	Custer	46-033-0132	0.06	0.069	0.061	0.057	0.059	0.059	Yes
South Dakota	Jackson	46-071-0001	0.052	0.064	0.062	0.057	0.057	0.058	Yes
South Dakota	Meade	46-093-0001	0.057	0.068	0.063	0.056	0.059	0.059	Yes
Wyoming	Big Horn	56-003-0002	—	0.039	0.064	0.056	0.059	0.059	Yes
Wyoming	Big Horn	56-003-0003	—	—	—	0.049	0.056	—	—
Wyoming	Campbell	56-005-0456	0.062	0.069	0.061	0.059	0.062	0.060	Yes
Wyoming	Converse	56-009-0008	—	—	0.057	0.058	0.06	—	—
Wyoming	Fremont	56-013-0099	0.068	0.067	0.062	0.065	0.062	0.063	Yes
Wyoming	Natrona	56-025-0100	—	—	0.065	0.061	0.06	0.062	Yes
Wyoming	Sublette	56-035-0100	0.075	0.067	0.063	0.062	0.062	0.062	Yes
Wyoming	Teton	56-039-1011	0.066	0.067	0.063	0.06	0.062	0.061	Yes
Wyoming	Weston	56-045-0003	—	0.044	0.067	0.059	0.061	0.062	Yes

Source: EPA AQS 2016
[a] Only valid data that meets completeness requirements are shown.
ppm = parts per million.

Table D-3-5. PM_{10} Annual Monitoring Data and Design Values by County for 2011-2015 [a]

State	County	Site ID	Estimated Number of Exceedances					2015 DV (average estimated exceedances 2013 – 2015)	DV Meets NAAQS?
			2011	2012	2013	2014	2015		
Montana	Fergus	30-027-0006	—	0	0	0	0	0	Yes
Montana	Phillips	30-071-0010	—	0	0	0	1	—	—
Montana	Powder River	30-075-0001	0	0	0	0	1	—	—
Montana	Richland	30-083-0001	0	0	2	0	0	0.7	Yes
Montana	Rosebud	30-087-0001	0	0	0	0	0	—	—
North Dakota	Burke	38-013-0004	0	0	0	0	0	0	Yes
North Dakota	Dunn	38-025-0003	0	0	0	0	0	0	Yes
North Dakota	McKenzie	38-053-0002	0	0	0	0	0	—	—
North Dakota	Williams	38-105-0003	—	—	0	0	0	—	—
South Dakota	Custer	46-033-0132	0	0	0	0	0	0	Yes
South Dakota	Jackson	46-071-0001	0	0	0	0	0	0	Yes
South Dakota	Meade	46-093-0001	0	0	0	0	0	0	Yes
South Dakota	Pennington	46-103-0020	0	0	0	0	1	0.3	Yes
Wyoming	Big Horn	56-003-0003	—	—	—	0	0	—	—
Wyoming	Campbell	56-005-0826	0	0	0	0	1	0.3	Yes
Wyoming	Converse	56-009-0088	0	0	0	0	2.1	0.7	Yes
Wyoming	Fremont	56-013-0232	0	0	0	0	0	0	Yes
Wyoming	Natrona	56-025-0001	0	0	0	0	0	0	Yes
Wyoming	Park	56-029-0001	0	0	0	0	0	—	—
Wyoming	Sheridan	56-033-0002	0	0	0	0	0	0	Yes
Wyoming	Sublette	56-035-0100	0	0	0	0	0	0	Yes
Wyoming	Teton	56-039-1006	0	0	0	0	0	0	Yes
Wyoming	Weston	56-045-0004	—	—	—	—	0	—	—

Source: EPAEPA AQS 2016

[a] Only valid data that meets completeness requirements are shown.

Table D-3-6. $PM_{2.5}$ Annual Monitoring Data and Design Values by County for 2011-2015 [a]

State	County	Site ID	98th Percentile of 24-hour $PM_{2.5}$ ($\mu g/m^3$)					2015 24-hour DV ($\mu g/m^3$)	24-hr DV Meets NAAQS?	Annual Mean ($\mu g/m^3$)					2015 Annual DV ($\mu g/m^3$)	Annual DV Meets NAAQS?
			'11	'12	'13	'14	'15			'11	'12	'13	'14	'15		
MT	Fergus	30-027-0006	—	10.0	10.5	15.8	40.1	22	Yes	—	2.6	3.6	4.3	5.7	4.5	Yes
MT	Gallatin	30-031-0008	30.8	—	—	—	—	—	—	6.2	—	—	—	—	—	—
MT	Phillips	30-071-0010	—	8.2	9.2	16.2	38.6	21	Yes	—	3.3	3.6	4.4	6.7	4.9	Yes
MT	Powder River	30-075-0001	21.4	24.3	15.3	20.3	31.4	22	Yes	6.5	8.5	5.0	6.0	7.4	6.2	Yes
MT	Richland	30-083-0001	14.7	19.3	17.3	19.1	35.4	24	Yes	7.3	8.3	7.1	6.9	7.1	7	Yes
MT	Rosebud	30-087-0001	17.3	28.9	10.9	19.4	26.4	19	Yes	4.5	7.9	4.0	5.5	6.8	5.4	Yes
MT	Yellowstone	30-111-0085	—	—	—	—	20.1	—	—	—	—	—	—	7.8	—	—
ND	Billings	38-007-0002	9.8	11.7	11.7	8.3	29.5	17	Yes	4.1	4.4	4.7	4.5	5.5	4.9	Yes
ND	Burke	38-013-0004	13.7	15.7	14.9	13.6	43.9	24	Yes	7.4	7.2	5.7	4.0	6.9	5.5	Yes
ND	Dunn	38-025-0003	13.9	16.6	13.2	12.6	37.1	21	Yes	6.4	5.8	4.3	4.3	6.6	5.1	Yes
ND	McKenzie	38-053-0002	17	17.4	11.4	11.1	31.7	18	Yes	8.8	7.0	3.6	2.9	3.7	3.4	Yes
ND	Williams	38-105-0003	—	—	22.2	16.6	35.8	25	Yes	—	—	9.6	6.2	5.0	6.9	Yes
SD	Custer	46-033-0132	11.5	14.9	9.4	7.1	21.3	13	Yes	3.7	4.9	3.1	2.4	4.1	3.2	Yes
SD	Jackson	46-071-0001	10	12.9	13.9	11.4	23.3	16	Yes	3.4	4.1	5.3	4.3	4.4	4.7	Yes
SD	Pennington	46-103-0020	13.1	17.1	15.3	15	30.4	20	Yes	4.5	6.3	7.9	6.1	9.5	7.8	Yes
WY	Big Horn	56-003-0003	—	—	—	18.2	14.5	—	—	—	—	—	7.2	8.6	—	—
WY	Campbell	56-005-1899	15.5	17.9	13.7	12.2	21	16	Yes	4.8	5.9	4.8	5.5	2.2	4.2	Yes
WY	Converse	56-009-0009	—	—	—	—	18.5	—	—	—	—	—	—	4.2	—	—

Table D-3-6. $PM_{2.5}$ Annual Monitoring Data and Design Values by County for 2011-2015 [a]

State	County	Site ID	98th Percentile of 24-hour $PM_{2.5}$ ($\mu g/m^3$)					2015 24-hour DV ($\mu g/m^3$)	24-hr DV Meets NAAQS?	Annual Mean ($\mu g/m^3$)					2015 Annual DV ($\mu g/m^3$)	Annual DV Meets NAAQS?
			'11	'12	'13	'14	'15			'11	'12	'13	'14	'15		
WY	Converse	56-009-0819	10.9	26.5	8	—	—	—	—	3.6	8.0	2.8	—	—	—	—
WY	Fremont	56-013-1003	30.3	24.8	28.5	26.3	20.1	25	Yes	7.8	7.8	7.8	6.7	6.2	6.9	Yes
WY	Natrona	56-025-0001	12.7	17.4	12.5	14.1	14.7	14	Yes	4.5	5.4	4.3	4.6	4.9	4.6	Yes
WY	Park	56-029-0001	11.5	16.4	14.7	9.8	19.4	15	Yes	4.4	5.1	4.3	3.7	4.2	4.1	Yes
WY	Sheridan	56-033-0002	23	18.9	16.7	20	35.8	24	Yes	7.7	8.3	6.7	6.5	7.5	6.9	Yes
WY	Sublette	56-035-0101	—	27.1	12.5	12.1	14.3	13	Yes	—	7.5	4.8	5.4	5.0	5	Yes
WY	Teton	56-039-1006	11.7	25.4	10.7	13.2	14.9	13	Yes	4.6	6.3	4.9	4.3	4.7	4.7	Yes
WY	Weston	56-045-0004	—	—	—	—	22.8	—	—	—	—	—	—	6.8	—	—

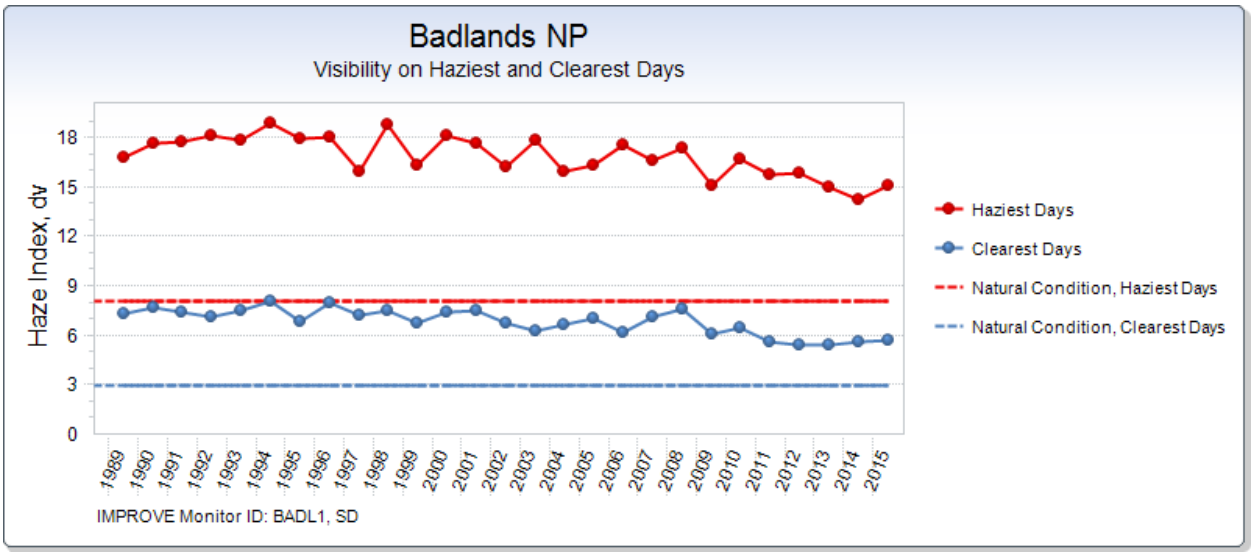
Source: EPAEPA AQS 2016
[a] Only valid data that meets completeness requirementsare shown.
$\mu g/m^3$ = micrograms per cubic meter.

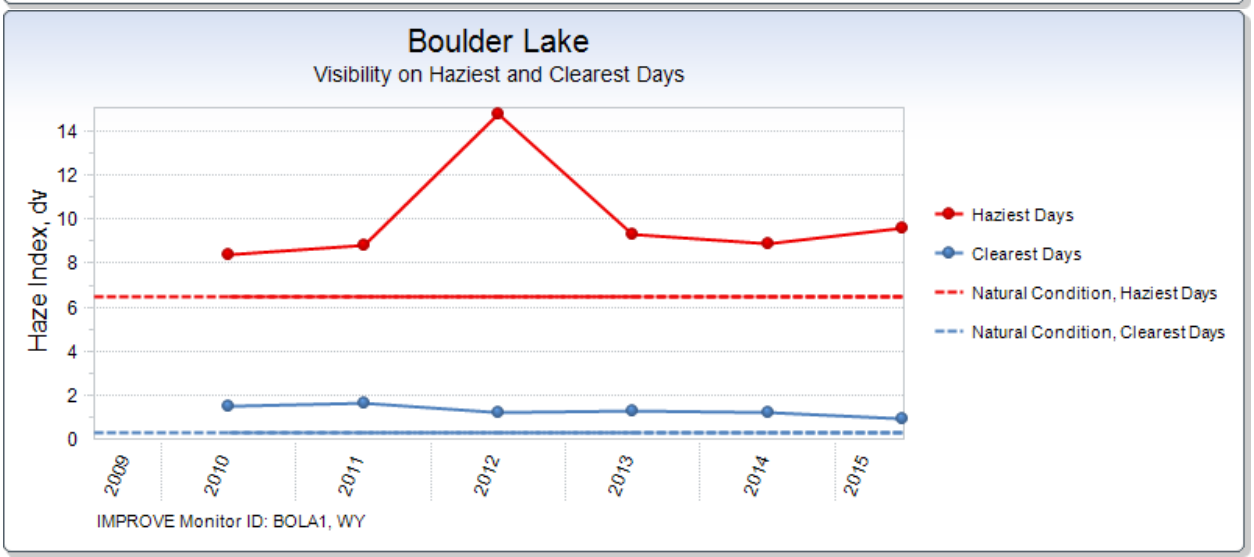
Table D-3-7. SO_2 Annual Monitoring Data and Design Values by County for 2011-2015 [a]

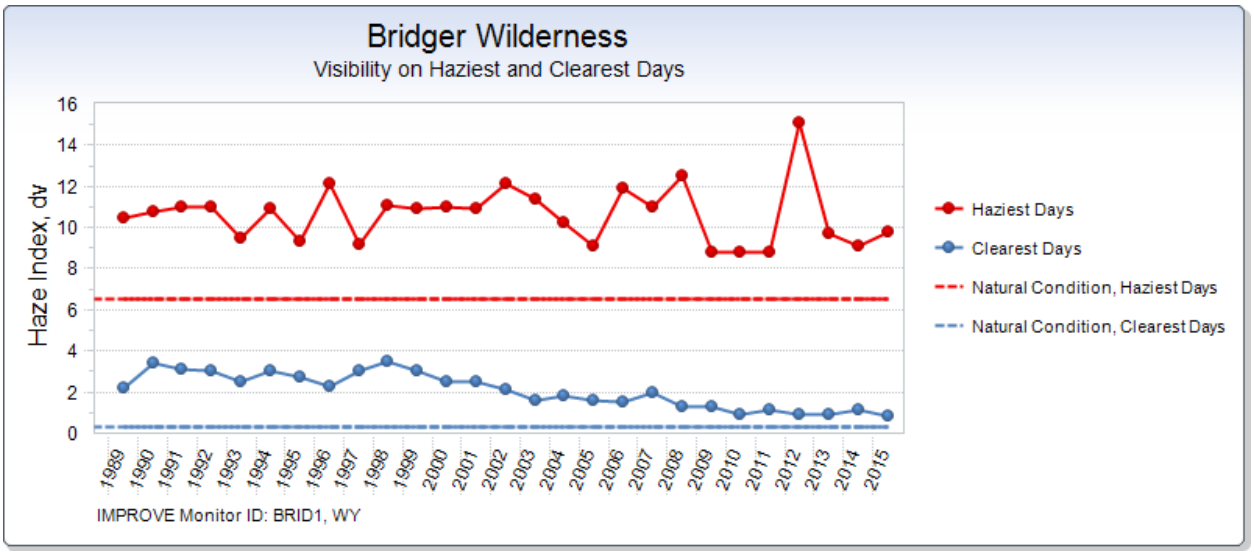
State	County	Site ID	99th Percentile of 1-hour daily maximum SO_2 (ppb)					2015 1-hour DV (ppb)	2015 DV meets NAAQS?
			2011	2012	2013	2014	2015		
Montana	Richland	30-083-0001	6	4	3	5	3	4	Yes
Montana	Yellowstone	30-111-0066	74	70	48	93	48	63	Yes
North Dakota	Billings	38-007-0002	5	6	4	4	5	5	Yes
North Dakota	Burke	38-013-0004	30	24	30	24	22	26	Yes
North Dakota	Dunn	38-025-0003	10	10	6	4	6	6	Yes
North Dakota	McKenzie	38-053-0104	6	6	12	6	7	8	Yes
North Dakota	Williams	38-105-0105	68	161	264	180	74	173	No
South Dakota	Jackson	46-071-0001	6	3	9	1	6	6	Yes
South Dakota	Pennington	46-103-0020	8	10	9	7	4	7	Yes
Wyoming	Campbell	56-005-0857	37	39	37	32	16	28	Yes
Wyoming	Fremont	56-013-6001	—	—	—	3	4	—	—
Wyoming	Natrona	56-025-2601	32	29	38	32	21	31	Yes
Wyoming	Weston	56-045-0800	9	20	6	2	4	4	Yes

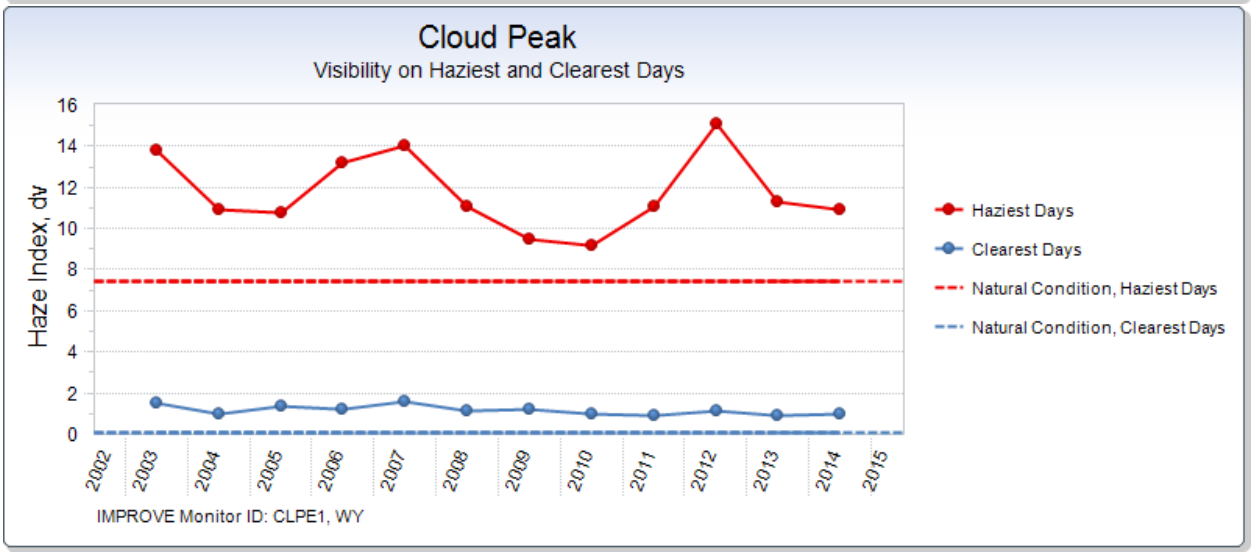
Source: EPA AQS 2016
[a] Only valid data that meets completeness requirements are shown.
ppb = parts per billion.

