June 24, 2019

Jim Parker
Talen Montana, LLC – Colstrip Steam Electric Station
580 Willow Ave.
P.O. Box 38
Colstrip, MT 59323

Dear Mr. Parker:

Montana Air Quality Permit #0513-12 is deemed final as of June 22, 2019, by the Department of Environmental Quality (Department). This permit is for a coal-fired electric generating facility. 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 A. Merkel
Permitting Services Section Supervisor
Air Quality Bureau
(406) 444-3626

Ed Warner
Lead Engineer – Permitting Services Section
Air Quality Bureau
(406) 444-2467

JM:EW
Enclosure

Montana Department of Environmental Quality
Air, Energy & Mining Division

Montana Air Quality Permit #0513-12

Talen Montana, LLC – Colstrip Steam Electric Station
580 Willow Ave.
P.O. Box 38
Colstrip, MT 59323

June 22, 2019

MONTANA AIR QUALITY PERMIT

Issued To: Talen Montana, LLC Colstrip Steam Electric Station 580 Willow Ave., P.O. Box 38 Colstrip, MT 59323	MAQP: #0513-12 Application Complete: 4/12/19 Preliminary Decision Issued: 5/17/2019 Department Decision Issued: 6/6/2019 Permit Final: 6/22/2019 AFS #: 087-0008

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

SECTION I: Permitted Facilities

A. Permitted Facility

Talen operates Colstrip Units 1, 2, 3, and 4 tangential coal-fired boilers and associated equipment for the generation of electricity. The Talen Colstrip facility is located in Section 34, Township 2 North, Range 41 East, in Rosebud County, Montana. A complete listing of facility equipment is found in the Permit Analysis.

B. Current Permit Action

On April 8, 2019, the Department of Environmental Quality (Department) received an MAQP application in accordance with the requirements of ARM 17.8.771(9) to address the Best Available Control Technology (BACT) requirement for mercury emissions. ARM 17.8.771(9) requires that no later than 10 years after issuance of a permit containing a mercury emission limit under ARM 17.8.771(1)(b)(i), and every 10 years thereafter, the affected facility must file an application to establish a revised mercury emission limit. This application fulfills this requirement. This action retains the mercury emission limit of 0.9 pounds per trillion British thermal units (lb/TBtu) on a rolling 12-month average basis.

SECTION II: Conditions and Limitations

A. Emission Limitations

1. Talen shall not cause or authorize emissions to be discharged into the outdoor atmosphere from any sources installed on or before November 23, 1968, that exhibit an opacity of 40% or greater averaged over 6 consecutive minutes (ARM 17.8.304).

2. Talen shall not cause or authorize emissions to be discharged into the outdoor atmosphere from any sources installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes (ARM 17.8.304).

3. Talen shall not cause or authorize emissions to be discharged into the outdoor atmosphere from the truck dump and lime silo bin vent, that exhibit an opacity

of 20% or greater averaged over 6 consecutive minutes (ARM 17.8.752 and 40 CFR 60, Subpart Y).

4. Talen shall not cause or authorize emissions to be discharged into the atmosphere from haul roads, access roads, parking lots, or the general plant property without taking reasonable precautions to control emissions of airborne particulate matter (ARM 17.8.308).

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

6. Talen shall comply with all applicable standards and limitations, and the reporting, recordkeeping, and notification requirements contained in 40 CFR 60, Subpart Y. Subpart Y affected sources include the truck dump station, the lime silo bin vent, and any other affected source constructed or modified after October 24, 1974 (ARM 17.8.340 and 40 CFR 60, Subpart Y).

7. Talen shall maintain and operate skirting, minimal volumes, and small drop distances at off-loading systems and bin vent filter systems to provide the maximum air pollution control for that which the systems were designed (ARM 17.8.752).

8. Units 1&2 shall be limited to a maximum of 700,800 tons of Syncoal during any rolling 12-month period (ARM 17.8.752).

9. Units 1&2 shall be limited to a maximum of 280,320 tons of petroleum coke during any rolling 12-month period (ARM 17.8.749).

10. The petroleum coke truck dump system particulate emissions shall be controlled by a partially enclosed dump basin, minimized dropping distances, covered conveyor belts, and an underground and enclosed feeder (ARM 17.8.749).

11. The petroleum coke rail dump system particulate emissions shall be controlled by an underground and enclosed dump basin, minimized dropping distances, covered conveyor belts, and an underground and enclosed feeder (ARM 17.8.749).