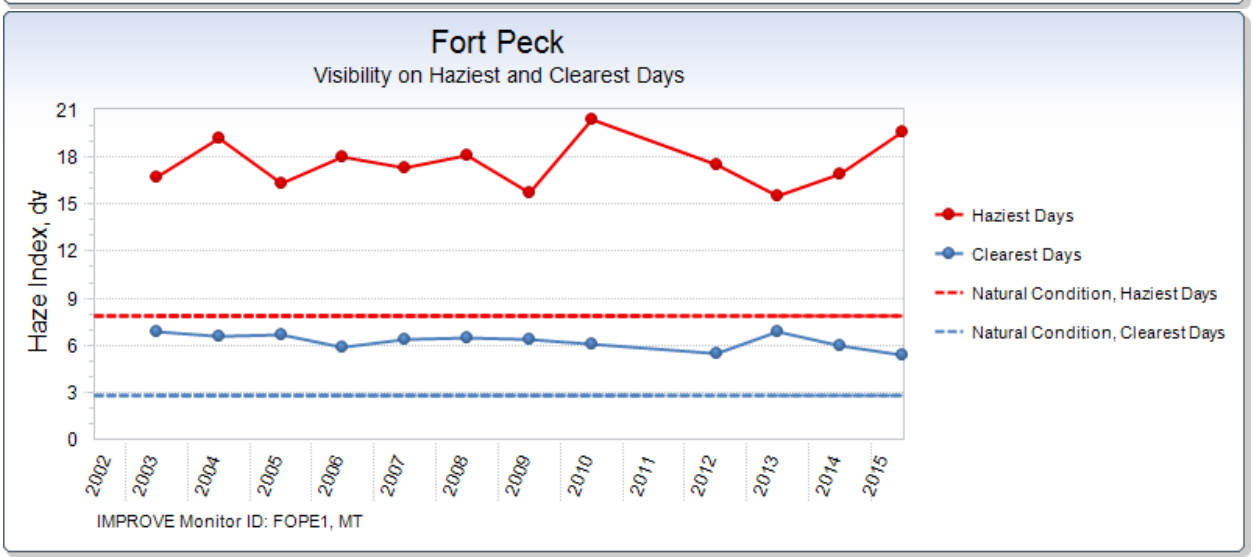
APPENDIX D-4. HISTORIC VISIBILITY TRENDS AT IMPROVE SITES

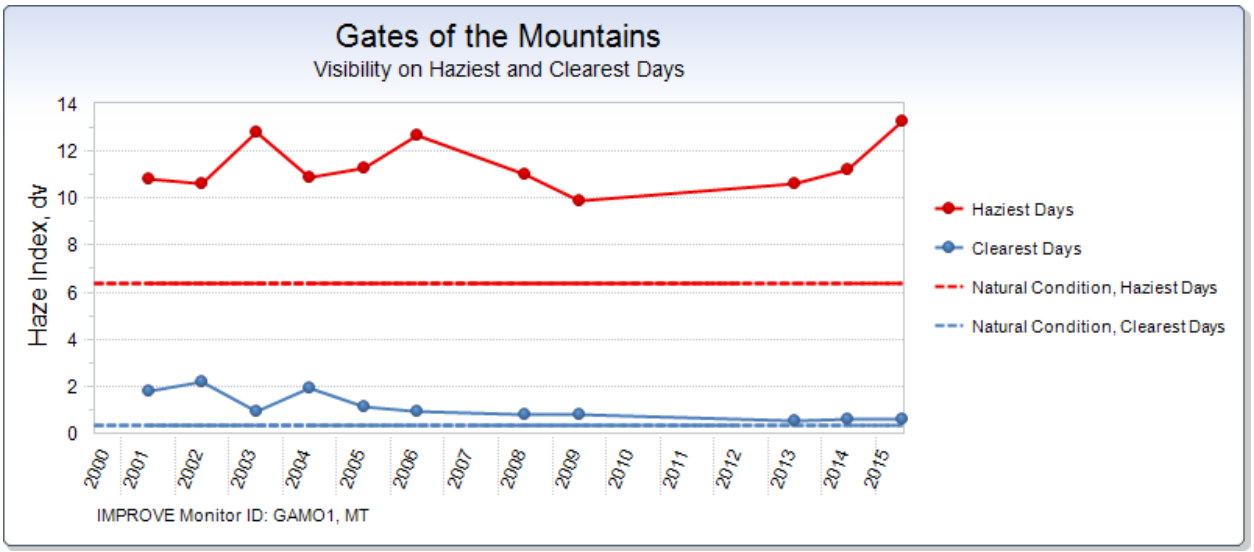


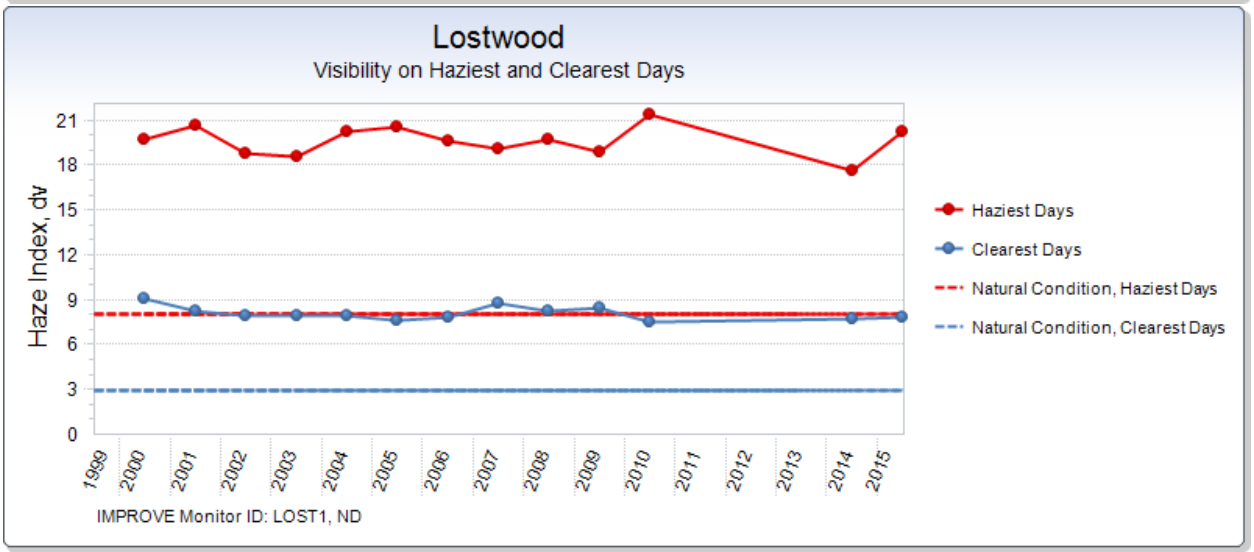


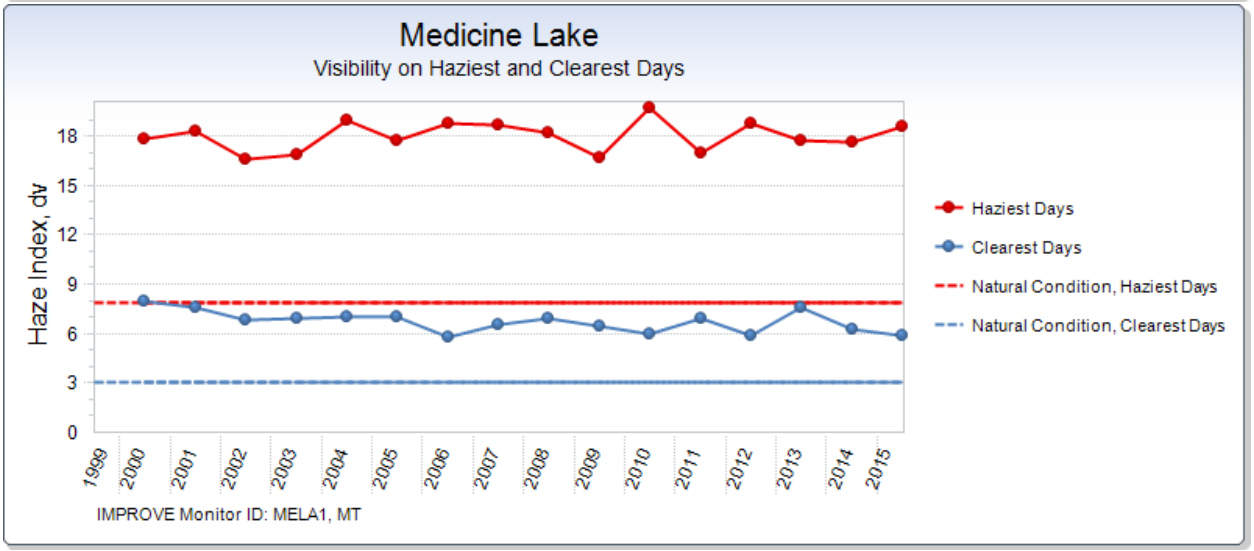

Bridger Wilderness
Visibility on Haziest and Clearest Days
Haze Index, dv
16
14
12
10
8
6
4
2
0
1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015
Haziest Days
Clearest Days
Natural Condition, Haziest Days
Natural Condition, Clearest Days
IMPROVE Monitor ID: BRID1, WY

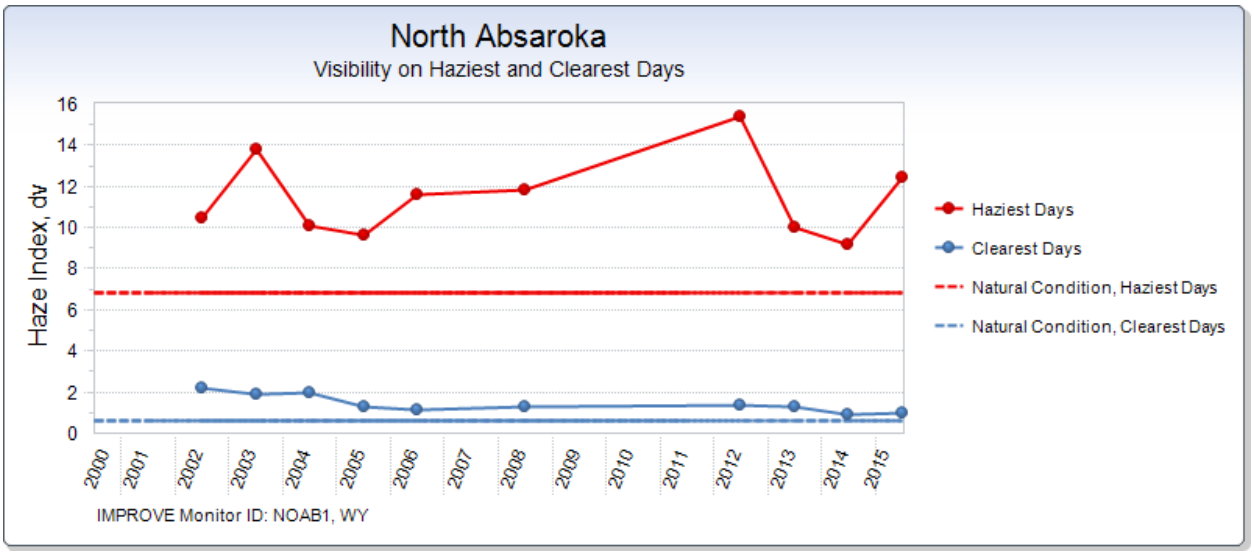

Cloud Peak
Visibility on Haziest and Clearest Days
Haze Index, dv
16
14
12
10
8
6
4
2
0
2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015
Haziest Days
Clearest Days
Natural Condition, Haziest Days
Natural Condition, Clearest Days
IMPROVE Monitor ID: CLPE1, WY

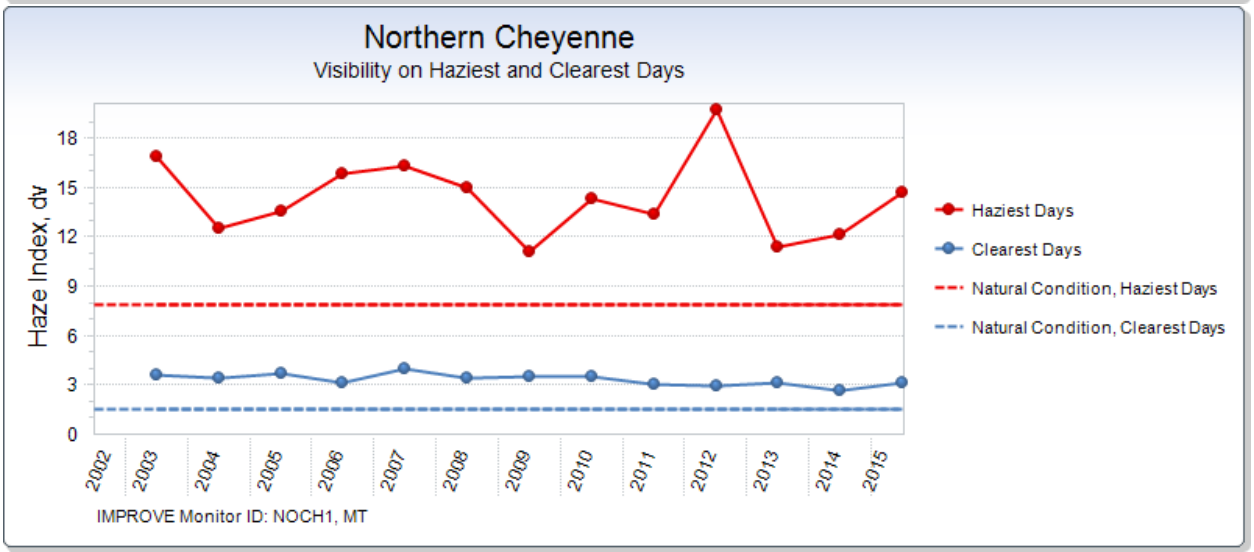

Fort Peck
Visibility on Haziest and Clearest Days
Haze Index, dv
21
18
15
12
9
6
3
0
2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015
Haziest Days
Clearest Days
Natural Condition, Haziest Days
Natural Condition, Clearest Days
IMPROVE Monitor ID: FOPE1, MT

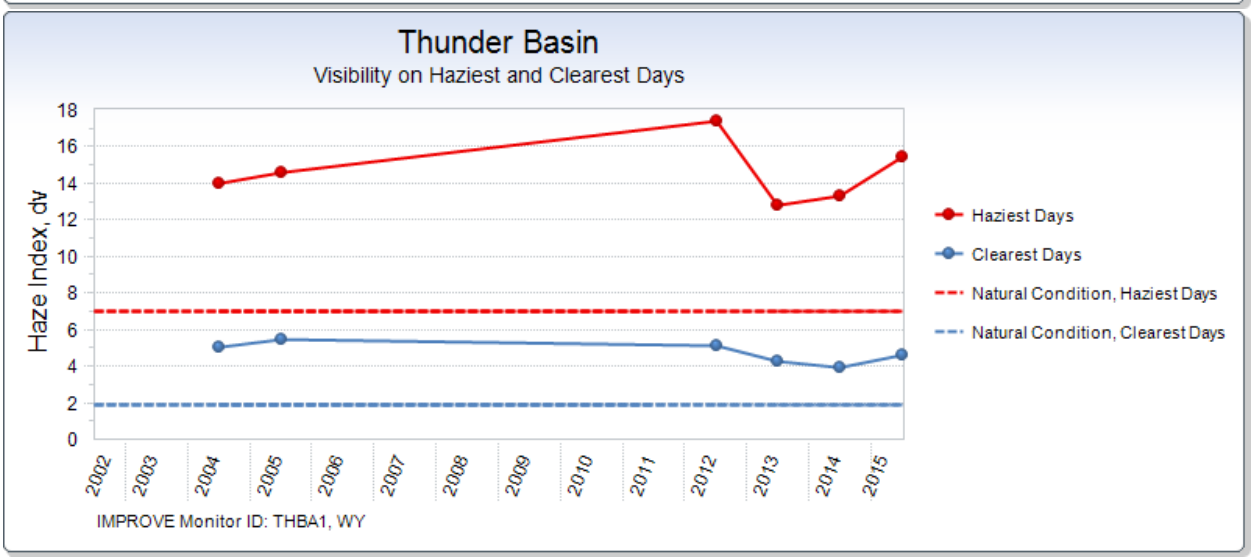

Gates of the Mountains
Visibility on Haziest and Clearest Days
Haze Index, dv
0
2
4
6
8
10
12
14
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Haziest Days
Clearest Days
Natural Condition, Haziest Days
Natural Condition, Clearest Days
IMPROVE Monitor ID: GAMO1, MT

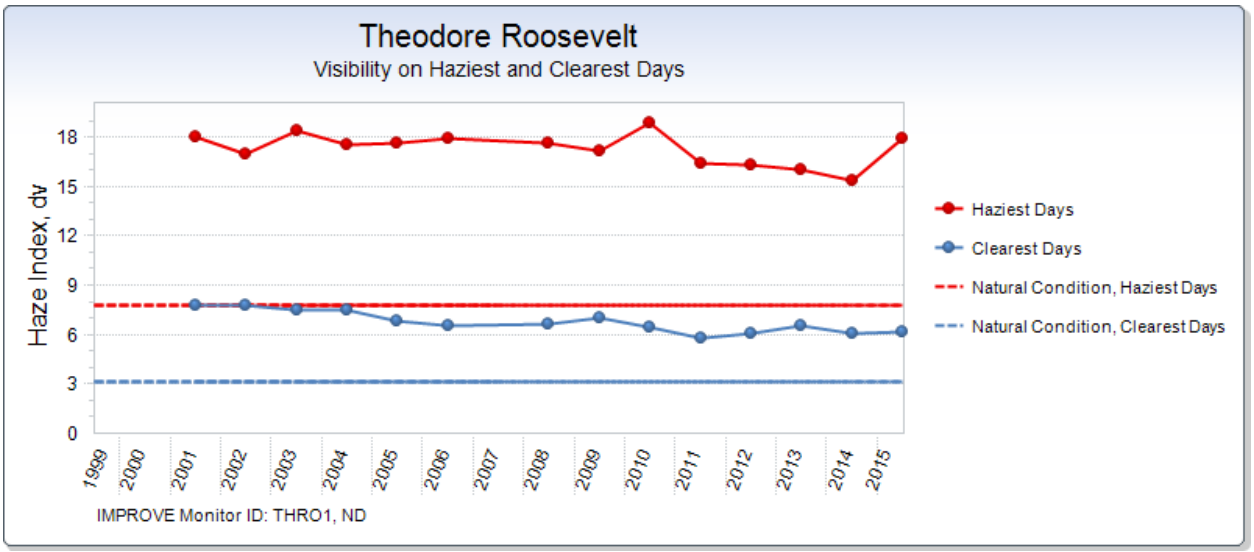

Lostwood
Visibility on Haziest and Clearest Days
Haze Index, dv
0
3
6
9
12
15
18
21
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Haziest Days
Clearest Days
Natural Condition, Haziest Days
Natural Condition, Clearest Days
IMPROVE Monitor ID: LOST1, ND

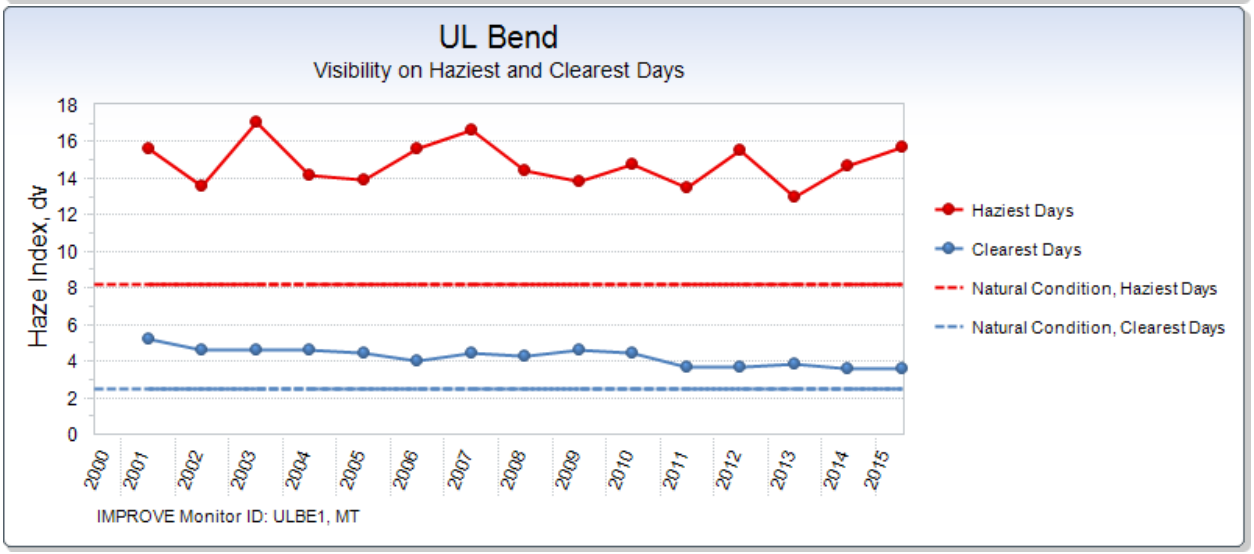

Medicine Lake
Visibility on Haziest and Clearest Days
Haze Index, dv
0
3
6
9
12
15
18
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Haziest Days
Clearest Days
Natural Condition, Haziest Days
Natural Condition, Clearest Days
IMPROVE Monitor ID: MELA1, MT


North Absaroka
Visibility on Haziest and Clearest Days
Haze Index, dv
0
2
4
6
8
10
12
14
16
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Haziest Days
Clearest Days
Natural Condition, Haziest Days
Natural Condition, Clearest Days
IMPROVE Monitor ID: NOAB1, WY


Northern Cheyenne
Visibility on Haziest and Clearest Days
Haze Index, dv
0
3
6
9
12
15
18
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Haziest Days
Clearest Days
Natural Condition, Haziest Days
Natural Condition, Clearest Days
IMPROVE Monitor ID: NOCH1, MT


Thunder Basin
Visibility on Haziest and Clearest Days
Haze Index, dv
0
2
4
6
8
10
12
14
16
18
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Haziest Days
Clearest Days
Natural Condition, Haziest Days
Natural Condition, Clearest Days
IMPROVE Monitor ID: THBA1, WY


Theodore Roosevelt
Visibility on Haziest and Clearest Days
Haze Index, dv
0
3
6
9
12
15
18
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Haziest Days
Clearest Days
Natural Condition, Haziest Days
Natural Condition, Clearest Days
IMPROVE Monitor ID: THRO1, ND


UL Bend
Visibility on Haziest and Clearest Days
Haze Index, dv
0
2
4
6
8
10
12
14
16
18
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Haziest Days
Clearest Days
Natural Condition, Haziest Days
Natural Condition, Clearest Days
IMPROVE Monitor ID: ULBE1, MT

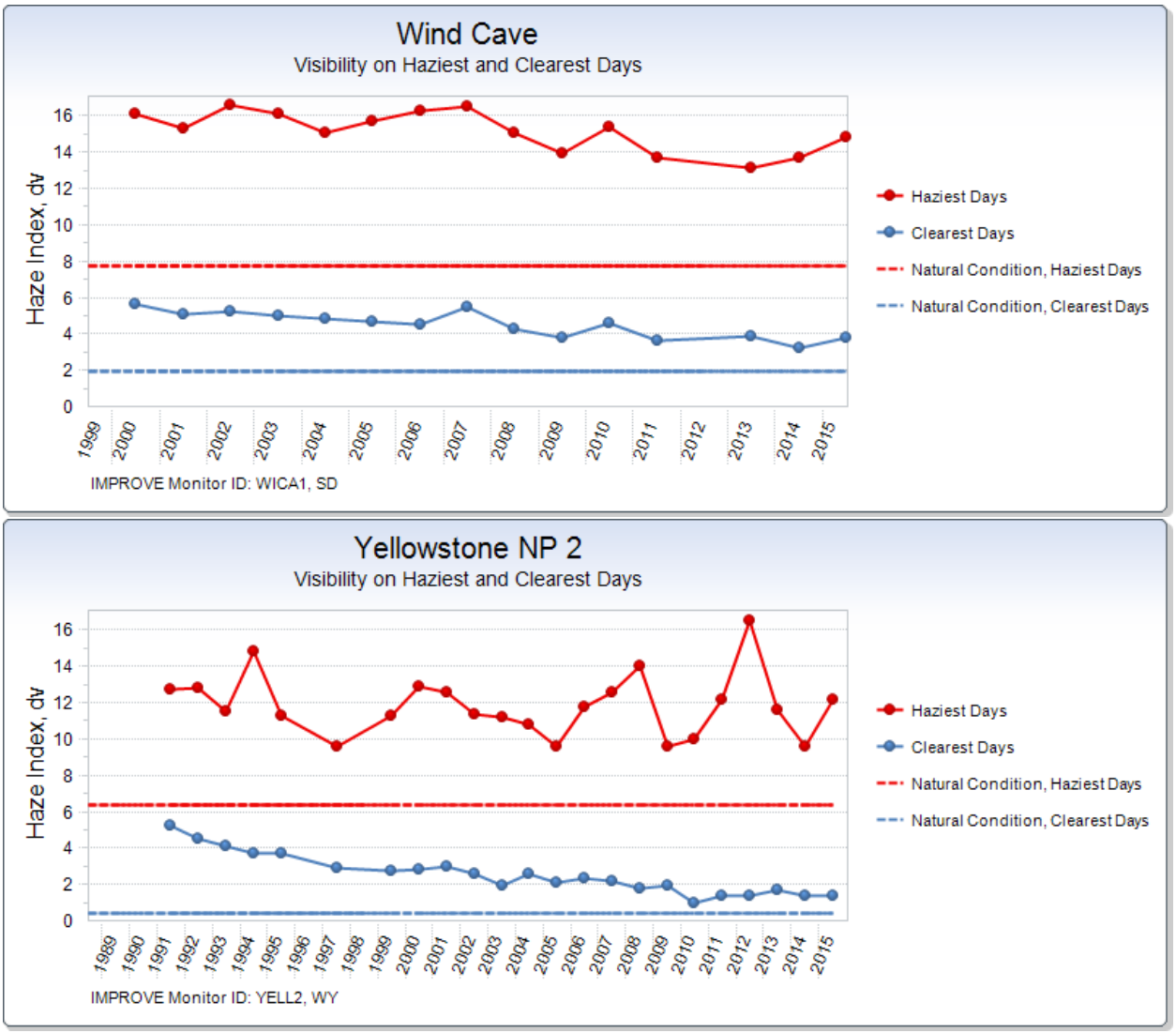


Figure D-4-1. Trends in visibility at several IMPROVE monitoring sites on the haziest and clearest days.

APPENDIX D-5. HISTORIC DEPOSITION TRENDS

Table D-5-1. Historic Deposition at National Trends Network Sites in the Cumulative and Indirect Effects Analysis Area for Air Quality [a,b]

Year	Precip. (cm)	Ca (kg/ha)	Mg (kg/ha)	K (kg/ha)	Na (kg/ha)	NH_4 (kg/ha)	NO_3 (kg/ha)	Inorg. N (kg/ha)	Cl (kg/ha)	SO_4 (kg/ha)	H^+ lab (kg/ha)	H^+ field (kg/ha)
Little Bighorn Battlefield National Monument (MT00)												
2000	27.61	0.60	0.069	0.052	0.105	0.70	2.20	1.04	0.15	1.52	0.01	0.03
2001	19.60	0.37	0.049	0.039	0.074	0.61	1.65	0.84	0.10	1.26	0.01	0.01
2002	25.06	0.55	0.068	0.058	0.075	0.96	2.48	1.31	0.11	1.47	0.01	0.01
2003	33.00	0.45	0.053	0.043	0.063	0.90	2.34	1.23	0.11	1.46	0.01	0.02
2004	32.51	0.65	0.075	0.055	0.127	0.73	2.33	1.09	0.14	1.65	0.01	0.03
2005	43.74	0.60	0.079	0.105	0.114	1.02	2.97	1.46	0.18	2.31	0.02	—
2006	28.89	0.43	0.061	0.069	0.058	0.61	1.71	0.86	0.10	1.24	0.01	—
2007	36.69	0.56	0.073	0.059	0.084	0.85	2.43	1.21	0.16	1.80	0.02	—
2008	36.44	0.65	0.095	0.087	0.095	0.89	2.28	1.21	0.16	1.82	0.01	—
2009	28.48	0.61	0.074	0.048	0.168	1.41	2.19	1.59	0.30	2.10	0.01	—
2010	34.53	0.70	0.093	0.079	0.100	0.93	2.54	1.30	0.17	1.75	0.01	—
2011	50.55	0.63	0.081	0.091	0.101	1.05	2.38	1.35	0.16	1.61	0.02	—
2012	23.04	0.77	0.090	0.083	0.164	0.84	1.58	1.01	0.18	1.14	0.00	—
2013	43.97	0.81	0.110	0.075	0.141	1.27	2.70	1.60	0.22	1.89	0.01	—
2014	41.55	0.51	0.079	0.071	0.100	1.08	2.41	1.39	0.16	1.39	0.02	—
2015	—	—	—	—	—	—	—	—	—	—	—	—
Poplar River (MT96)												
2000	32.08	0.68	0.093	0.112	0.119	1.11	3.16	1.57	0.21	2.42	0.02	0.02
2001	26.26	0.43	0.066	0.045	0.089	0.92	2.50	1.28	0.13	1.88	0.01	0.01
2002	29.18	1.02	0.143	0.105	0.190	1.49	3.55	1.96	0.18	2.87	0.01	0.02
2003	31.95	0.45	0.067	0.042	0.058	1.05	2.34	1.34	0.12	1.69	0.01	0.01
2004	22.33	0.57	0.087	0.047	0.205	0.91	2.13	1.19	0.11	1.81	0.01	0.01
2005	27.00	0.43	0.076	0.065	0.068	1.20	2.34	1.47	0.13	1.99	0.01	—
2006	22.28	0.54	0.080	0.076	0.080	0.93	2.12	1.20	0.11	1.52	0.01	—
2007	39.61	0.70	0.111	0.087	0.079	1.38	2.50	1.64	0.15	2.37	0.01	—
2008	—	—	—	—	—	—	—	—	—	—	—	—
2009	—	—	—	—	—	—	—	—	—	—	—	—
2010	27.83	0.67	0.100	0.053	0.083	0.81	1.99	1.08	0.13	1.67	0.01	—
2011	37.38	0.93	0.131	0.079	0.075	1.67	2.38	1.84	0.13	1.56	0.01	—
2012	25.30	0.62	0.089	0.061	0.071	1.33	2.09	1.51	0.12	1.29	0.00	—
2013	—	—	—	—	—	—	—	—	—	—	—	—
2014	—	—	—	—	—	—	—	—	—	—	—	—
2015	—	—	—	—	—	—	—	—	—	—	—	—

Table D-5-1. Historic Deposition at National Trends Network Sites in the Cumulative and Indirect Effects Analysis Area for Air Quality [a,b]

Year	Precip. (cm)	Ca (kg/ha)	Mg (kg/ha)	K (kg/ha)	Na (kg/ha)	NH_4 (kg/ha)	NO_3 (kg/ha)	Inorg. N (kg/ha)	Cl (kg/ha)	SO_4 (kg/ha)	H^+ lab (kg/ha)	H^+ field (kg/ha)
Harve - Northern Agricultural Research Center (MT98)												
2000	25.90	0.41	0.060	0.057	0.067	0.80	2.18	1.12	0.10	1.52	0.01	0.02
2001	14.40	0.25	0.037	0.045	0.094	0.55	1.45	0.76	0.09	0.90	0.01	0.01
2002	33.55	0.43	0.064	0.067	0.070	0.94	2.27	1.24	0.13	1.57	0.01	0.01
2003	28.43	0.58	0.074	0.114	0.151	0.94	2.26	1.24	0.18	1.43	0.01	0.01
2004	30.78	1.30	0.123	0.295	0.394	1.55	1.99	1.65	0.52	1.64	0.01	0.01
2005	—	—	—	—	—	—	—	—	—	—	—	—
2006	24.82	0.45	0.069	0.084	0.119	0.70	1.86	0.96	0.14	1.29	0.01	—
2007	—	—	—	—	—	—	—	—	—	—	—	—
2008	33.52	0.66	0.101	0.164	0.151	1.27	2.31	1.51	0.21	1.95	0.01	—
2009	26.14	0.45	0.081	0.105	0.120	1.07	1.70	1.22	0.11	1.79	0.01	—
2010	38.59	0.46	0.062	0.069	0.062	0.94	2.12	1.21	0.11	1.23	0.01	—
2011	—	—	—	—	—	—	—	—	—	—	—	—
2012	—	—	—	—	—	—	—	—	—	—	—	—
2013	50.67	0.92	0.162	0.552	0.162	2.90	3.10	2.95	0.25	2.14	0.01	—
2014	34.67	0.53	0.090	0.073	0.083	1.19	2.11	1.40	0.12	1.32	0.01	—
2015	38.46	0.75	0.123	0.085	0.123	1.89	2.73	2.09	0.21	1.59	0.01	—
Theodore Roosevelt National Park - Painted Canyon (ND00)												
2001	35.53	0.75	0.117	0.078	0.185	1.24	3.43	1.74	0.17	2.51	0.02	0.03
2002	30.98	1.42	0.201	0.108	0.214	1.99	4.17	2.49	0.15	2.77	0.00	0.01
2003	42.66	1.50	0.239	0.085	0.124	2.36	4.42	2.84	0.17	3.15	0.01	0.02
2004	27.74	0.52	0.083	0.044	0.114	0.88	2.07	1.15	0.09	1.67	0.01	0.01
2005	48.18	0.96	0.135	0.120	0.222	1.82	4.14	2.35	0.20	3.34	0.01	—
2006	24.33	0.80	0.109	0.085	0.139	1.44	3.11	1.82	0.13	2.15	0.00	—
2007	35.66	1.16	0.164	0.107	0.125	2.02	3.41	2.34	0.19	2.53	0.01	—
2008	26.87	0.84	0.126	0.073	0.102	1.29	2.64	1.60	0.16	1.98	0.01	—
2009	34.31	1.14	0.158	0.103	0.185	1.29	2.63	1.60	0.22	2.07	0.01	—
2010	58.09	1.28	0.163	0.093	0.139	2.11	3.96	2.53	0.22	2.61	0.01	—
2011	—	—	—	—	—	—	—	—	—	—	—	—
2012	—	—	—	—	—	—	—	—	—	—	—	—
2013	—	—	—	—	—	—	—	—	—	—	—	—
2014	—	—	—	—	—	—	—	—	—	—	—	—
2015	30.89	0.94	0.139	0.201	0.312	1.78	2.49	1.94	0.39	1.68	0.00	—
Wind Cave National Park - Elk Mountain (SD04)												
2002	—	—	—	—	—	—	—	—	—	—	—	—
2003	—	—	—	—	—	—	—	—	—	—	—	—
2004	—	—	—	—	—	—	—	—	—	—	—	—
2005	40.89	1.14	0.094	0.143	0.102	1.83	4.69	2.48	0.20	2.93	0.01	—

Table D-5-1. Historic Deposition at National Trends Network Sites in the Cumulative and Indirect Effects Analysis Area for Air Quality [a,b]

Year	Precip. (cm)	Ca (kg/ha)	Mg (kg/ha)	K (kg/ha)	Na (kg/ha)	NH_4 (kg/ha)	NO_3 (kg/ha)	Inorg. N (kg/ha)	Cl (kg/ha)	SO_4 (kg/ha)	H^+ lab (kg/ha)	H^+ field (kg/ha)
2006	28.72	1.13	0.098	0.126	0.098	1.30	3.52	1.80	0.17	1.95	0.01	—
2007	34.42	1.66	0.124	0.138	0.117	2.12	4.61	2.69	0.20	2.74	0.01	—
2008	52.83	2.80	0.227	0.238	0.280	3.13	6.10	3.81	0.36	4.47	0.01	—
2009	50.08	2.48	0.200	0.160	0.200	2.14	4.68	2.72	0.30	3.00	0.01	—
2010	58.71	1.97	0.170	0.200	0.264	3.04	5.29	3.56	0.36	3.48	0.01	—
2011	53.13	1.57	0.138	0.165	0.133	2.30	4.78	2.86	0.27	2.70	0.01	—
2012	35.07	1.14	0.109	0.098	0.123	2.00	3.32	2.31	0.17	1.79	0.00	—
2013	—	—	—	—	—	—	—	—	—	—	—	—
2014	62.20	2.18	0.199	0.317	0.199	2.77	4.78	3.23	0.38	2.64	0.01	—
2015	57.90	1.38	0.139	0.237	0.104	2.92	4.08	3.20	0.30	2.12	0.01	—
Cottonwood (SD08)												
2000	43.18	1.02	0.095	0.095	0.186	2.62	5.69	3.32	0.24	3.31	0.01	0.02
2001	38.89	0.91	0.089	0.086	0.148	2.14	4.68	2.72	0.22	2.93	0.01	0.01
2002	31.44	0.51	0.044	0.047	0.060	1.38	3.20	1.80	0.10	1.89	0.01	0.02
2003	28.60	0.75	0.083	0.083	0.109	2.09	4.20	2.57	0.16	2.74	0.01	0.02
2004	37.22	1.02	0.089	0.216	0.302	2.26	4.56	2.79	0.23	2.68	0.01	0.01
2005	47.49	0.77	0.085	0.104	0.114	2.64	4.54	3.08	0.19	3.02	0.01	—
2006	—	—	—	—	—	—	—	—	—	—	—	—
2007	36.02	0.66	0.068	0.119	0.122	1.97	3.10	2.23	0.17	2.25	0.01	—
2008	59.99	1.52	0.138	0.180	0.240	3.26	5.58	3.80	0.31	3.69	0.01	—
2009	41.89	1.06	0.096	0.084	0.096	2.20	3.96	2.61	0.21	2.33	0.01	—
2010	53.52	0.79	0.070	0.102	0.112	2.36	3.40	2.60	0.21	2.25	0.01	—
2011	50.19	1.03	0.105	0.100	0.141	2.55	4.31	2.96	0.27	2.43	0.01	—
2012	—	—	—	—	—	—	—	—	—	—	—	—
2013	52.12	1.84	0.167	0.167	0.182	3.52	5.57	3.99	0.29	3.09	0.00	—
2014	—	—	—	—	—	—	—	—	—	—	—	—
2015	62.46	1.04	0.112	0.156	0.119	3.80	4.95	4.07	0.27	2.31	0.01	—
Sinks Canyon (WY02)												
2000	40.06	0.87	0.084	0.052	0.116	0.51	2.24	0.90	0.15	1.54	0.02	0.02
2001	22.77	0.57	0.061	0.064	0.123	0.63	2.04	0.95	0.15	1.37	0.01	0.01
2002	32.12	0.96	0.087	0.061	0.202	0.84	2.78	1.28	0.20	1.87	0.01	0.02
2003	37.55	0.74	0.083	0.053	0.090	0.63	1.86	0.91	0.13	1.29	0.01	0.02
2004	53.81	0.93	0.097	0.081	0.231	1.00	3.30	1.52	0.24	2.56	0.03	0.04
2005	40.21	1.02	0.113	0.076	0.197	1.17	3.21	1.64	0.23	2.61	0.02	—
2006	28.57	0.57	0.066	0.051	0.151	0.45	1.71	0.74	0.13	1.27	0.01	—
2007	37.36	0.86	0.090	0.064	0.161	0.68	2.60	1.12	0.15	1.70	0.02	—
2008	45.63	1.61	0.123	0.068	0.183	0.69	1.95	0.98	0.22	1.55	0.01	—
2009	50.28	1.22	0.121	0.070	0.186	0.77	2.30	1.12	0.24	1.66	0.01	—

Table D-5-1. Historic Deposition at National Trends Network Sites in the Cumulative and Indirect Effects Analysis Area for Air Quality [a,b]

Year	Precip. (cm)	Ca (kg/ha)	Mg (kg/ha)	K (kg/ha)	Na (kg/ha)	NH_4 (kg/ha)	NO_3 (kg/ha)	Inorg. N (kg/ha)	Cl (kg/ha)	SO_4 (kg/ha)	H^+ lab (kg/ha)	H^+ field (kg/ha)
2010	53.92	1.52	0.124	0.081	0.253	0.83	2.42	1.19	0.30	1.90	0.01	—
2011	53.16	0.80	0.090	0.064	0.128	0.62	2.01	0.93	0.19	1.40	0.02	—
2012	—	—	—	—	—	—	—	—	—	—	—	—
2013	—	—	—	—	—	—	—	—	—	—	—	—
2014	—	—	—	—	—	—	—	—	—	—	—	—
2015	58.17	0.65	0.081	0.064	0.105	0.91	1.68	1.09	0.15	1.11	0.02	—
Pinedale (WY06)												
2000	—	—	—	—	—	—	—	—	—	—	—	—
2001	—	—	—	—	—	—	—	—	—	—	—	—
2002	—	—	—	—	—	—	—	—	—	—	—	—
2003	20.33	0.41	0.043	0.028	0.081	0.50	1.84	0.80	0.11	1.09	0.01	0.02
2004	36.36	0.76	0.073	0.055	0.182	0.59	2.65	1.05	0.26	1.57	0.02	0.03
2005	34.63	0.73	0.083	0.066	0.163	0.73	2.90	1.22	0.23	2.21	0.02	—
2006	20.05	0.55	0.058	0.084	0.112	0.39	1.86	0.72	0.16	1.09	0.01	—
2007	24.41	0.62	0.068	0.061	0.227	0.59	2.27	0.97	0.17	1.31	0.01	—
2008	28.12	0.75	0.082	0.073	0.188	0.58	2.27	0.97	0.27	1.38	0.01	—
2009	35.18	1.12	0.109	0.077	0.215	0.59	2.02	0.92	0.33	1.37	0.01	—
2010	—	—	—	—	—	—	—	—	—	—	—	—
2011	—	—	—	—	—	—	—	—	—	—	—	—
2012	—	—	—	—	—	—	—	—	—	—	—	—
2013	—	—	—	—	—	—	—	—	—	—	—	—
2014	—	—	—	—	—	—	—	—	—	—	—	—
2015	—	—	—	—	—	—	—	—	—	—	—	—
Yellowstone National Park - Tower Falls (WY08)												
2000	34.20	0.73	0.072	0.099	0.168	0.66	2.19	1.01	0.29	1.29	0.01	0.01
2001	29.71	0.42	0.045	0.059	0.119	0.53	1.67	0.79	0.18	0.91	0.01	0.01
2002	30.54	1.24	0.110	0.140	0.177	0.81	2.13	1.11	0.23	1.10	0.01	0.01
2003	—	—	—	—	—	—	—	—	—	—	—	—
2004	32.27	0.53	0.058	0.610	0.345	0.62	2.05	0.95	0.38	1.18	0.01	0.02
2005	37.78	0.41	0.045	0.072	0.147	0.69	1.83	0.95	0.26	1.14	0.01	—
2006	35.57	0.71	0.089	0.142	0.281	0.78	2.25	1.12	0.30	1.54	0.02	—
2007	34.23	1.32	0.113	0.147	0.113	0.90	2.14	1.18	0.20	1.34	0.01	—
2008	34.45	0.75	0.072	0.096	0.327	0.61	1.43	0.79	0.35	1.07	0.01	—
2009	48.16	1.33	0.120	0.116	0.284	0.83	2.21	1.14	0.35	1.55	0.02	—
2010	—	—	—	—	—	—	—	—	—	—	—	—
2011	—	—	—	—	—	—	—	—	—	—	—	—
2012	47.27	1.42	0.147	0.222	0.402	1.59	2.55	1.81	0.51	1.67	0.01	—
2013	38.66	0.89	0.097	0.116	0.170	1.33	2.50	1.60	0.32	1.57	0.01	—

Table D-5-1. Historic Deposition at National Trends Network Sites in the Cumulative and Indirect Effects Analysis Area for Air Quality [a,b]

Year	Precip. (cm)	Ca (kg/ha)	Mg (kg/ha)	K (kg/ha)	Na (kg/ha)	NH_4 (kg/ha)	NO_3 (kg/ha)	Inorg. N (kg/ha)	Cl (kg/ha)	SO_4 (kg/ha)	H^+ lab (kg/ha)	H^+ field (kg/ha)
2014	—	—	—	—	—	—	—	—	—	—	—	—
2015	—	—	—	—	—	—	—	—	—	—	—	—
Grand Tetons National Park (WY94)												
2011	—	—	—	—	—	—	—	—	—	—	—	—
2012	37.54	1.96	0.188	0.143	0.447	1.07	2.73	1.45	0.50	1.59	0.01	—
2013	—	—	—	—	—	—	—	—	—	—	—	—
2014	58.93	1.23	0.141	0.159	0.389	1.36	2.76	1.68	0.54	1.54	0.02	—
2015	55.72	1.14	0.139	0.134	0.496	1.42	2.91	1.76	0.55	1.74	0.02	—
Newcastle (WY99)												
2000	—	—	—	—	—	—	—	—	—	—	—	—
2001	43.22	1.21	0.099	0.099	0.151	1.74	5.14	2.52	0.22	3.05	0.02	0.02
2002	37.14	1.02	0.089	0.074	0.108	1.57	4.95	2.34	0.19	2.70	0.02	0.01
2003	36.33	0.97	0.087	0.058	0.102	1.17	3.69	1.74	0.16	2.19	0.02	0.02
2004	31.09	1.03	0.090	0.068	0.096	1.18	3.71	1.76	0.16	2.30	0.01	0.02
2005	49.77	1.04	0.095	0.124	0.119	1.56	4.38	2.20	0.23	2.92	0.02	—
2006	34.37	0.90	0.089	0.148	0.096	1.08	3.07	1.53	0.16	2.05	0.01	—
2007	42.34	1.20	0.110	0.123	0.157	1.67	3.98	2.20	0.21	2.83	0.01	—
2008	45.71	1.47	0.128	0.165	0.187	1.74	4.40	2.35	0.29	3.00	0.01	—
2009	39.35	0.93	0.079	0.094	0.102	1.12	2.81	1.50	0.18	1.88	0.01	—
2010	43.36	1.36	0.130	0.130	0.139	1.42	3.00	1.78	0.20	2.51	0.01	—
2011	56.37	1.44	0.135	0.485	0.186	2.86	3.83	3.09	0.33	2.90	0.01	—
2012	28.64	1.20	0.112	0.120	0.126	1.12	2.70	1.48	0.17	1.48	0.00	—
2013	—	—	—	—	—	—	—	—	—	—	—	—
2014	—	—	—	—	—	—	—	—	—	—	—	—
2015	46.02	1.04	0.101	0.101	0.097	1.84	2.95	2.10	0.18	1.61	0.01	—

Source: NADP 2016
[a] Only valid data that meets NTN completeness requirements are shown.
[b] The Gypsum Creek NTN Site (WY98) did not have any valid data for the period 2000-2015 and is not shown.
Ca = calcium.
Cl = chloride.
cm = centimeter(s).
H^+ = free acidity.
K = potassium.
kg/ha = kilogram(s) per hectare.
Mg = magnesium.
Na = sodium.
NH_4 = ammonium.
NO_3 = nitrate.
Precip. = precipitation.
SO_4 = sulfate.

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APPENDIX D-6. SUPPLEMENTAL INFORMATION FOR CUMULATIVE EFFECTS FOR AIR QUALITY

Table D-6-1. Maximum Future Air Emissions from Existing and Reasonably Foreseeable Areas and Facilities of the Rosebud Mine

Mine Area/Facility	PM_{10}	$PM_{2.5}$	NOx	CO	SO_2	VOC
	(tons / year)					
Area C [1]	641.6	66.7	256.5	302.4	7.9	18.8
Areas A, B [2]	151.4	21.7	88.1	157.0	9.5	7.3
Area D	34.7	3.5	--	--	--	--
Area E	11.3	1.1	--	--	--	--
AM5	207.3	33.1	166.9	297.5	18.0	13.9
Portable Crusher	0.2	0.1	1.9	0.4	0.6	0.1

1. Includes coal production from Area C BLM Lease Modification
2. Includes coal production from AM4, BX and Area B BLM Lease Modification

Table D-6-2. Estimated Future Annual Emissions from Colstrip Units 1 and 2*

Emission Source(s)	PM_{10}	$PM_{2.5}$	NOx	CO	SO_2	VOC
Colstrip Units 1 and 2	(tons / year)					
Boiler - Unit 1	272.23	227.77	3717.15	305.58	2013.15	42.78
Boiler - Unit 2	240.10	200.91	2090.34	269.35	1744.72	37.71
Coal Storage Pile	4.13	0.62	0	0	0	0
Fugitive Dust - Haul Roads	0.11	0	0	0	0	0
Diesel Emergency Generator	0.0177	0.0171	0.56	0.29	0.14	0.0023
On-road Mobile	0.0048	0.0028	0.12	0.89	0.0004	0.19
Non-road Mobile	0.0054	0.0052	0.04	0.86	0.0001	0.04

Source: Montana DEQ Annual Emission Inventory Reporting Records (2015)
* Emissions are rounded to two decimal places, except when additional significant figures are required to highlight differences or to show differences between pollutants

Table D-6-3. (a) Projected Future Emissions from Other Major Regional Point Sources in the Indirect/Cumulative Impacts Analysis Area, and (b) Projected Future Regional Emissions in the Analysis Area

Facility	Latitude	Longitude	NOx	SO_2	PM_{10}	$PM_{2.5}$	VOC
Black Thunder Mine	43.700	-105.290	11726	163	4272	1791	0
Coal Creek Mine	43.968	-105.284	9100	12	334	122	0
Dave Johnston	42.838	-105.777	7664	6993	919	643	107
North Antelope Rochelle Mine	43.532	-105.257	3325	197	2898	932	113
Wyodak Plant	44.288	-105.383	3088	1359	351	285	52
Elk Basin Gas Plant	44.980	-108.843	1281	0	18	18	62
Elk Basin Gas Plant	44.977	-108.838	1239	0	18	18	150
GCC Dacotah	44.087	-103.272	1151	271	33	33	44
Antelope Mine	43.478	-105.342	1083	70	1483	214	41
Hilight-Reno Junction Gas Plant	43.031	-105.147	1010	0	17	17	74
Hilight-Reno Junction Gas Plant	43.843	-105.360	1004	0	17	17	78
MDU - Lewis & Clark Station	47.679	-104.153	863	137	211	134	12
Caballo Mine	44.100	-105.364	791	79	48	48	49
Cordero Rojo Complex	44.029	-105.367	784	79	1441	420	28
Belle Ayr Mine	44.101	-105.365	730	17	939	402	0
378 (name unknown)	48.395	-102.916	697	952	11	11	85
Tioga Gas Plant	48.395	-102.916	675	0	15	15	7
Eagle Butte Mine	44.387	-105.506	648	5	839	196	0
Blaine County #1	48.423	-109.421	548	0	3	0	0
Sycamore	44.250	-105.860	528	0	0	0	1
Neil Simpson Two	44.285	-105.384	522	287	37	37	13
005-0001 (name unknown)	48.423	-109.421	464	0	4	4	25
Phillips 66 Refinery, Billings	45.781	-108.493	462	31	91	75	287
Dry Fork Station	44.388	-105.460	460	888	203	147	45
Rawhide Mine	44.414	-105.460	450	34	305	21	22