12. Talen shall maintain and operate the scrubbers to control emissions on Units 1&2 (ARM 17.8.749).

13. Talen shall be limited to a maximum fuel use of 28% petroleum coke for each of the Units 1&2, based on the maximum heat input value of the units (ARM 17.8.749).

14. Emissions of particulate matter from either Units 3 or 4 shall not exceed the following limits (ARM 17.8.749):

    a. 0.05 pounds per million British thermal units (lb/MMBtu); and

b. 379 pounds per hour (lb/hr).

15. Emissions of sulfur dioxide (SO2) from either Units 3 or 4 shall not exceed the following limits (these are stack emission limits; no percent sulfur reduction limit applies) (ARM 17.8.749):

    a. 761 lb/hr, averaged over any rolling 30-day period, calculated each day at midnight, using hourly data calculated each hour on the hour;

    b. 0.18 lb/MMBtu heat input, averaged over any calendar-day, not to be exceeded more than once during any calendar-month;

    c. 1363 lb/hr, averaged over any calendar-day, not to be exceeded more than once during any calendar-month; and

    d. 1% sulfur content of the coal (as received).

16. Talen shall be limited to 4,140 lb/hr of SO2, averaged over any 3-hour rolling period from both Units 3 and 4 stacks combined (ARM 17.8.749).

17. Emissions of NOx from either Unit 3 or 4 shall not exceed the following limits:

    a. 0.70 lb/MMBtu heat input when burning coal. If fuel other than coal is burned, the allowable NOx emission rate shall be determined by the following equation (40 CFR 60, Subpart D):

    $$E = \frac{0.2x + 0.3y + 0.7z}{x + y + z}$$

    Where: E is the allowable emissions in lb/MMBtu heat input,
    x is the fraction of total heat input derived from gaseous fuels,
    y is the fraction of total heat input derived from liquid fuels,
    z is the fraction of total heat input derived from solid fuels.

    b. 5,301 lb/hr.

18. Beginning January 1, 2008, for Unit 3 and January 19, 2010, for Unit 4, Talen shall not exceed any of the following NOx emission limits from Units 3 or 4 (ARM 17.8.749 and Consent Decree CV-07-40-BLG-RFC-CSO entered 5/14/07):

    a. 30-day rolling average emission rate of:

        i. 0.18 lb/MMBtu weighted average for each hour that either unit is operating above 400 gross megawatts (MW); and

        ii. 0.30 lb/MMBtu weighted average for each hour that either unit is operating at or below 400 gross MW;

    b. 1,363 lb/hr 30-day rolling average emission rate for each unit;

c. 24-hour average emission rate of:

i. 0.25 lb/MMBtu weighted average for each hour that either unit is operating above 400 gross MW; and

ii. 0.30 lb/MMBtu weighted average for each hour that either unit is operating at or below 400 gross MW;

d. 1,893 lb/hr 24-hour average emission rate for each unit.

For the purposes of Section II.A.18, if a unit is operating above 400 MW for part of one hour and at or below 400 MW for the remainder of that hour, the applicable emissions limits shall be based on the average load for the hour. In addition, the emission rates for Section II.A.18 limits are considered for an operating day in which any fuel is combusted in the unit.

19. Talen shall operate digital controls, low-NOx burners and overfire air on Unit 3 sufficient to meet the emissions limits in Section II.A.18 (ARM 17.8.749 and Consent Decree CV-07-40-BLG-RFC-CSO entered 5/14/07).

20. By January 1, 2009, Talen shall complete the final design and by January 19, 2010, Talen shall install and operate digital controls, low-NOx burners and overfire air on Unit 4 sufficient to meet the Unit 4 emissions limits in Section II.A.18 (ARM 17.8.749 and Consent Decree CV-07-40-BLG-RFC-CSO entered 5/14/07 with stipulation filed 12/22/2009).

21. The Unit 3 and 4 NOx emission limits specified in Section II.A.18 shall apply at all times, including periods of start-up, shutdown, load fluctuation, maintenance and malfunction, regardless of cause (ARM 17.8.749 and Consent Decree CV-07-40-BLG-RFC-CSO entered 5/14/07).

22. Emissions from either Unit 3 or 4 shall not exhibit an opacity of 20% or greater over any 6-minute period. The opacity provisions of 40 CFR 60.42 are applicable (ARM 17.8.340).