Facility	Latitude	Longitude	NOx	SO_2	PM_{10}	$PM_{2.5}$	VOC
Colony West Plant	44.870	-104.161	410	50	94	28	1
WYGEN Station I	44.286	-105.384	407	284	48	35	11
Graymont Western US Inc.	46.328	-111.617	405	93	51	19	0
Rocky Mountain Power	45.764	-107.600	398	389	67	53	16
CHS Inc. Refinery Laurel	45.659	-108.768	398	190	57	44	931
Colony East Plant	44.865	-104.150	390	63	106	27	1
Buckskin Mine	44.442	-105.534	312	32	1047	562	3
Dry Fork Coal Mine	44.370	-105.448	299	16	205	18	12
376 (name unknown)	47.297	-103.098	291	410	10	10	77
Neil Simpson One	44.286	-105.387	282	791	351	347	7
1204 (name unknown)	48.693	-102.922	276	3	9	9	119
Williston Basin Interstate Pipeline Company	44.990	-103.933	276	0	4	4	8
380 (name unknown)	47.592	-104.000	268	158	10	10	81
Beaver Creek Gas Plant	42.846	-108.318	253	0	4	4	88
Wyodak Mine	44.197	-105.488	237	4	229	85	6
WYGEN II	44.291	-105.381	236	315	59	43	13
375 (name unknown)	48.873	-102.546	232	106	6	6	87
Beaver Creek Gas Plant	42.847	-108.314	229	0	2	2	2
Hardin Compressor Station	45.739	-107.546	224	0	0	0	7
383 (name unknown)	47.929	-103.874	224	1	3	3	35
Frannie Lime Plant	44.996	-108.625	223	32	57	22	0
1084 (name unknown)	48.037	-102.352	214	232	5	5	110
Paradise Compressor Station	42.685	-109.809	213	0	6	6	171
Paradise Compressor Station	42.685	-109.804	212	0	6	6	139
Lovell Plant	44.859	-108.225	205	23	87	16	0
Riverton Dome Gas Plant_EPA Permitted	42.939	-108.347	205	0	0	0	12
Fort Buford Compressor Station	47.929	-103.874	201	0	3	3	18
396 (name unknown)	47.252	-102.719	199	4	7	7	43
ExxonMobil Billings Refinery	45.814	-108.433	196	652	194	188	414
267 (name unknown)	48.588	-102.855	194	101	4	4	48
Richardton Ethanol Plant	46.878	-102.297	190	80	177	172	64
Wygen III	44.289	-105.379	185	335	67	49	15
237 (name unknown)	47.064	-103.414	170	1	3	3	59
390 (name unknown)	47.108	-103.324	170	1	3	3	56
Bill	43.162	-105.262	168	1	4	4	11
Spring Creek Mine	45.112	-106.904	164	19	789	86	0
Pete Lien And Sons Inc	44.116	-103.281	161	0	24	8	5
203 (name unknown)	47.252	-102.750	160	2	3	3	36
381 (name unknown)	47.805	-103.428	154	2	3	3	24
025-0003 (name unknown)	46.614	-104.419	151	2	2	2	24
Falcon Compressor Station	42.524	-109.673	149	0	6	6	140
Sidney Sugar Facility	47.717	-104.136	149	19	55	24	1
Falcon Compressor Station	42.525	-109.673	148	0	6	6	107
Western Sugar Cooperative	45.770	-108.500	147	4	12	5	3
Willow Creek Compressor Station	42.921	-106.931	147	0	0	0	76
Blue	47.908	-102.758	147	1	1	1	100
Elk Basin Compressor Station	44.979	-108.841	146	0	2	2	8
Hinsdale	48.393	-107.090	142	1	4	4	9
Colony Plant	44.861	-104.142	140	33	123	24	1
Clar	47.632	-102.603	140	1	2	2	27
1026 (name unknown)	48.353	-103.114	140	1	3	3	57
Elk Basin Compressor Station (CIG)	44.978	-108.841	139	0	2	2	8
Casper Refinery	42.859	-106.243	139	165	45	42	216
Huntley	45.900	-108.298	138	1	4	3	9
Elmore Pit	44.359	-105.378	138	25	6	5	3

Facility	Latitude	Longitude	NOx	SO_2	PM_{10}	$PM_{2.5}$	VOC
Calumet Montana Refining	47.525	-111.290	137	5	41	30	356
Flying Creek-Bridge Draw Compressor Station	44.283	-106.158	136	0	7	7	134
379 (name unknown)	47.934	-103.671	135	1	3	3	256
071-0003 (name unknown)	48.743	-107.631	133	0	2	2	54
Flying Creek-Bridge Draw Compressor Station	44.283	-106.158	133	0	7	7	139
Casper Extraction Plant	42.856	-106.238	129	0	0	0	142
377 (name unknown)	48.038	-102.321	128	149	2	2	33
Williston Basin – Cabin Creek	46.614	-104.419	128	2	3	3	10
Glasgow	48.191	-106.626	126	1	3	3	8
241 (name unknown)	48.084	-103.791	124	1	2	2	26
Sheridan	44.814	-106.951	117	1	3	3	7
Casper Extraction Plant	42.856	-106.237	116	0	0	0	16
085-0006 (name unknown)	48.214	-104.395	112	4	2	2	20
1155 (name unknown)	47.930	-103.874	111	1	2	2	23
Koch Pit (761S)	42.902	-110.107	110	0	6	4	0
Zane	47.639	-102.597	110	1	2	2	50
Absaloka Mine	45.804	-107.079	109	20	458	60	1
1074 (name unknown)	48.035	-102.221	107	1	2	2	23
025-0013 (name unknown)	46.394	-104.285	105	1	4	4	60
200 (name unknown)	48.293	-102.950	105	132	2	2	46
228 (name unknown)	47.869	-102.866	104	146	2	2	38
253 (name unknown)	48.345	-103.787	102	1	1	1	36
1164 (name unknown)	48.113	-102.226	102	1	2	2	23
1163 (name unknown)	48.147	-102.225	102	1	2	2	23
1162 (name unknown)	48.183	-102.226	102	1	2	2	23
Glendive	47.100	-104.716	102	1	3	3	6
246 (name unknown)	47.897	-102.992	93	1	1	1	203
210 (name unknown)	47.638	-103.535	85	1	2	2	395
292 (name unknown)	46.168	-103.532	81	135	3	3	46
Smith Ranch-Highland Operations	43.051	-105.685	80	3	193	24	13
025-0001 (name unknown)	46.384	-104.256	78	202	2	2	67
Casper Asphalt Hot Plant (CT-1523)	42.859	-106.370	77	9	2	0	130
Newcastle Refinery	43.848	-104.214	72	277	83	74	76
Hardin Generating Station	45.729	-107.607	71	1	2	2	4
Lost Cabin Gas Plant	43.278	-107.604	61	0	109	109	0
260 (name unknown)	47.338	-103.557	58	1	2	2	205
227 (name unknown)	47.754	-103.295	53	160	1	1	17
239 (name unknown)	48.030	-102.886	52	125	1	1	16
Decker Mine	45.054	-106.822	47	6	387	41	0
Countertops Inc	44.049	-103.189	36	3	35	35	169
Worland Plant	44.012	-107.981	25	1	159	135	0
Casper Extraction Plant	42.856	-106.236	19	0	0	0	142
Stillwater Mine	45.389	-109.876	16	1	116	33	0
Signal Peak Energy – Bull Mountain Mine	46.270	-108.421	16	0	184	28	0
Elk Basin Gas Plant	44.980	-108.843	15	0	0	0	113
CRH US Trident Plant	45.945	-111.477	13	1	139	64	1
Dave Johnston	42.838	-105.777	10	0	476	276	0
Well Draw Booster Station	42.988	-105.137	8	0	0	0	223
Oregon Basin Gas Plant	44.353	-108.903	7	211	1	1	0
Worland Plant #02	44.023	-107.962	2	0	0	0	135
Halfmoon Battery	44.379	-109.086	2	0	0	0	380
Halfmoon Battery	44.379	-109.086	2	0	0	0	293
1045 (name unknown)	48.113	-103.778	1	0	0	0	194
250 (name unknown)	47.981	-103.662	1	0	0	0	192

Facility	Latitude	Longitude	NOx	SO_2	PM_{10}	$PM_{2.5}$	VOC
240 (name unknown)	48.113	-103.782	1	0	0	0	192
214 (name unknown)	47.380	-103.859	1	0	0	0	192
Montana Sulfur & Chemical	45.814	-108.428	1	1926	1	1	0
Grass Creek Mine	43.921	-108.701	0	0	325	14	0
Great Falls Terminal	47.521	-111.221	0	0	0	0	105

Source: EPA 2025 emissions projection from 2011 National Emissions Inventory (https://www.epa.gov/air-emissions-modeling/2011-version-61-platform) as applied in BLM 2016a and BLM 2016b.

(b)

Emissions Category	Regional Emissions (tons / year)					
	PM_{10}	$PM_{2.5}$	NO_x	CO	SO_2	VOC
Point Source	31,915	15,156	98,418	59,984	37,747	22,254
Low-level Anthropogenic	346,881	51,479	76,566	188,103	9,554	285,519
Low-level Biogenic	0	0	23,418	49,898	0	406,356
Fires	7,822	6,004	2,019	44,573	502	7,060
Total – Anthropogenic	**378,796**	**66,635**	**174,984**	**248,087**	**47,301**	**307,773**
Total – All	**386,618**	**72,639**	**200,421**	**342,559**	**47,804**	**721,189**

Source: BLM 2016a

Table D-6-4. Maximum Annual Future Trace Metal HAP Emissions from Fugitive Coal Dust in Areas A, B, C, and AM5

Metal HAP	Concentration in Coal (ppm)			HAP Emissions (lb / year)		
	Area C	Areas A + B	AM5	Area C	Areas A, B	AM5
Antimony	0.41	0.34	0.49	7.76E-03	8.60E-03	2.35E-02
Arsenic	4.63	0.75	1.71	8.76E-02	1.90E-02	8.20E-02
Beryllium	0.25	0.29	0.53	4.73E-03	7.34E-03	2.54E-02
Cadmium	0.09	0.05	0.06	1.70E-03	1.27E-03	2.88E-03
Chromium	5.23	3.23	4.07	9.90E-02	8.17E-02	1.95E-01
Copper	13.82	5.99	6.73	2.61E-01	1.52E-01	3.23E-01
Lead	3.14	3.97	3.99	5.94E-02	1.00E-01	1.91E-01
Manganese	44.26	80.64	79.35	8.37E-01	2.04E+00	3.80E+00
Mercury	0.17	0.06	0.07	3.22E-03	1.52E-03	3.36E-03
Nickel	19.13	1.32	2.72	3.62E-01	3.34E-02	1.30E-01
Selenium	0.43	0.58	0.68	8.14E-03	1.47E-02	3.26E-02

ppm = parts per million
lb/year = pound(s) per year
1. Moisture-corrected, average concentration from coal sampling data provided by PPL Montana (2014)
2. Aggregate data from Areas C, D, and E

Table D-6-5. Potential Maximum Annual Future Diesel Particulate Matter (DPM) Emissions from Areas A, B, C, and AM5

Mine Area(s)	DPM (tons / year)
Area C [1]	7.6
Areas A + B [2]	7.2
AM5	13.7
Total	**28.6**

1. Includes coal production from Area C BLM Lease Modification
2. Includes coal production from AM4, BX and Area B BLM Lease Modification

Table D-6-6. Annual Nitrogen and Sulfur Deposition due to Cumulative Impacts at Class I

Class I Area	Nitrogen Maximum	Nitrogen Average	Sulfur Maximum	Sulfur Average
	(kg/ha)	(kg/ha)	(kg/ha)	(kg/ha)
Badlands National Park	4.3440	3.6055	0.7892	0.6248
Bridger	1.6034	1.3823	0.6176	0.4103
Fitzpatrick	1.5597	1.2957	0.5757	0.4016
Fort Peck Indian Reservation	6.4179	3.0307	1.0845	0.7461
Gates of the Mountains Wilderness	1.4505	1.3682	0.2912	0.2624
Grand Teton National Park	2.0666	1.3386	0.6178	0.3111
Lostwood National Wildlife Refuge	4.9499	4.4264	2.1462	1.7811
Lostwood Wilderness	5.0380	4.7604	2.1462	2.0851
Medicine Lake (Class I)	7.2281	3.6332	0.9564	0.8945
North Absaroka	1.4853	1.0377	0.4479	0.2984
Northern Cheyenne	2.1564	1.5386	0.8018	0.5347
Teton	1.3102	1.0780	0.4475	0.3090
Theo Roosevelt National Park	4.7562	3.6181	1.0431	0.7531
UL Bend National Wildlife Refuge	2.1556	1.9439	0.5030	0.4596
UL Bend Wilderness	1.9928	1.7442	0.4793	0.4270
Washakie	1.3507	1.0188	0.4420	0.2998
Wind Cave National Park	3.1190	2.7765	0.5581	0.5301
Yellowstone National Park	2.2810	1.1178	0.6066	0.2726
Sensitive Class II Area	**Nitrogen Maximum**	**Nitrogen Average**	**Sulfur Maximum**	**Sulfur Average**
	(kg/ha)	(kg/ha)	(kg/ha)	(kg/ha)
Absaroka-Bear	1.8537	1.1265	0.6081	0.3411
Benton Lake	4.4213	3.1133	0.3442	0.3140
Bighorn Canyon	2.4403	1.5934	0.5527	0.3536
Bowdoin National Wildlife Refuge	3.5949	2.8573	0.5730	0.5436
Devils Tower National Monument	2.4143	2.4143	0.3652	0.3652
Fort Union National Historic Site	3.6798	3.6798	0.8191	0.8191
Halfbreed Lake	1.8538	1.6648	0.2648	0.2470
Lake Zahl National Wildlife Refuge	4.4312	4.2050	0.9664	0.9597
Lee Metcalf	1.3593	1.1470	0.3883	0.2979
Little Bighorn National Monument	1.6940	1.6940	0.2869	0.2869
Medicine Lake (Class II)	7.2281	3.6022	0.9564	0.8932
Stewart Lake	2.9475	2.9475	0.5254	0.5254
UL Bend	2.1556	1.8373	0.5030	0.4399

kg = kilograms. ha = hectare.

Table D-6-7. Change in Haze Index at Class I Areas and Contributions from Direct and Indirect Impacts

Class I Area	Cumulative Change in Haze Index Δdv (98th percentile of daily maximum)	Direct (%)	Indirect (%)	# of Days > 0.5 Δdv		# of Days > 1.0 Δdv	
				Direct	Indirect	Direct	Indirect
Badlands NP	20.1	0.1%	5.8%	0	8	0	2
Bridger	7.8	0.2%	5.6%	0	0	0	0
Fitzpatrick	7.9	0.2%	5.1%	0	0	0	0
Flathead IR	26.4	0.4%	8.3%	0	14	0	7
Gates of Mountains	11.1	0.0%	1.8%	0	0	0	0
Grand Teton NP	13.9	0.0%	1.8%	0	0	0	0
Lostwood NWR	23.7	0.1%	6.8%	0	4	0	1
Lostwood Wilderness	23.7	0.1%	6.4%	0	4	0	1
Medicine Lake (Class I)	26.4	0.2%	7.9%	0	9	0	3
North Absaroka	10.4	0.2%	4.0%	0	0	0	0
North Cheyenne	12.0	4.8%	20.8%	2	96	0	21
Teton	8.2	0.1%	4.0%	0	0	0	0
Theo Roosevelt NP	22.5	0.2%	7.3%	0	11	0	4
UL Bend NWR	19.8	0.2%	5.8%	0	3	0	1
UL Bend Wilderness	19.8	0.2%	5.5%	0	2	0	1
Washakie	12.9	0.1%	2.7%	0	0	0	0
Wind Cave NP	15.5	0.2%	5.4%	0	2	0	0
Yellowstone NP	17.4	0.1%	2.6%	0	0	0	0

Table D-6-8. Change in Haze Index at Class I Areas due to Colstrip Units 3 and 4 in the Montana Federal Implementation Plan (source: EPA, 2012)

Class I Area	98^{tn} percentile of daily maximum Δdv For 2006, 2007, 2008		Maximum number of days over 0.5 Δdv for 2006, 2007, 2008	
	Colstrip Unit 3	Colstrip Unit 4	Colstrip Unit 3	Colstrip Unit 4
North Absaroka Wilderness	0.200	0.168	1	1
Theodore Roosevelt National Park	0.498	0.485	7	7
UL Bend National Wildlife	0.471	0.468	6	6
Washakie Wilderness Area	0.223	0.223	2	2
Yellowstone National Park	0.151	0.148	1	1

Source: Modeling Report: Montana Regional Haze Federal Implementation Plan (FIP) Support. https://www.regulations.gov/document?D=EPA-R08-OAR-2011-0851-0035

Table D-6-9. Maximum Annual Average Air Concentration and Annual Deposition of HAPs from total Rosebud Mine fugitive coal dust emissions

Metal HAP	Maximum Annual Average Air Concentration [1] (µg/m^3)	Maximum Deposition Flux [1] (kg/ha-year)
Antimony	1.91E-07	1.66E-04
Arsenic	8.43E-07	7.32E-04
Beryllium	1.80E-07	1.56E-04
Cadmium	2.77E-08	2.41E-05
Chromium	1.78E-06	1.55E-03
Copper	3.49E-06	3.03E-03
Lead	1.79E-06	1.55E-03
Manganese	3.39E-05	2.95E-02
Mercury	3.61E-08	3.13E-05
Nickel	2.25E-06	1.96E-03
Selenium	2.78E-07	2.42E-04

Deposition Flux = Deposition per unit area per unit time
µg/m^3 = micrograms per cubic meter
kg/ha-year = kilogram per hectare per year
1. The annual average concentration and deposition flux of each HAP are calculated using the average concentration in Areas A, B, C, F, and AM5 weighted by the coal fugitive dust emissions of each area.

Table D-6-10. Estimated contribution of Colstrip 3 and 4, and Rosebud Power Plant mercury emissions to regional wet mercury deposition

Year	Annual Precipitation[1]	Mercury Wet Deposition		Contribution of Colstrip 3 and 4 + Rosebud Power Plant to Wet Deposition at Badger Peak
		Measured value at MDN Badger Peak monitor location[1]	Modeled value due to Colstrip 3 and 4 + Rosebud Power Plant at same location[2]	
	(cm)	(µg/m^2-year)	(µg/m^2-year)	(%)
2011	63.02	6.641	0.024	0.36%
2012[3]	22.94	3.833	0.009	0.24%
2013[3]	47.68	5.037	0.020	0.40%
2014	41.02	4.532	0.023	0.51%
2015	39.04	5.989	0.019	0.32%

cm = centimeter; µg/m^2-year = micrograms per square meter per year; % = percent

1. Data from the Mercury Deposition Network (MDN)
2. The modeled mercury wet deposition at the location of the Badger Peak MDN monitor
3. Data from 2012 and 2013 at Badger Peak showed 69% and 70% completeness compared to the 75% recommended completeness criterion.

Table D-6-11. Cumulative Mercury Deposition and Estimated Relative Contribution of Colstrip 3 and 4, and Rosebud Power Plant

Wet + Dry Mercury Annual Deposition Flux		Contribution of Colstrip 3 and 4, and Rosebud Power Plant to Cumulative Mercury Deposition
Cumulative [1]	**Contribution from Colstrip 3 and 4 and Rosebud Power Plant [2]**	
(µg/m^2-year)	(µg/m^2-year)	**(%)**
19 (range of 18-20)	0.20 [3]	1.05%
	1.45 [4]	7.63%

µg/m^2-year = micrograms per square meter per year

% = percentage

1. Midpoint of 18-20 range modeled by Corbitt et al. (2011) for wet + dry annual deposition flux in 2005 (Figure 6 of Corbitt et al.)
2. Modeled annual wet + dry deposition flux from indirect effects due to Colstrip 3 and 4 and Rosebud Power Plant (average over 2011-2015)
3. Modeled wet + dry deposition due to indirect effects at location of Badger Peak MDN site
4. Modeled wet + dry deposition due to indirect effects at location of spatial maximum

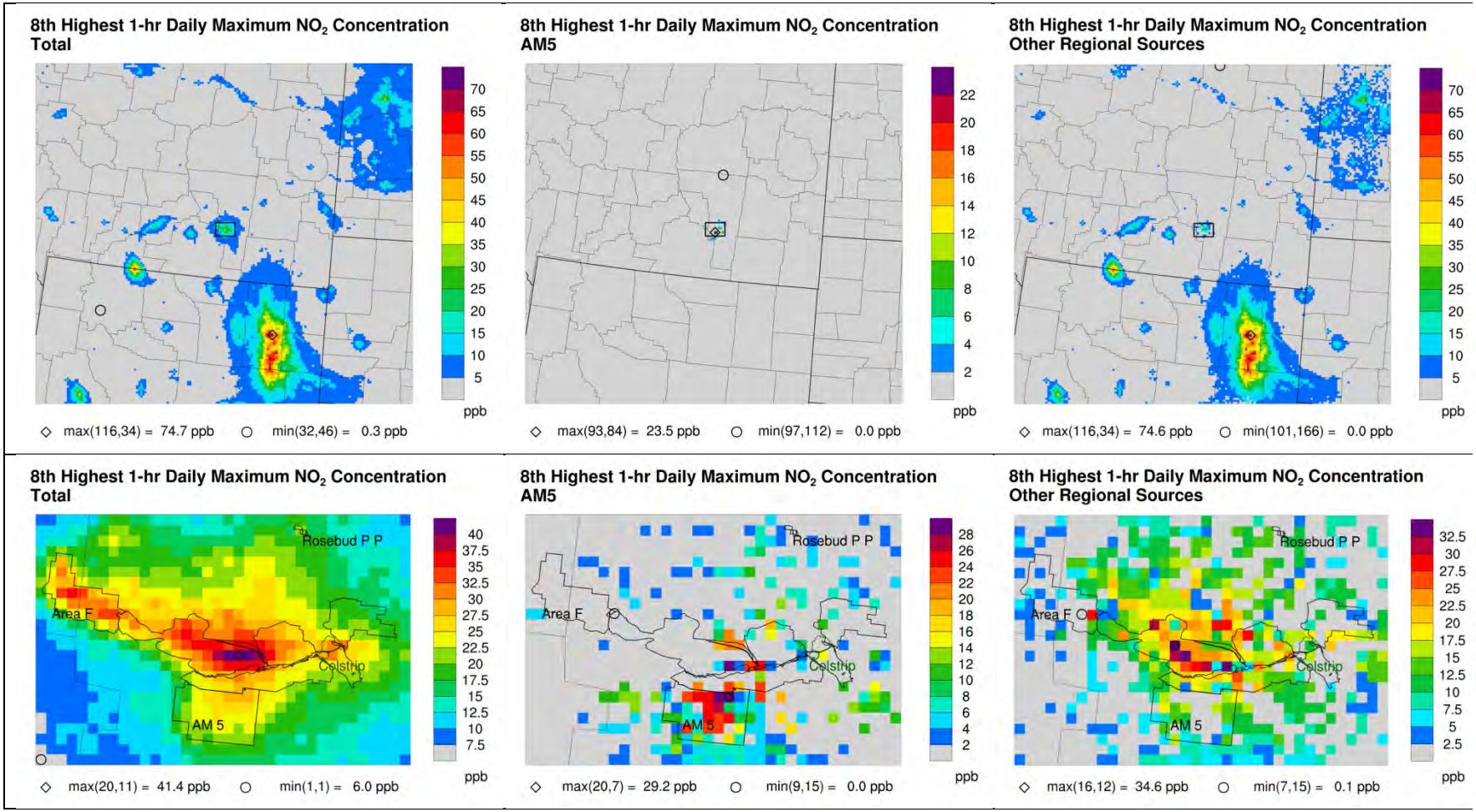


Figure D-6-1. Spatial distribution of cumulative 1-hour NO_2 (left) and contributions from AM5 (middle) and other regional sources (right) within the 4 km (top) and 1 km (bottom) modeling domains, respectively.

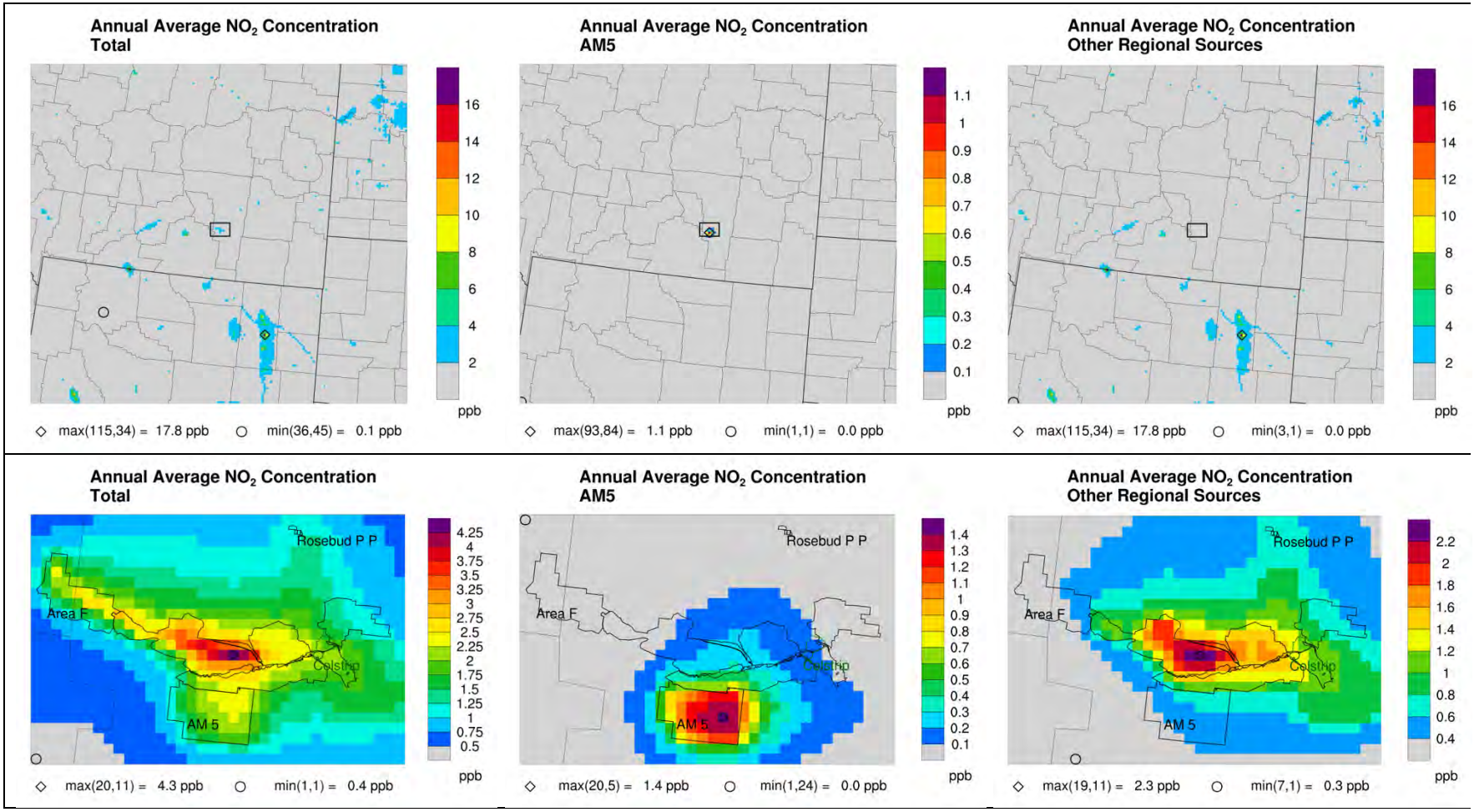


Figure D-6-2. Spatial distribution of cumulative annual average NO_2 (left) and contributions from AM5 (middle) and other regional sources (right) within the 4 km (top) and 1 km (bottom) modeling domains, respectively.

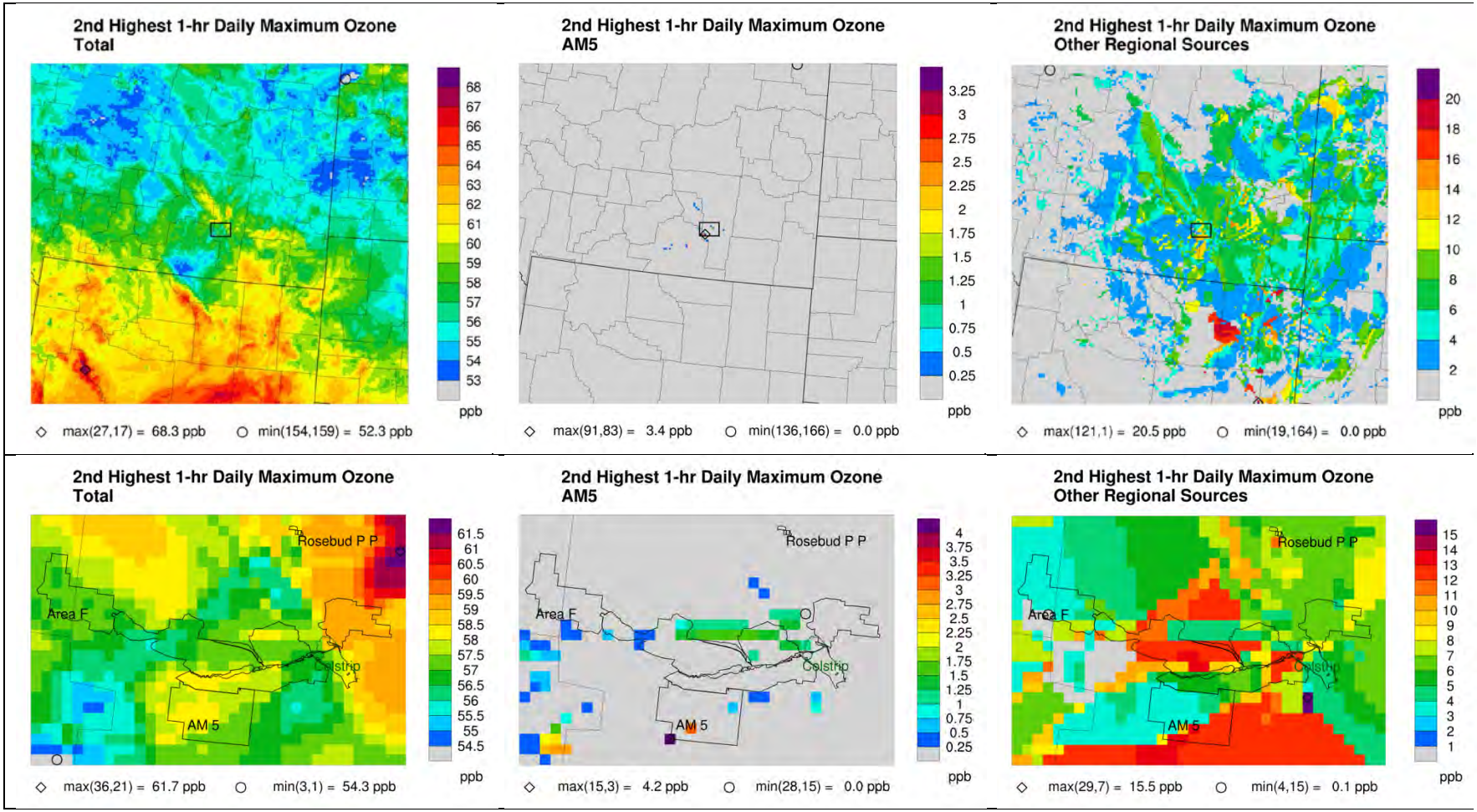


Figure D-6-3. Spatial distribution of cumulative 2nd highest 1-hour O_3 (left) and contributions from AM5 (middle) and other regional sources (right) within the 4 km (top) and 1 km (bottom) modeling domains, respectively.

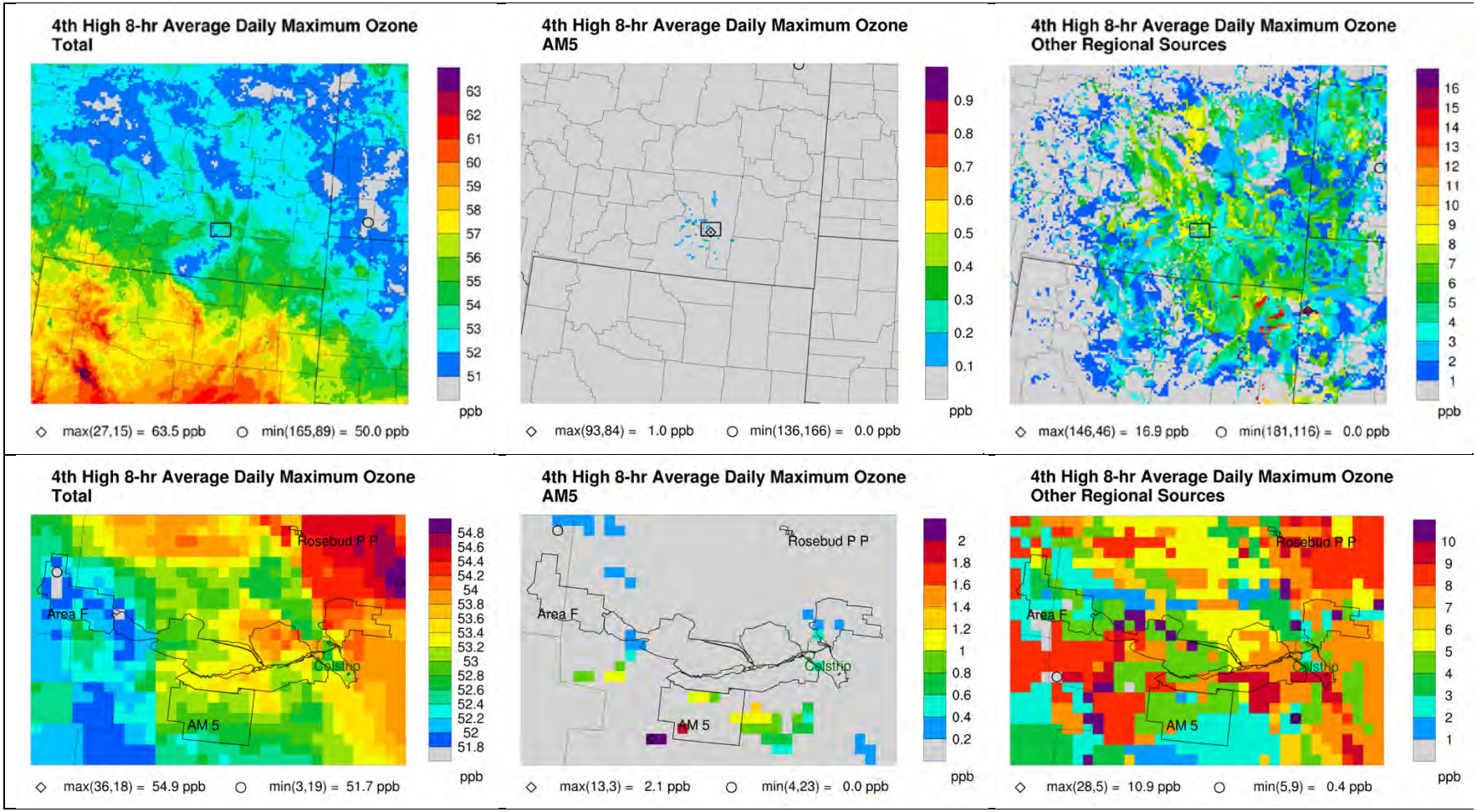


Figure D-6-4. Spatial distribution of cumulative 4th highest 8-hour O_3 (left) and contributions from AM5 (middle) and other regional sources (right) within the 4 km (top) and 1 km (bottom) modeling domains, respectively.

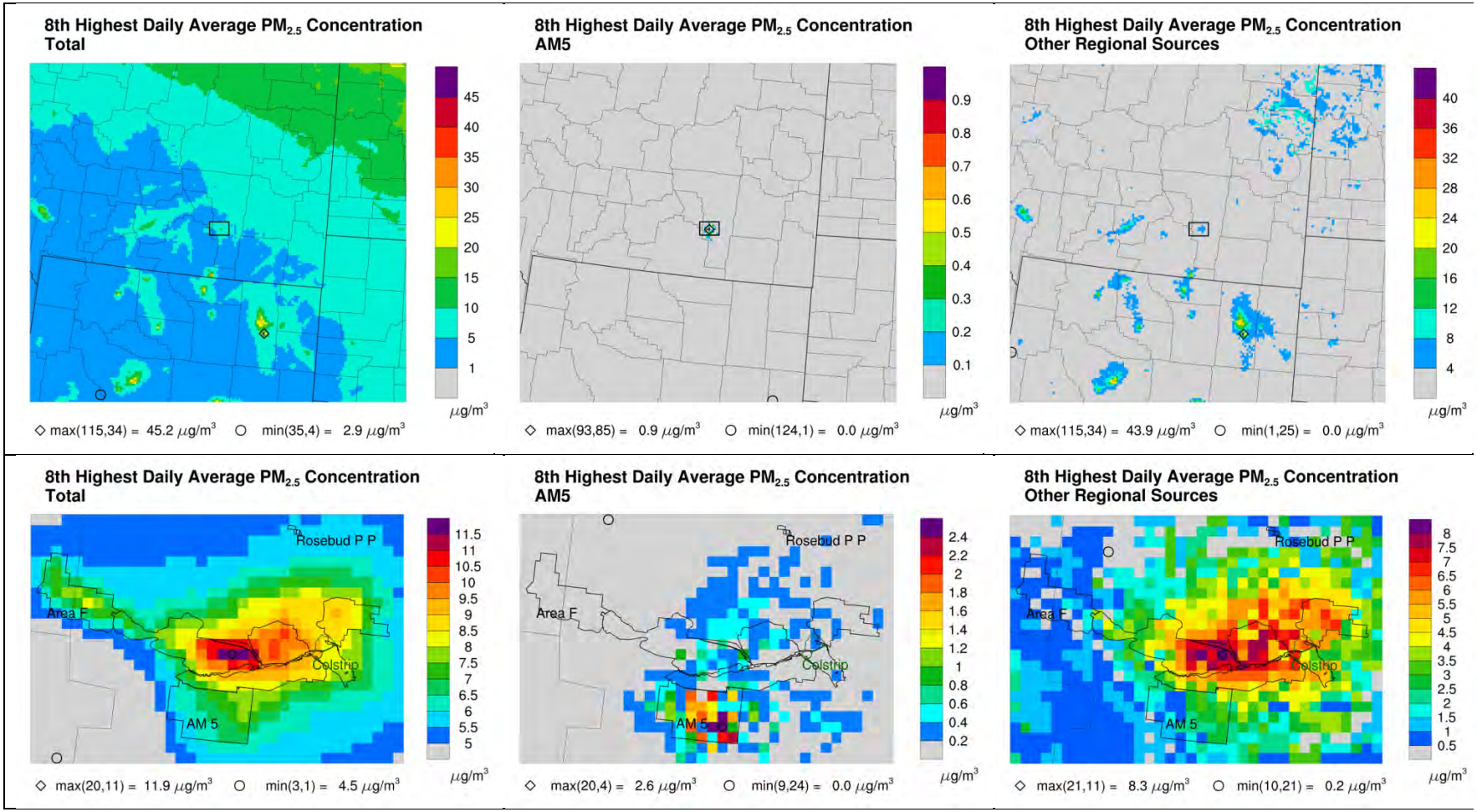


Figure D-6-5. Spatial distribution of cumulative 8th highest daily $PM_{2.5}$ (left) and contributions from AM5 (middle) and other regional sources (right) within the 4 km (top) and 1 km (bottom) modeling domains, respectively.

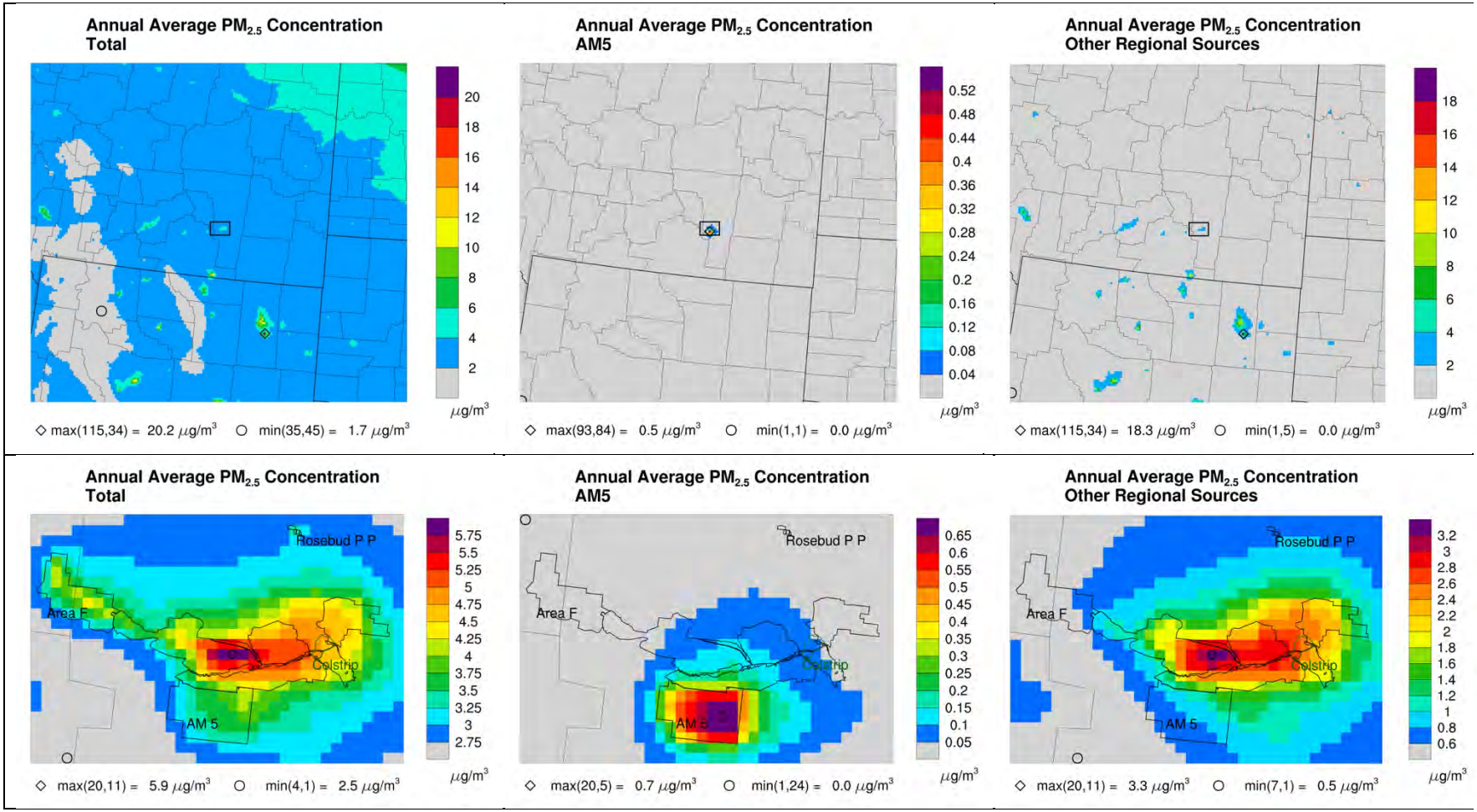


Figure D-6-6. Spatial distribution of cumulative annual average $PM_{2.5}$ (left) and contributions from AM5 (middle) and other regional sources (right) within the 4 km (top) and 1 km (bottom) modeling domains, respectively.

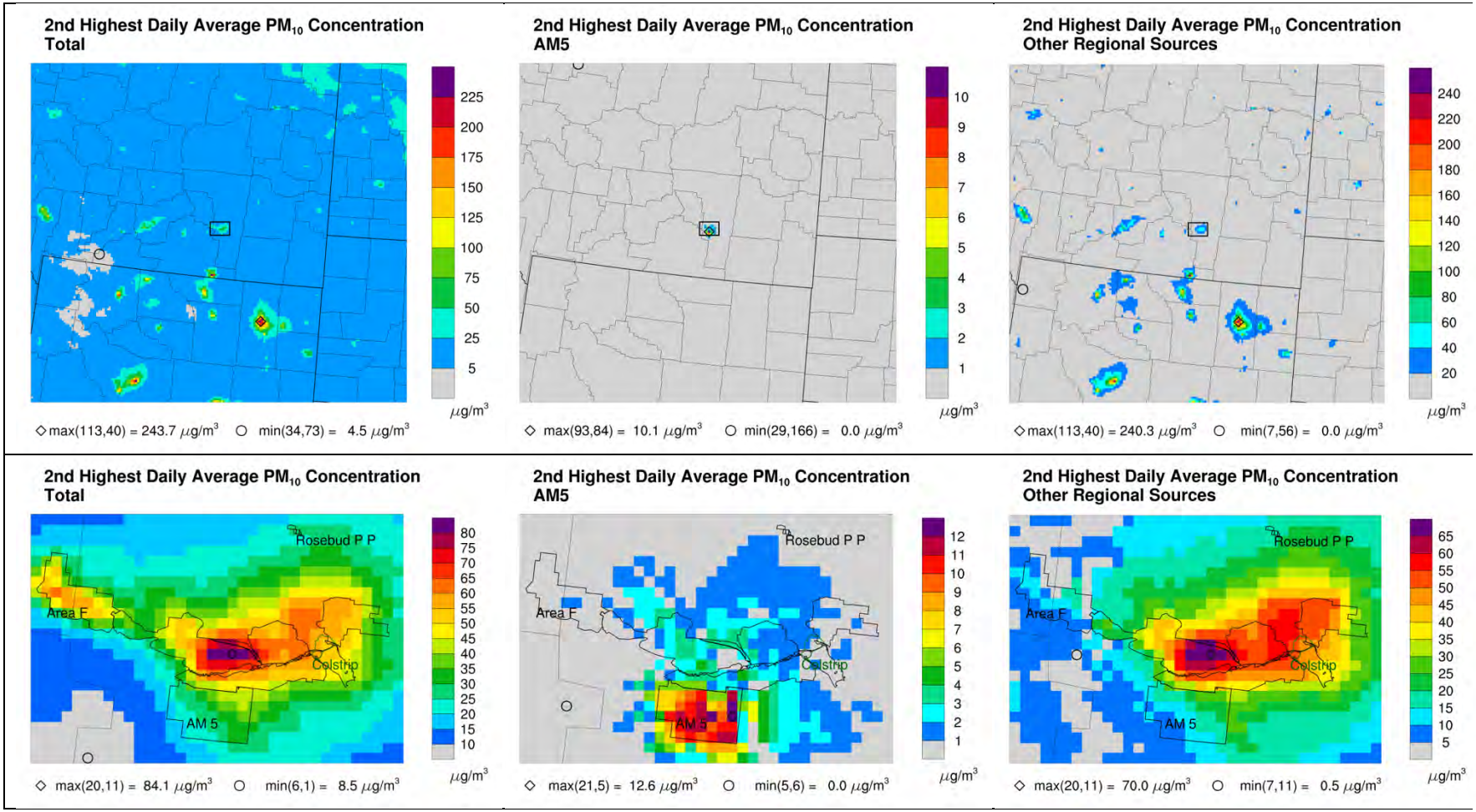


Figure D-6-7. Spatial distribution of cumulative 2nd highest daily PM_{10} (left) and contributions from AM5 (middle) and other regional sources (right) within the 4 km (top) and 1 km (bottom) modeling domains, respectively.