23. Units 3 and 4 shall each be limited to a maximum heat input of 6.63 x 107 MMBtu over any rolling 12-month period (ARM 17.8.749).

24. Beginning January 1, 2010, facility-wide emissions of mercury (Hg) shall not exceed 0.9 pounds mercury per trillion British thermal units (lb/TBtu), calculated as a rolling 12-month average. The facility-wide emissions shall be calculated according to the following equation (ARM 17.8.771):

$$\text{Facility-wide Hg emissions} = \frac{(\text{Unit1}_{\text{lbHg/TBtu}} + \text{Unit2}_{\text{lbHg/TBtu}} + \text{Unit3}_{\text{lbHg/TBtu}} + \text{Unit4}_{\text{lbHg/TBtu}})}{4}$$

Where: $\text{Unit1}_{\text{lbHg/TBtu}}$ = rolling 12-month mercury emissions from Unit 1 as an average of the last 12 individual calendar monthly averages.

$Unit2_{lbHg/TBtu}$ = rolling 12-month mercury emissions from Unit 2 as an average of the last 12 individual calendar monthly averages.

$Unit3_{lbHg/TBtu}$ = rolling 12-month mercury emissions from Unit 3 as an average of the last 12 individual calendar monthly averages.

$Unit4_{lbHg/TBtu}$ = rolling 12-month mercury emissions from Unit 4 as an average of the last 12 individual calendar monthly averages.

25. On each Unit 1-4, Talen shall install a mercury control system that oxidizes and sorbs emissions of mercury. Talen shall implement the operation and maintenance of mercury control systems on or before January 1, 2010 (ARM 17.8.771).

26. Talen shall comply with all applicable standards and limitations, and the applicable operating, reporting, recordkeeping, and notification requirements contained in 40 CFR Part 75 (ARM 17.8.771).

27. Talen shall operate and maintain the mercury oxidizer/sorbent handling systems, including the bin vent filter systems, to provide the maximum air pollution control for that which the systems were designed (ARM 17.8.749).

28. The mechanical evaporators at the wastewater pond site each shall not exceed 2000 hours of operation during any rolling 12-month time period. This mechanical evaporation system shall consist of no more than (ARM 17.8.749 and 17.8.752):

    a. 8 Minetek (or demonstrated equivalent) evaporator units.

    b. 31 Slimline (or demonstrated equivalent) evaporator units.

29. Talen shall maintain wind fences at the wastewater pond site as shown in Attachment 3, at a minimum or to a greater extent, to provide containment of particulate matter generated from the evaporated water plumes (ARM 17.8.749).

30. Talen shall operate the mechanical evaporation system at the wastewater pond site using best management practices, including specific operational controls based on wind speed, wind direction, ambient air temperature, and relative humidity to help contain the potential evaporation drift within the pond. The evaporators shall not be operated during meteorological conditions that fall outside of the following operational parameters (ARM 17.8.752):

Minetek Operational Parameters

Wind Direction			N	NE	E	SE	S	SW	W	NW
Max Wind Speed (mph)			25	20	5	5	10	10	25	25
Directional Parameters	Center (°)		0	45	90	135	180	225	270	315
	Min (°)		337.5	22.5	67.5	112.5	157.5	202.5	247.5	292.5
	Max (°)		22.5	67.5	112.5	157.5	202.5	247.5	292.5	337.5
Wind Speed (mph)	<=5	Max Humidity (%)	90	90	60	60	60	60	90	90
		Min Temp. (°F)	47	47	47	47	47	47	47	47
	<=10	Max Humidity (%)	90	90					90	90
		Min Temp. (°F)	47	47					47	47
	<=15	Max Humidity (%)	90	90					90	90
		Min Temp. (°F)	47	47					47	47
	<=20	Max Humidity (%)	90	90					90	90
		Min Temp. (°F)	47	47					47	0
	<=25	Max Humidity (%)	90						90	90
		Min Temp. (°F)	47						47	47