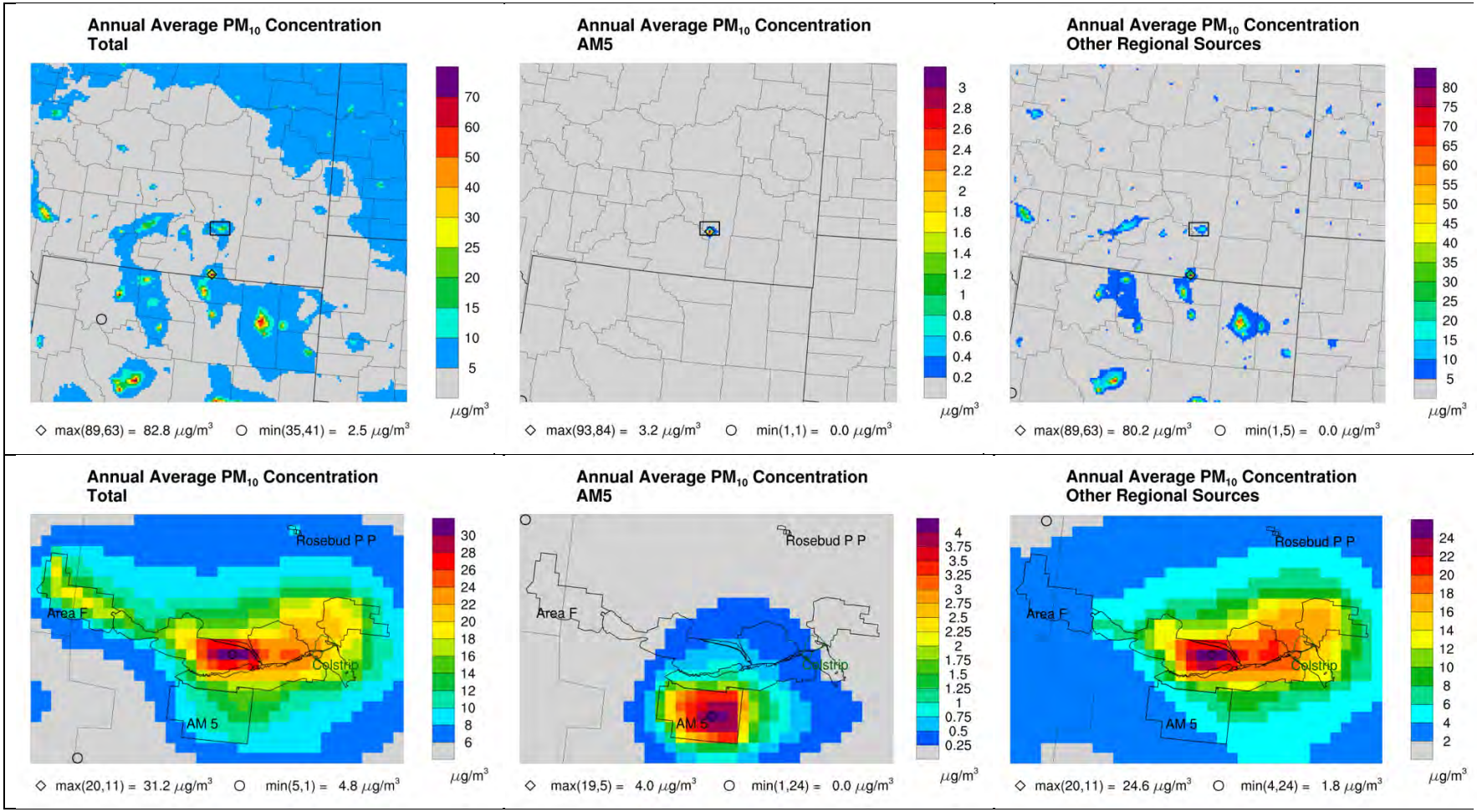


Figure D-6-8. Spatial distribution of cumulative annual average PM_{10} (left) and contributions from AM5 (middle) and other regional sources (right) within the 4 km (top) and 1 km (bottom) modeling domains, respectively.

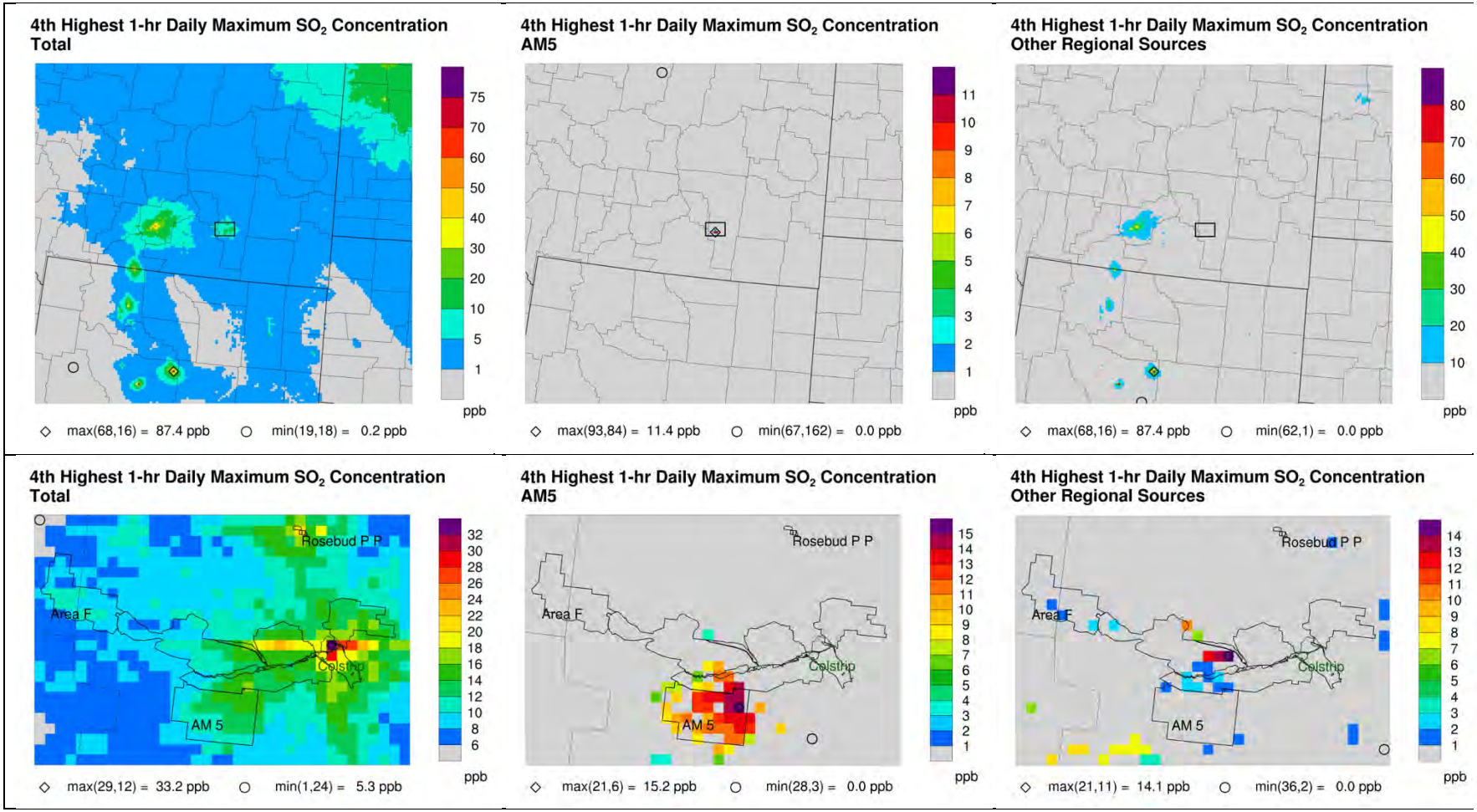


Figure D-6-9. Spatial distribution of cumulative 4th highest 1-hour SO_2 (left) and contributions from AM5 (middle) and other regional sources (right) within the 4 km (top) and 1 km (bottom) modeling domains, respectively.

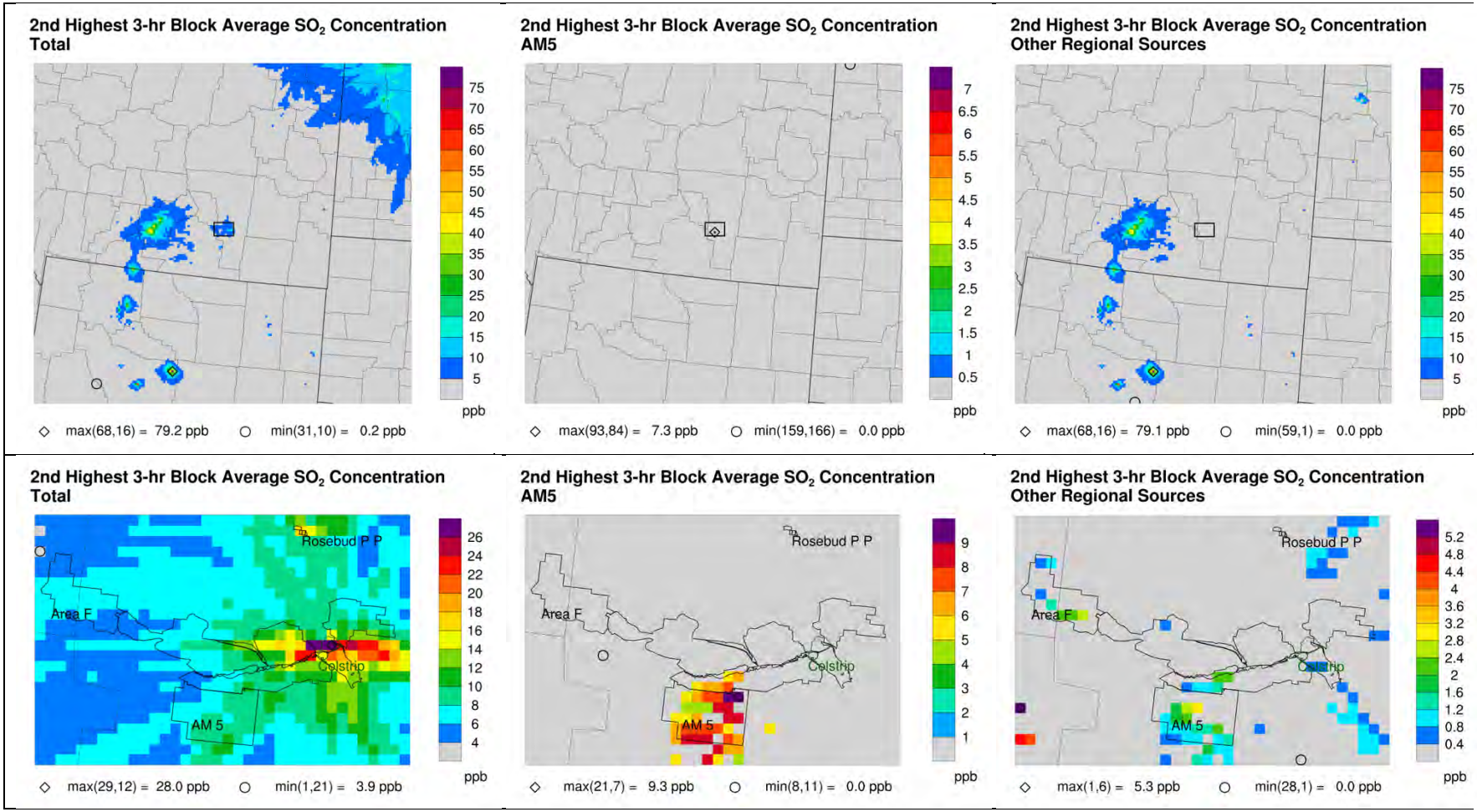


Figure D-6-10. Spatial distribution of cumulative 2nd highest 3-hour SO_2 (left) and contributions from AM5 (middle) and other regional sources (right) within the 4 km (top) and 1 km (bottom) modeling domains, respectively.

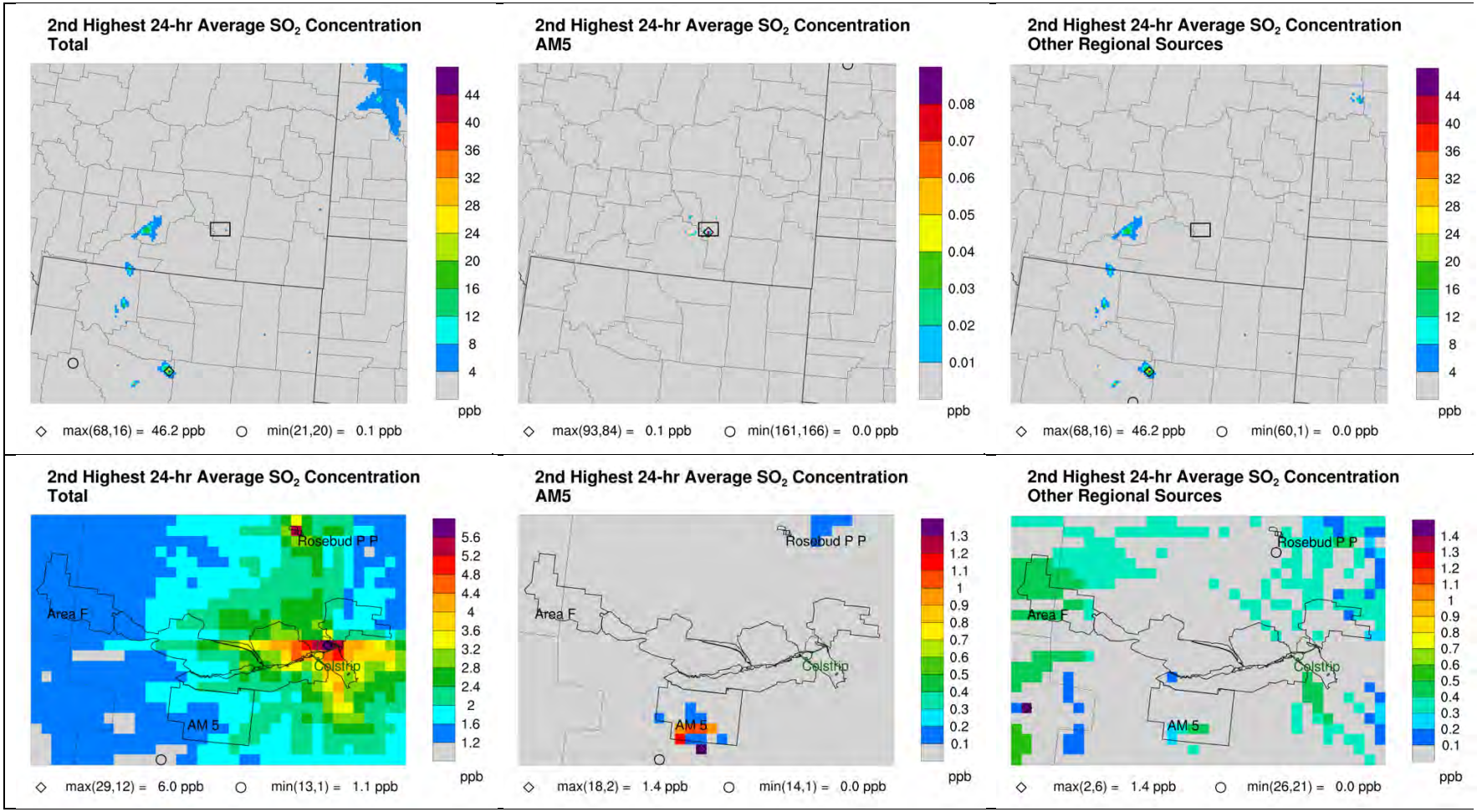


Figure D-6-11. Spatial distribution of cumulative 2nd highest 24-hour SO_2 (left) and contributions from AM5 (middle) and other regional sources (right) within the 4 km (top) and 1 km (bottom) modeling domains, respectively.

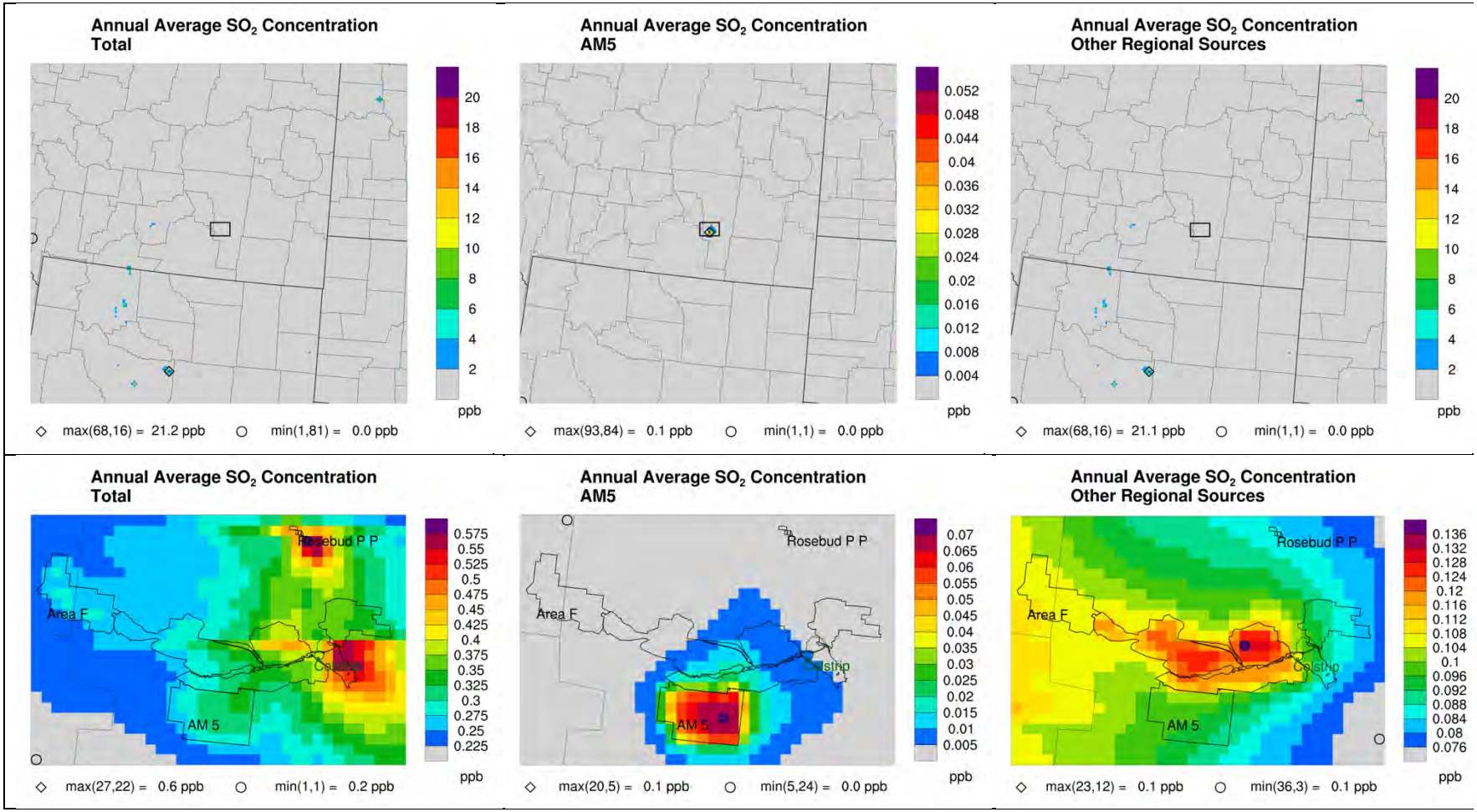


Figure D-6-12. Spatial distribution of cumulative annual average SO_2 (left) and contributions from AM5 (middle) and other regional sources (right) within the 4 km (top) and 1 km (bottom) modeling domains, respectively.

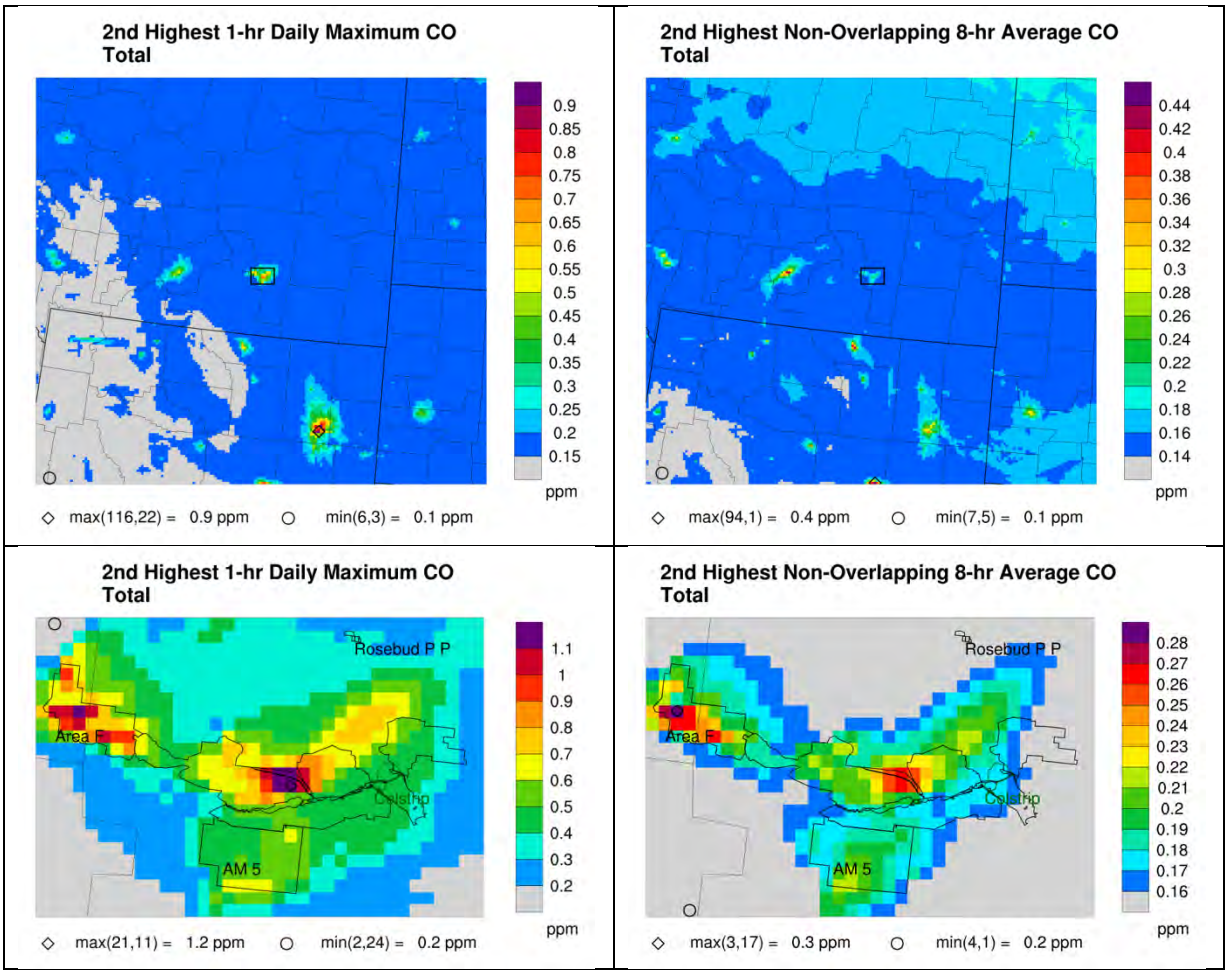


Figure D-6-13. Spatial distribution of cumulative 2nd highest 1-hour (left) and 8-hour (right) CO concentrations within the 4 km (top) and 1 km (bottom) modeling domains, respectively.

Table D-6-12. CAMx modeling results at Nonattainment/Maintenance Areas in Montana and Wyoming within the Air Quality Analysis Area.

(a) Montana

Location	Pollutant	NAAQS Violated	Nonattainment Designation	AQS Site ID	Total (ppb)	Source contribution (ppb)					
						Direct	Indirect	Colstrip 12	AM5	Other Regional Sources	Boundary Conditions
Laurel	SO_2	1971 (24-hr)	March 03, 1978	30-111-0016	6.8	0.0	0.1	0.0	0.0	6.6	0.1
Billings	SO_2	2010 (1-hr)	August 05, 2013	30-111-0066	40.7	0.0	0.0	0.0	0.0	40.7	0.0
Lame Deer	PM_{10}	1987 (24-hr)	November 15, 1990	30-087-0307	17.5	0.0	0.0	0.0	0.2	14.9	2.3

Concentrations may not add up exactly due to rounding.

(b) Wyoming

Location	Pollutant	NAAQS Violated	Nonattainment Designation	AQS Site ID	Total (ppb)	Source contribution (ppb)					
						Direct	Indirect	Colstrip 12	AM5	Other Regional Sources	Boundary Conditions
Sheridan	PM_{10}	1971 (24-hr)	November 15, 1990	56-033-0001	84.9	0.0	0.0	0.0	0.0	82.6	2.1
Sheridan	PM_{10}	1971 (24-hr)	November 15, 1990	56-033-0002	52.1	0.0	0.0	0.0	0.0	48.9	3.0
Sheridan	PM_{10}	1971 (24-hr)	November 15, 1990	56-033-0003	82.5	0.0	0.0	0.0	0.0	79.5	2.8
Sheridan	PM_{10}	1971 (24-hr)	November 15, 1990	56-033-1003	84.9	0.0	0.0	0.0	0.0	82.6	2.1
Upper Green River Basin	O_3	2008 (8-hr)	July 20, 2012	56-035-0097	58.3	0.0	0.0	0.0	0.0	0.0	58.3
Upper Green River Basin	O_3	2008 (8-hr)	July 20, 2012	56-035-0099	59.8	0.0	0.0	0.0	0.0	0.2	59.5
Upper Green River Basin	O_3	2008 (8-hr)	July 20, 2012	56-035-0100	59.4	0.0	0.0	0.0	0.0	0.1	59.4
Upper Green River Basin	O_3	2008 (8-hr)	July 20, 2012	56-035-0101	59.2	0.0	0.0	0.0	0.0	0.3	58.9
Upper Green River Basin	O_3	2008 (8-hr)	July 20, 2012	56-035-0700	59.2	0.0	0.0	0.0	0.0	0.0	59.2

Concentrations may not add up exactly due to rounding

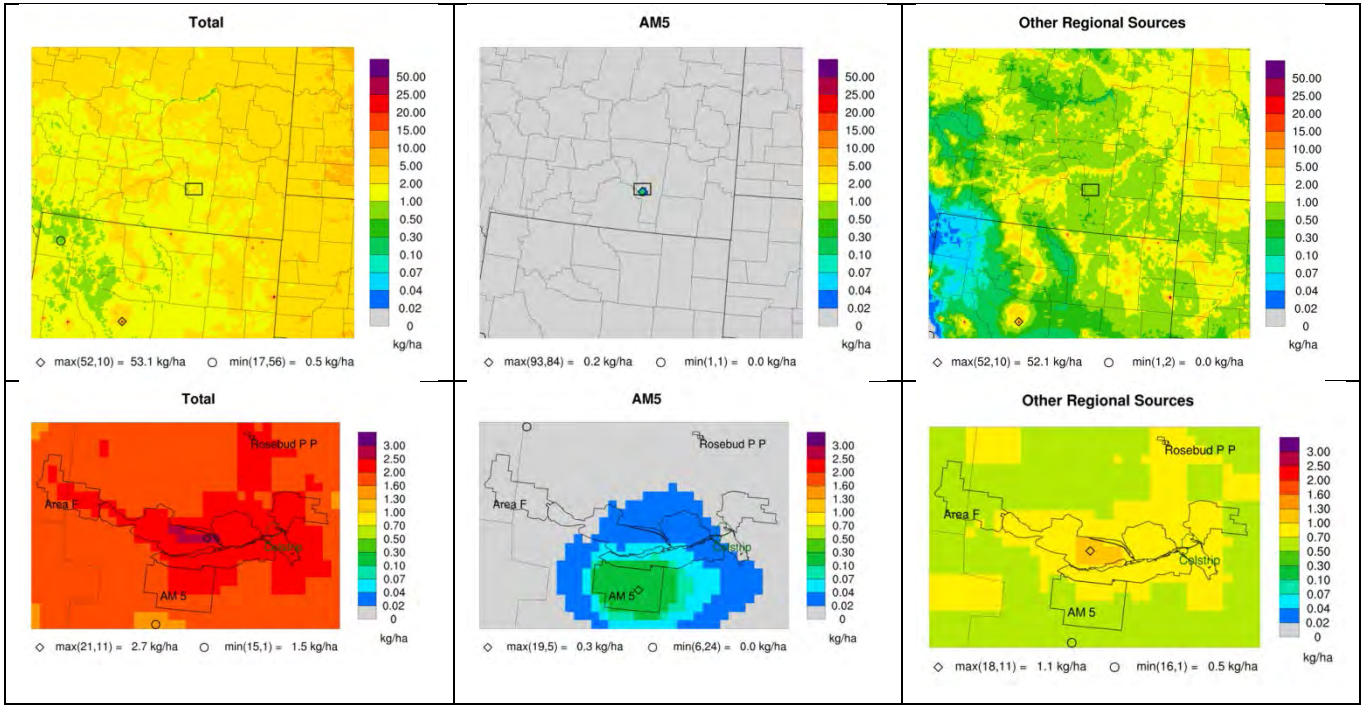


Figure D-6-14. Spatial distribution of annual cumulative nitrogen deposition (left) and contributions from AM5 (middle) and other regional sources (right) within the 4 km (top) and 1 km (bottom) modeling domains, respectively.

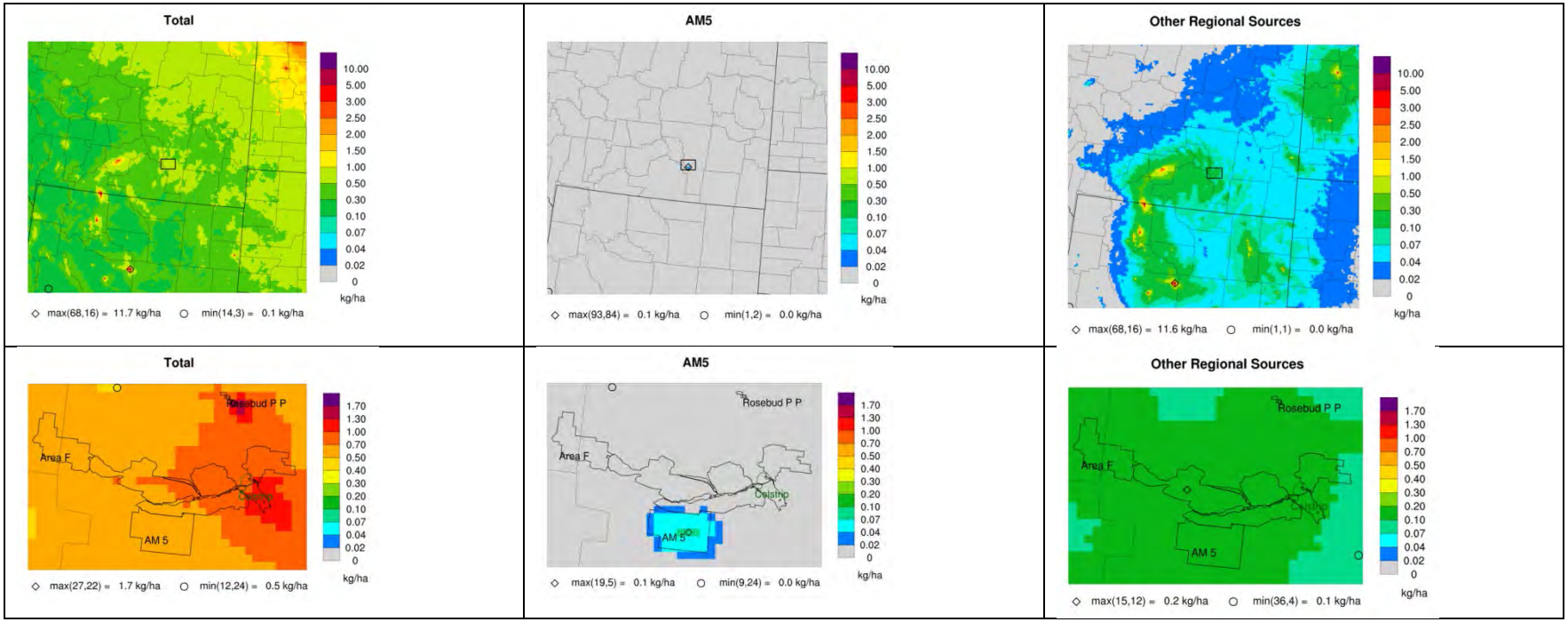


Figure D-6-15. Spatial distribution of annual cumulative sulfur deposition (left) and contributions from AM5 (middle) and other regional sources (right) within the 4 km (top) and 1 km (bottom) modeling domains, respectively.

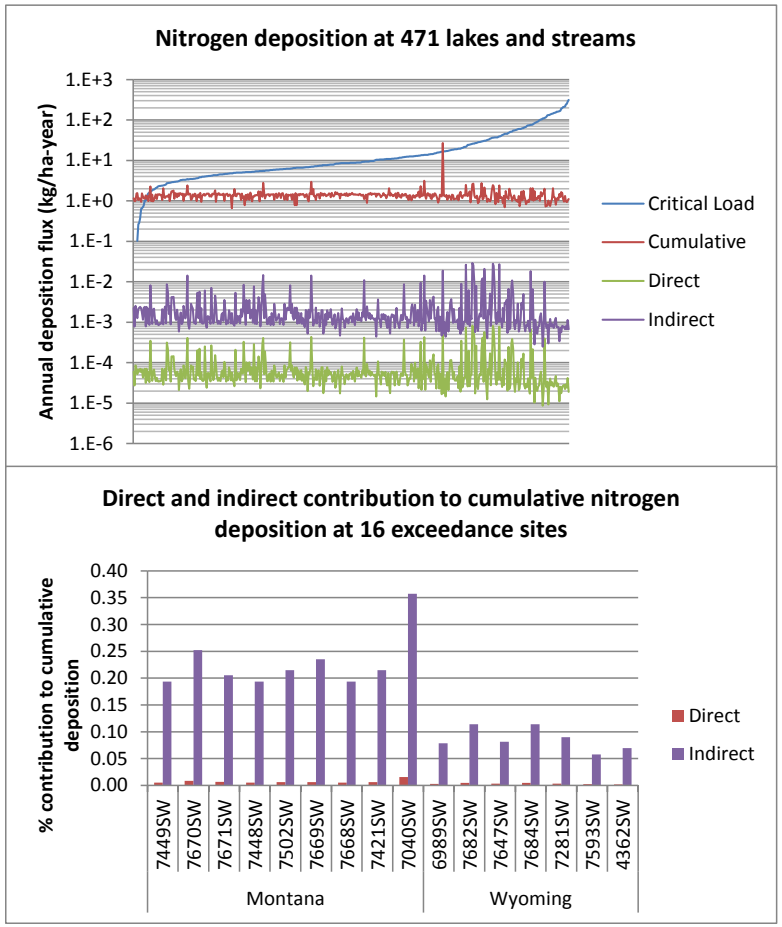


Figure D-6-16. Comparison of cumulative nitrogen deposition to critical loads of nitrogen-based acidity for surface waters (top) and relative contribution of direct and indirect impacts to cumulative deposition at locations with exceedance of the critical load (bottom).

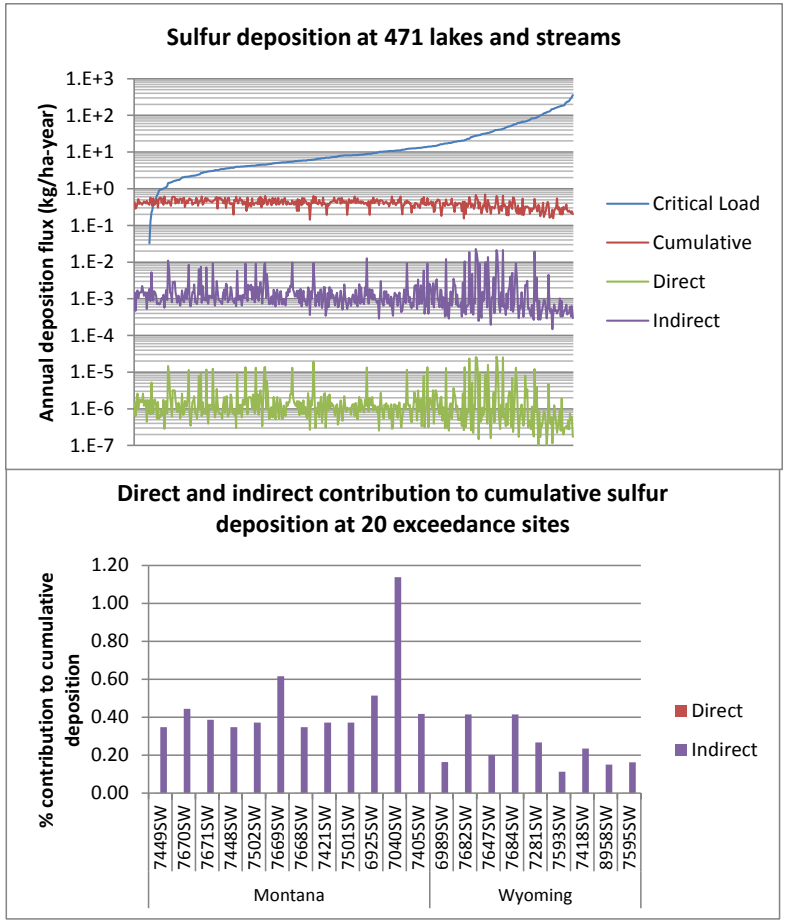
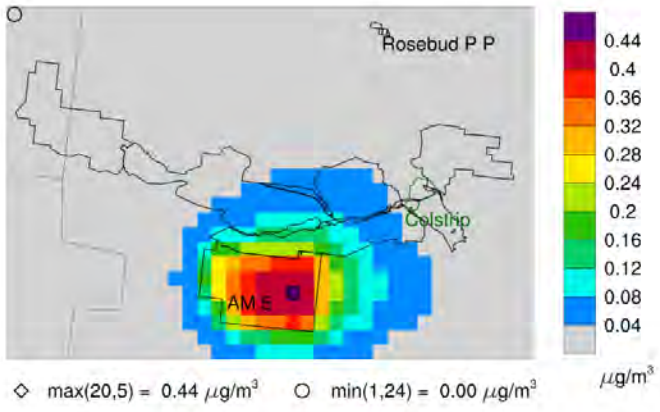
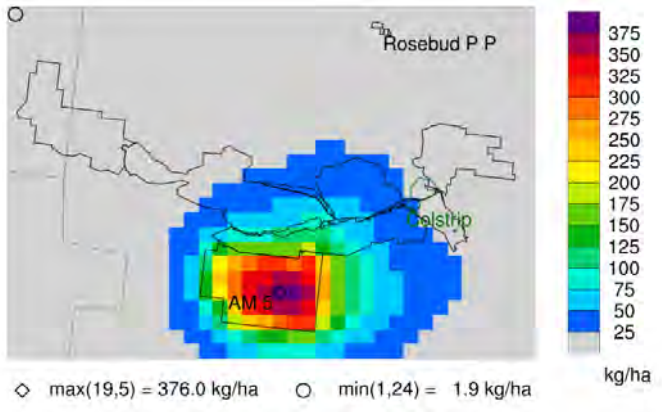


Figure D-6-17. Comparison of cumulative sulfur deposition to critical loads of sulfur-based acidity for surface waters (top) and relative contribution of direct and indirect impacts to cumulative deposition at locations with exceedance of the critical load (bottom).

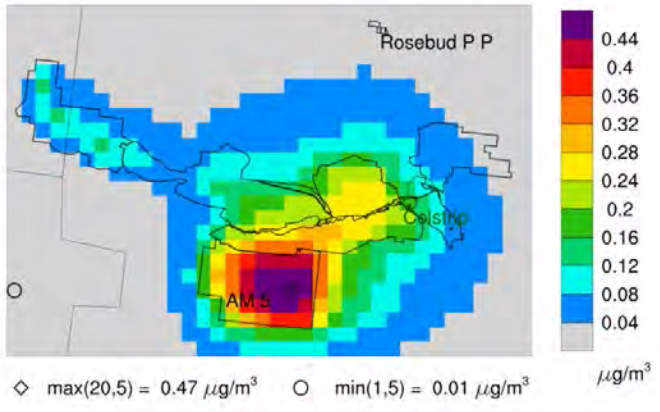
(a) Annual average air concentration of PM_{10} due to AM5 fugitive coal dust emissions



(b) Annual deposition flux of PM_{10} due to AM5 fugitive coal dust emissions



(c) Annual average air concentration of PM_{10} due to all fugitive coal dust emissions from the Rosebud Mine



(d) Annual deposition flux of PM_{10} due to all fugitive coal dust emissions from the Rosebud Mine

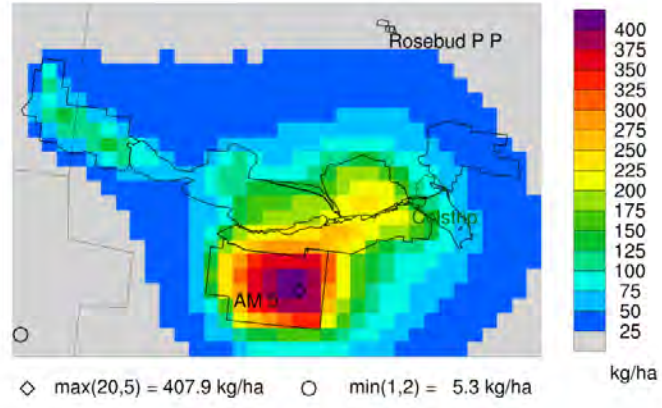
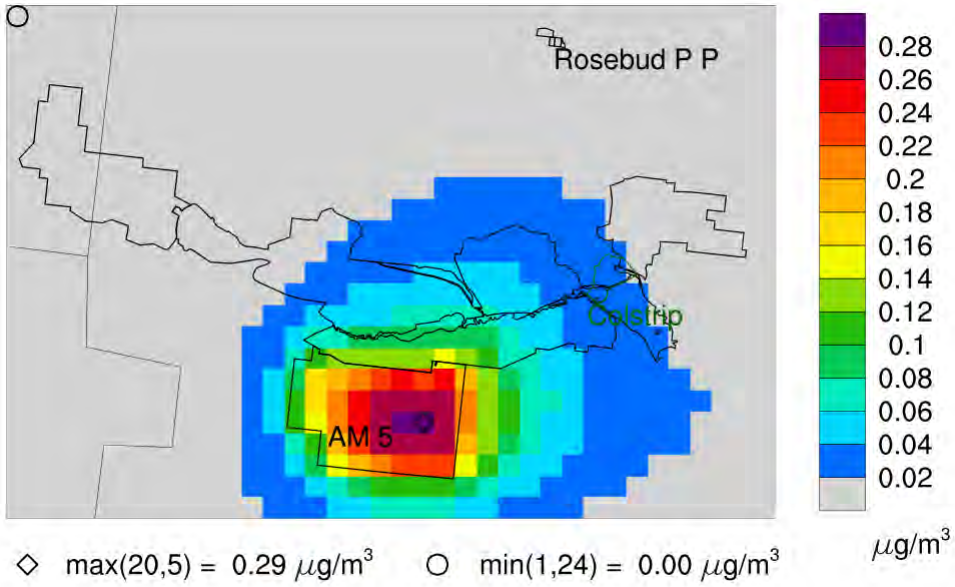


Figure D-6-18. Spatial distribution of the annual average air concentration of PM_{10} (left) and annual deposition of HAP-containing fugitive coal dust (right) due to AM5 emissions (top) and emissions from all coal dust emissions from current and future areas at the Rosebud Mine (bottom).

(a) Annual average air concentration of DPM due to AM5 diesel exhaust emissions



(c) Annual average air concentration of DPM due to all Rosebud Mine diesel exhaust emissions

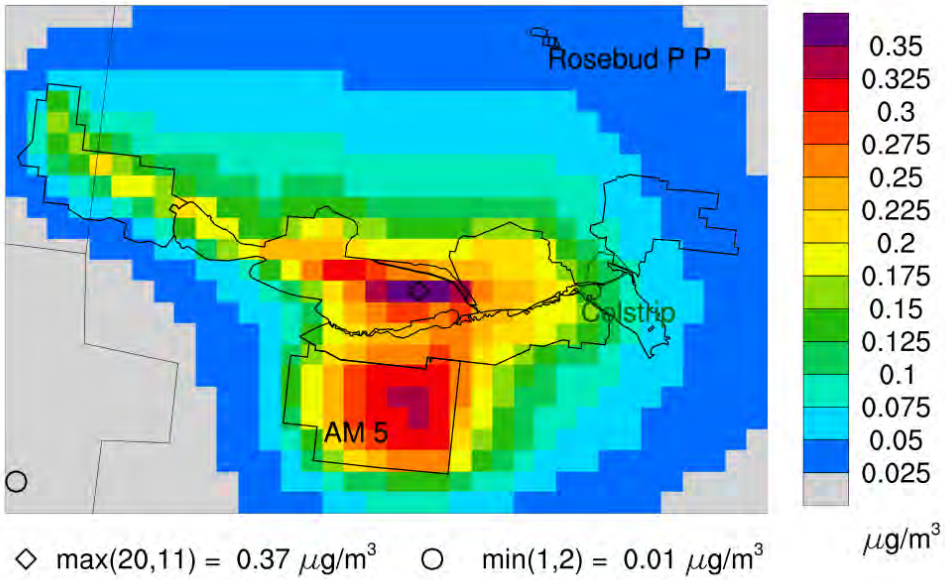


Figure D-6-19. Spatial distribution of annual average DPM air concentrations due to (a) AM5 and (b) total current and future Rosebud Mine diesel exhaust emissions.

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Appendix E – List of Surface Water and Ground Water Rights

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Water Rights Number	Source	Priority Date (yr/mo/day)	Owner	Purpose	County	Township and Range	Section	Quarter Section	Reservoir?	Maximum Flow Rate (Gpm)	Maximum Volume (Ac-ft)	Maximum Acreage (Acres)	Well Depth (feet)
42KJ 106490 00	GROUNDWATER	19811230	WPP LLC	STOCK	Treasure	2N38E	25	SESESW	N	5			
42KJ 108264 00	SPRING. UNNAMED TRIBUTARY OF BLACK HANK CREEK	19111231	WPP LLC	STOCK	Rosebud	2N39E	33	NWSWNW	N				
42KJ 108360 00	GROUNDWATER	19650218	GNP LLC	STOCK	Rosebud	2N39E	25	SESWNE	N	3.5			
42KJ 108365 00	SPRING. UNNAMED TRIBUTARY OF UNNAMED TRIBUTARY OF WEST FORK ARMELLS CREEK	19111231	GREAT NORTHERN PROPERTIES LTD PRTNRSHP	STOCK	Rosebud	2N39E	25	SWSENE	N				
42KJ 108368 00	GROUNDWATER	19650218	GREAT NORTHERN PROPERTIES LTD PRTNRSHP	STOCK	Rosebud	2N39E	25	SESWNE	N	3.5			136
42KJ 108369 00	ARMELLS CREEK. WEST FORK	19680705	GREAT NORTHERN PROPERTIES LTD PRTNRSHP	STOCK	Rosebud	2N39E	25	NWSWSW	Y				
42KJ 108370 00	UNNAMED TRIBUTARY OF UNNAMED TRIBUTARY OF WEST FORK ARMELLS CREEK	19680705	GREAT NORTHERN PROPERTIES LTD PRTNRSHP	STOCK	Rosebud	2N39E	25	SWNWNE	Y				
42KJ 108371 00	SPRING. UNNAMED TRIBUTARY OF TRAIL CREEK	19111231	GREAT NORTHERN PROPERTIES LTD PRTNRSHP	STOCK	Treasure	2N38E	1	SWNENW	N				
42KJ 108381 00	GROUNDWATER	19431231	GREAT NORTHERN PROPERTIES LTD PRTNRSHP	STOCK	Rosebud	2N39E	19	SWNESW	N	5			235
42KJ 108385 00	UNNAMED TRIBUTARY OF TRAIL CREEK	19680628	GREAT NORTHERN PROPERTIES LTD PRTNRSHP	STOCK	Treasure	2N38E	1	SENENW	Y				
42KJ 108386 00	SPRING. UNNAMED TRIBUTARY OF TRAIL CREEK	19111231	GREAT NORTHERN PROPERTIES LTD PRTNRSHP	STOCK	Treasure	2N38E	1	SENWNW	N				
42KJ 108387 00	SPRING. UNNAMED TRIBUTARY OF TRAIL CREEK	19111231	GREAT NORTHERN PROPERTIES LTD PRTNRSHP	STOCK	Treasure	2N38E	1	NWSENW	N				
42KJ 108393 00	SPRING. UNNAMED TRIBUTARY OF ROBBIE CREEK	19130610	WPP LLC	STOCK	Treasure	2N38E	13	SWSWSW	N				
42KJ 108394 00	SPRING. UNNAMED TRIBUTARY OF MCCLURE CREEK	19130610	WPP LLC	STOCK	Treasure	2N38E	13	SWSENW	N				
42KJ 108395 00	SPRING. UNNAMED TRIBUTARY OF ROBBIE CREEK	19130610	WPP LLC	STOCK	Treasure	2N38E	13	SESWSE	N				
42KJ 108396 00	SPRING. UNNAMED TRIBUTARY OF MCCLURE CREEK	19111231	WPP LLC	STOCK	Treasure	2N38E	13	NWNENW	N				
42KJ 108397 00	DONLEY CREEK	19680628	WPP LLC	STOCK	Treasure	2N38E	25	SESESW	Y				
42KJ 108399 00	SPRING. UNNAMED TRIBUTARY OF UNNAMED TRIBUTARY OF WEST FORK ARMELLS CREEK	19111231	GREAT NORTHERN PROPERTIES LTD PRTNRSHP	STOCK	Rosebud	2N39E	25	NWSESE	N				
42KJ 108400 00	GROUNDWATER	19591231	GREAT NORTHERN PROPERTIES LTD PRTNRSHP	STOCK	Rosebud	2N39E	29	SWSWNW	N	10			110
42KJ 108401 00	UNNAMED TRIBUTARY OF UNNAMED TRIBUTARY OF WEST FORK ARMELLS CREEK	19680705	WPP LLC	STOCK	Rosebud	2N39E	35	NESWNW	Y				
42KJ 108407 00	SPRING. UNNAMED TRIBUTARY OF UNNAMED TRIBUTARY OF WEST FORK ARMELLS CREEK	19111231	WPP LLC	STOCK	Rosebud	2N39E	35	SWNWSW	N				
42KJ 108513 00	GROUNDWATER	19700226	BNSF RAILWAY CO	STOCK	Rosebud	2N39E	15	NWSENW	N	5			
42KJ 108673 00	SPRING. UNNAMED TRIBUTARY OF MCCLURE CREEK	19111231	WPP LLC	STOCK	Treasure	2N38E	13	SENWNE	N				
42KJ 111926 00	SPRING. UNNAMED TRIBUTARY OF UNNAMED TRIBUTARY OF WEST FORK ARMELLS CREEK	19081231	HOWARD FAMILY REVOCABLE TRUST	STOCK	Rosebud	2N39E	24	SENENW	N				
42KJ 145450 00	UNNAMED TRIBUTARY OF ARMELLS CREEK. WEST FORK	19561231	SALMOND RANCH CO	STOCK	Rosebud	2N39E	3	NWSESW	Y				
42KJ 162796 00	UNNAMED TRIBUTARY OF DONLEY CREEK	19441231	BOOTH LAND & LIVESTOCK CO	STOCK	Rosebud	2N39E	31	SWSESW	Y				
42KJ 162797 00	GROUNDWATER	19500630	BOOTH LAND & LIVESTOCK CO	STOCK	Rosebud	2N39E	31	NWSESW	N	5			
42KJ 162798 00	GROUNDWATER	19500630	BOOTH LAND & LIVESTOCK CO	STOCK	Rosebud	2N39E	31	SESWNE	N	5			220
42KJ 162799 00	GROUNDWATER	19640519	WESTERN ENERGY CO	STOCK	Rosebud	2N39E	27	NWNWSE	N	4.5			156
42KJ 162812 00	SPRING. UNNAMED TRIBUTARY OF DONLEY CREEK	19341231	WESTERN ENERGY CO	STOCK	Rosebud	2N39E	27	SWNWSE	N	3			
42KJ 162813 00	UNNAMED TRIBUTARY OF DONLEY CREEK	19501231	BOOTH LAND & LIVESTOCK CO	STOCK	Rosebud	2N39E	31	SENWSW	Y				
42KJ 162814 00	GROUNDWATER	19571130	WESTERN ENERGY CO	STOCK	Rosebud	2N39E	34	NWSENE	N	9			120
42KJ 162828 00	UNNAMED TRIBUTARY OF DONLEY CREEK	19341231	WESTERN ENERGY CO	STOCK	Rosebud	2N39E	27	NWNWSE	Y				
42KJ 162844 00	SPRING. UNNAMED TRIBUTARY OF UNNAMED TRIBUTARY OF WEST FORK ARMELLS CREEK	19570731	WESTERN ENERGY CO	STOCK	Rosebud	2N39E	26	NESESE	N	6			
42KJ 162845 00	GROUNDWATER	19631231	WESTERN ENERGY CO	STOCK	Rosebud	2N39E	8	NWNENE	N	6			14
42KJ 162850 00	GROUNDWATER	19481231	BOOTH LAND & LIVESTOCK CO	STOCK	Rosebud	2N39E	32	SESESE	N	10			
42KJ 162852 00	SPRING. UNNAMED TRIBUTARY OF DONLEY CREEK	19341231	WESTERN ENERGY CO	STOCK	Rosebud	2N39E	27	SWNWSE	N	3			
42KJ 162853 00	SPRING. UNNAMED TRIBUTARY OF DONLEY CREEK	19431231	BOOTH LAND & LIVESTOCK CO	STOCK	Rosebud	2N39E	31	SWSESW	N				
42KJ 177098 00	ARMELLS CREEK. WEST FORK	19070913	KL RANCH LLC	STOCK	Rosebud	2N39E	2	E2E2	N				
42KJ 177100 00	SPRING. UNNAMED TRIBUTARY OF UNNAMED TRIBUTARY OF WEST FORK ARMELLS CREEK	19140710	KL RANCH LLC	STOCK	Rosebud	2N39E	2	NWNESW	N				
42KJ 177102 00	DONLEY CREEK	19070904	KL RANCH LLC	STOCK	Rosebud	2N39E	14	N2NE	N				
42KJ 177102 00	DONLEY CREEK	19070904	KL RANCH LLC	STOCK	Rosebud	2N39E	14	W2SW	N				
42KJ 177102 00	DONLEY CREEK	19070904	KL RANCH LLC	STOCK	Rosebud	2N39E	14	SWNW	N				
42KJ 177102 00	DONLEY CREEK	19070904	KL RANCH LLC	STOCK	Rosebud	2N39E	14	N2NW	N				
42KJ 177103 00	ARMELLS CREEK. WEST FORK	19090419	KL RANCH LLC	STOCK	Rosebud	2N39E	12	W2W2	N				
42KJ 177107 00	GROUNDWATER	19470807	KL RANCH LLC	STOCK	Rosebud	2N39E	24	NESWSW	N	5			
42KJ 177108 00	SPRING. UNNAMED TRIBUTARY OF UNNAMED TRIBUTARY OF WEST FORK ARMELLS CREEK	19110731	KL RANCH LLC	STOCK	Rosebud	2N39E	24	NESENW	N				
42KJ 177109 00	GROUNDWATER	19590206	KL RANCH LLC	STOCK	Rosebud	2N39E	24	SESESW	N	5			
42KJ 177110 00	GROUNDWATER	19470701	KL RANCH LLC	STOCK	Rosebud	2N39E	22	SWNWSW	N	12			
42KJ 177111 00	GROUNDWATER	19600523	KL RANCH LLC	STOCK	Rosebud	2N39E	12	SWSWSW	N	5			
42KJ 177112 00	GROUNDWATER	19280901	KL RANCH LLC	STOCK	Rosebud	2N39E	12	SWSWSW	N	5			
42KJ 177113 00	GROUNDWATER	19470725	KL RANCH LLC	STOCK	Rosebud	2N39E	10	SWNWNW	N	5			
42KJ 177606 00	GROUNDWATER	19501231	WESTERN ENERGY CO	DOMESTIC	Rosebud	2N39E	26	SESWSE	N	5	1		
42KJ 177607 00	GROUNDWATER	19571130	WESTERN ENERGY CO	DOMESTIC	Rosebud	2N39E	34	NWSENE	N	9	0.6	0.25	120
42KJ 183227 00	SPRING. UNNAMED TRIBUTARY OF TRAIL CREEK	19360430	BOOTH LAND & LIVESTOCK CO	STOCK	Treasure	2N38E	1	NWSWSW	N	5			
42KJ 183228 00	SPRING. UNNAMED TRIBUTARY OF TRAIL CREEK	19360430	BOOTH LAND & LIVESTOCK CO	STOCK	Treasure	2N38E	1	SENWSW	N	5			
42KJ 183229 00	SPRING. UNNAMED TRIBUTARY OF TRAIL CREEK	19360430	BOOTH LAND & LIVESTOCK CO	STOCK	Treasure	2N38E	1	SWNWNW	N	5			
42KJ 183230 00	SPRING. UNNAMED TRIBUTARY OF TRAIL CREEK	19360430	BOOTH LAND & LIVESTOCK CO	STOCK	Treasure	2N38E	1	SWSENE	N	5			
42KJ 183231 00	UNNAMED TRIBUTARY OF TRAIL CREEK	19481231	BOOTH LAND & LIVESTOCK CO	STOCK	Treasure	2N38E	1	SWNENW	Y				

42KJ 183234 00	SPRING. UNNAMED TRIBUTARY OF HORSE CREEK	19361231	BOOTH BROS LAND & LIVESTOCK	STOCK	Treasure	2N38E	10	NWSENW	N	7				
42KJ 183235 00	SPRING. UNNAMED TRIBUTARY OF HORSE CREEK	19470430	BOOTH BROS LAND & LIVESTOCK	STOCK	Treasure	2N38E	10	SESWSE	N	7				
42KJ 183236 00	HORSE CREEK	19361231	BOOTH BROS LAND & LIVESTOCK	STOCK	Treasure	2N38E	14	NWSWNW	Y					
42KJ 183237 00	GROUNDWATER	19361231	BOOTH BROS LAND & LIVESTOCK	STOCK	Treasure	2N38E	14	SWSWNW	N	8				
42KJ 183333 00	GROUNDWATER	19500531	BOOTH LAND & LIVESTOCK CO	STOCK	Rosebud	2N39E	6	NWSWNW	N	8				
42KJ 183334 00	GROUNDWATER	19500531	BOOTH BROS LAND & LIVESTOCK	STOCK	Rosebud	2N39E	6	SWNWNW	N	8				
42KJ 183338 00	GROUNDWATER	19520630	BOOTH BROS LAND & LIVESTOCK	STOCK	Rosebud	2N39E	17	NESWSE	N	8				
42KJ 183339 00	SPRING. UNNAMED TRIBUTARY OF MCCLURE CREEK	19500430	BOOTH BROS LAND & LIVESTOCK	STOCK	Rosebud	2N39E	18	SENWNE	N	8				
42KJ 183348 00	UNNAMED TRIBUTARY OF HORSE CREEK	19530831	BOOTH BROS LAND & LIVESTOCK	STOCK	Treasure	2N38E	22	NWSENE	Y					
42KJ 183350 00	SPRING. UNNAMED TRIBUTARY OF ROBBIE CREEK	19370430	BOOTH BROS LAND & LIVESTOCK	STOCK	Treasure	2N38E	23	NWSENE	N	8				
42KJ 183351 00	ROBBIE CREEK	19370531	BOOTH BROS LAND & LIVESTOCK	STOCK	Treasure	2N38E	26	NWNENW	Y					
42KJ 183352 00	GROUNDWATER	19520831	BOOTH BROS LAND & LIVESTOCK	STOCK	Treasure	2N38E	24	NWSWNW	N	20				
42KJ 183353 00	SPRING. UNNAMED TRIBUTARY OF ROBBIE CREEK	19520831	BOOTH BROS LAND & LIVESTOCK	STOCK	Treasure	2N38E	24	NENWNE	N					
42KJ 183486 00	GROUNDWATER	19500531	BOOTH BROS LAND & LIVESTOCK	STOCK	Rosebud	2N39E	6	NWNWSW	N	8				
42KJ 183492 00	SPRING. UNNAMED TRIBUTARY OF ROBBIE CREEK	19520831	BOOTH BROS LAND & LIVESTOCK	STOCK	Treasure	2N38E	24	NWNWNW	N					
42KJ 183493 00	UNNAMED TRIBUTARY OF HORSE CREEK	19401231	BOOTH BROS LAND & LIVESTOCK	STOCK	Treasure	2N38E	15	SWSESW	Y					
42KJ 183493 00	UNNAMED TRIBUTARY OF HORSE CREEK	19401231	BOOTH BROS LAND & LIVESTOCK	STOCK	Treasure	2N38E	22	NWNENW	Y					
42KJ 183494 00	GROUNDWATER	19470430	BOOTH BROS LAND & LIVESTOCK	STOCK	Treasure	2N38E	15	SESWSW	N	10				
42KJ 183497 00	TRAIL CREEK	19570831	BOOTH BROS LAND & LIVESTOCK	STOCK	Rosebud	2N39E	7	NESENE	Y					
42KJ 183497 00	TRAIL CREEK	19570831	BOOTH BROS LAND & LIVESTOCK	STOCK	Rosebud	2N39E	8	NWSWNW	Y					
42KJ 183498 00	SPRING. UNNAMED TRIBUTARY OF MCCLURE CREEK	19540831	BOOTH BROS LAND & LIVESTOCK	STOCK	Rosebud	2N39E	8	NENWSW	N	8				
42KJ 183499 00	GROUNDWATER	19570430	BOOTH BROS LAND & LIVESTOCK	STOCK	Rosebud	2N39E	7	NESWNE	N	10				
42KJ 183500 00	UNNAMED TRIBUTARY OF TRAIL CREEK	19550430	BOOTH BROS LAND & LIVESTOCK	STOCK	Rosebud	2N39E	7	SWSENW	N					
42KJ 183501 00	TRAIL CREEK	19540831	BOOTH BROS LAND & LIVESTOCK	STOCK	Rosebud	2N39E	7	SWSENW	Y					
42KJ 183501 00	TRAIL CREEK	19540831	BOOTH BROS LAND & LIVESTOCK	STOCK	Rosebud	2N39E	7	SESWNW	Y					
42KJ 183502 00	UNNAMED TRIBUTARY OF TRAIL CREEK	19111015	BOOTH BROS LAND & LIVESTOCK	STOCK	Rosebud	2N39E	6	NESENE	Y					
42KJ 183503 00	UNNAMED TRIBUTARY OF TRAIL CREEK	19111015	BOOTH BROS LAND & LIVESTOCK	STOCK	Rosebud	2N39E	6	NWSWNW	Y					
42KJ 183508 00	SPRING. UNNAMED TRIBUTARY OF BLACK HANK CREEK	19130729	BOOTH BROS LAND & LIVESTOCK	STOCK	Rosebud	2N39E	32	SESWNE	N					
42KJ 183509 00	GROUNDWATER	19360430	BOOTH BROS LAND & LIVESTOCK	STOCK	Rosebud	2N39E	32	NWNWNE	N	8				
42KJ 183510 00	SPRING. UNNAMED TRIBUTARY OF DONLEY CREEK	19270430	BOOTH BROS LAND & LIVESTOCK	STOCK	Rosebud	2N39E	30	SENWSE	N					
42KJ 183511 00	GROUNDWATER	19540831	BOOTH BROS LAND & LIVESTOCK	STOCK	Rosebud	2N39E	28	NWNESW	N	8				
42KJ 183512 00	BLACK HANK CREEK	19560430	BOOTH BROS LAND & LIVESTOCK	STOCK	Rosebud	2N39E	28	NWSWNE	Y					
42KJ 183513 00	DONLEY CREEK	19540831	BOOTH BROS LAND & LIVESTOCK	STOCK	Rosebud	2N39E	28	NWNWNW	Y					
42KJ 183513 00	DONLEY CREEK	19540831	BOOTH BROS LAND & LIVESTOCK	STOCK	Rosebud	2N39E	29	NENENE	Y					
42KJ 183514 00	GROUNDWATER	19560430	BOOTH BROS LAND & LIVESTOCK	STOCK	Rosebud	2N39E	20	SWNWSE	N	6				
42KJ 183532 00	ROBBIE CREEK	19130610	BOOTH BROS LAND & LIVESTOCK	STOCK	Rosebud	2N39E	17	S2	N					
42KJ 19562 00	GROUNDWATER	19780719	KL RANCH LLC	STOCK	Rosebud	2N39E	14	NWNW	N	8	1.5		180	
42KJ 25022 00	TRAIL CREEK	19560701	MONTANA. STATE OF BOARD OF LAND COMMISSIONERS	STOCK	Treasure	2N38E	12	SENWNW	Y					
42KJ 28394 00	GROUNDWATER	19800729	BOOTH LAND & LIVESTOCK CO	STOCK	Rosebud	2N39E	31	SENE	N	10	6.72		40	
42KJ 30011413	GROUNDWATER	20040712	SALMOND RANCH CO	STOCK	Rosebud	2N39E	11	NESW	N				160	
42KJ 30011417	GROUNDWATER	20040712	SALMOND RANCH CO	STOCK	Rosebud	2N39E	5	N2	N				100	
42KJ 30044356	GROUNDWATER	20081015	KL RANCH LLC	STOCK	Rosebud	2N39E	12	NWNW	N	10	3.95		220	
42KJ 38017 00	SPRING. UNNAMED TRIBUTARY OF HORSE CREEK	19450930	BOOTH LAND & LIVESTOCK CO	STOCK	Treasure	2N38E	34	NWNWNE	N					
42KJ 42782 00	GROUNDWATER	19450415	MONTANA. STATE OF BOARD OF LAND COMMISSIONERS	STOCK	Rosebud	2N39E	16	NWNWSE	N	18				
42KJ 42798 00	GROUNDWATER	19820319	GREAT NORTHERN PROPERTIES LTD PRTNRSHP	STOCK	Rosebud	2N39E	15	NWSENW	N	5	2.25			
42KJ 4389 00	GROUNDWATER	19741211	BOOTH BROS LAND & LIVESTOCK	DOMESTIC/STOCK	Treasure	2N38E	24	SENW	N	10			90	
42KJ 44608 00	GROUNDWATER	19480901	BOOTH BROS LAND & LIVESTOCK	STOCK	Treasure	2N38E	26	NWNENE	N	30			225	
42KJ 44613 00	SPRING. UNNAMED TRIBUTARY OF TRAIL CREEK	19150101	BOOTH BROS LAND & LIVESTOCK	STOCK	Treasure	2N38E	12	NENESW	N					
42KJ 44616 00	SPRING. UNNAMED TRIBUTARY OF TRAIL CREEK	19400101	BOOTH BROS LAND & LIVESTOCK	STOCK	Treasure	2N38E	11	NENESE	N					
42KJ 44618 00	UNNAMED TRIBUTARY OF TRAIL CREEK	19670501	BOOTH BROS LAND & LIVESTOCK	STOCK	Treasure	2N38E	11	NWNENE	Y					
42KJ 44618 00	UNNAMED TRIBUTARY OF TRAIL CREEK	19670501	BOOTH BROS LAND & LIVESTOCK	STOCK	Treasure	2N38E	11	NENWNE	Y					
42KJ 44621 00	GROUNDWATER	19390501	BOOTH BROS LAND & LIVESTOCK	STOCK	Treasure	2N38E	11	SWSWSW	N	5				
42KJ 44622 00	GROUNDWATER	19560712	BOOTH BROS LAND & LIVESTOCK	STOCK	Rosebud	2N39E	30	NENWSW	N	10				
42KJ 44628 00	ROBBIE CREEK	19500731	BOOTH BROS LAND & LIVESTOCK	STOCK	Treasure	2N38E	26	W2NENW	Y					
42KJ 45734 00	GROUNDWATER	19820415	KL RANCH LLC	STOCK	Rosebud	2N39E	23	SESENW	N	3	1.5			
42KJ 45735 00	GROUNDWATER	19820415	KL RANCH LLC	DOMESTIC	Rosebud	2N39E	12	SWSWSW	N	5	2			
42KJ 46519 00	GROUNDWATER	19820427	WESTERN ENERGY CO	STOCK	Rosebud	2N39E	27	SWSWSW	N	10	3.4			
42KJ 46520 00	GROUNDWATER	19820427	WESTERN ENERGY CO	STOCK	Rosebud	2N39E	34	SENESE	N	10	3.4			
42KJ 47995 00	SPRING. UNNAMED TRIBUTARY OF ARMELLS CREEK. WEST FORK	19500415	MONTANA. STATE OF BOARD OF LAND COMMISSIONERS	STOCK	Rosebud	2N39E	36	NENWSW	N					
42KJ 56479 00	GROUNDWATER	19840618	GREAT NORTHERN PROPERTIES LTD PRTNRSHP	STOCK	Rosebud	2N39E	15	SENESE	N	15	0.5		80	
42KJ 58982 00	GROUNDWATER	19850813	KL RANCH LLC	STOCK	Rosebud	2N39E	2	NESW	N	10	0.5		80	
42KJ 68059 00	GROUNDWATER	19880223	KL RANCH LLC	STOCK	Rosebud	2N39E	12	NENW	N	12	1.26		51	
42KJ 8211 00	MCCLURE CREEK	19400415	MONTANA. STATE OF BOARD OF LAND COMMISSIONERS	STOCK	Rosebud	2N39E	18	SESWNW	Y					

Appendix F – Comments on the DEIS and Responses (to be included in the Final EIS)

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