Slimline Operational Parameters

Wind Direction (Blowing From)			N	NE	E	SE	S	SW	W	NW
Max Wind Speed (mph)			20	5	5	5	17	20	20	20
Directional Parameters	Center (°)		0	45	90	135	180	225	270	315
	Min (°)		337.5	22.5	67.5	112.5	157.5	202.5	247.5	292.5
	Max (°)		22.5	67.5	112.5	157.5	202.5	247.5	292.5	337.5
Wind Speed (mph)	<=5	Max Humidity (%)	70	65	65	65	65	70	65	65
		Min Temp. (°F)	50	50	50	50	50	50	50	50
	<=10	Max Humidity (%)	65				60	65	60	60
		Min Temp. (°F)	50				55	50	55	55
	<=15	Max Humidity (%)	60				60	60	60	60
		Min Temp. (°F)	55				55	55	55	55
	<=20	Max Humidity (%)	55					60	55	60
		Min Temp. (°F)	60					55	60	55
	<=25	Max Humidity (%)								
		Min Temp. (°F)								
	<=30	Max Humidity (%)								
		Min Temp. (°F)								

31. Talen shall comply with the following limitations related to the delivery and processing of coal received at the unloading facilities for truck and/or railcar:

    a. The maximum combined amount of coal that may be received by Talen at the truck and railcar unloading facilities shall not exceed 7 million tons per rolling 12-month period (ARM 17.8.749).

    b. Particulate emissions from material transfers for truck or rail unloading points and conveyor drops shall be controlled by utilizing watering to the extent practicable and partial enclosures (ARM 17.8.752).

c. Plant roads used for transporting coal deliveries to the truck unloading facilities shall be paved. Trucks shall cover loads and comply with posted speed limits (ARM 17.8.752).

d. The paved roads referenced in Section II.A.31.c shall be flushed with water as necessary followed by sweeping to minimize particulate emissions (ARM 17.8.752).

e. Talen shall minimize the particulate emissions from the storage pile of coal transferred from truck or rail unloading facilities by utilizing a chemical surfactant to crust over any inactive portion of the pile and applying water spray, to the extent practicable, to any active portion of the pile (ARM 17.8.752).

f. Chemical dust suppressant shall be applied as necessary to the unpaved area around the storage pile experiencing front-end loader traffic to minimize particulate emissions. Front end loader traffic shall comply with posted speed limits (ARM 17.8.752).

32. Talen shall comply with all applicable standards and limitations, and the reporting, recordkeeping, and notification requirements contained in 40 CFR 63, Subpart UUUUU. Subpart UUUUU affected sources include Units 1, 2, 3, and 4 (ARM 17.8.342 and 40 CFR 63, Subpart UUUUU).

33. Talen shall comply with all applicable standards and limitations, and the reporting, recordkeeping, and notification requirements contained in 40 CFR 63, Subpart ZZZZ. Subpart ZZZZ applies to the emergency diesel generators (ARM 17.8.342 and 40 CFR 63, Subpart ZZZZ).

B. Testing Requirements

1. Talen shall conduct annual stack tests, or another testing/monitoring schedule as may be approved by the Department, for total particulate and demonstrate compliance with the limitations in Section II.A.14. The testing shall be conducted in accordance with 40 CFR 60.46(b)(2)(i). Demonstrations of compliance with the opacity limits, if required during these tests, shall be based on certified opacity monitors unless otherwise specified by the Department (ARM 17.8.104 and ARM 17.8.105).

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

3. The Department may require further testing (ARM 17.8.105).

C. Monitoring Requirements for Units 3 and 4

1. Talen shall install, operate, calibrate, and maintain continuous emission monitoring systems (CEMS) for the following:

   a. A CEMS for the measurement of SO2 shall be operated on each stack (ARM 17.8.340 and 40 CFR 60.45).

   b. A CEMS for the measurement of NOx shall be operated on each stack (ARM 17.8.340 and 40 CFR 60.45).

   c. A CEMS for measurement of carbon dioxide or oxygen shall be operated on each stack (ARM 17.8.340 and 40 CFR 60.45).

   d. A CEMS for the measurement of opacity shall be operated on each stack (ARM 17.8.340 and 40 CFR 60.45).

   e. Continuous monitoring for stack gas temperature, stack gas moisture (where necessary), megawatt production, and Btu per hour (as a function of heat rate and megawatt production) shall be performed on each unit (40 CFR 52.21).

   f. Talen shall maintain the data acquisition system such that load data in MW is recorded no less than once per minute (ARM 17.8.749 and Consent Decree CV-07-40-BLG-RFC-CSO entered 5/14/07).

2. All continuous monitors shall be operated, excess emissions reported, and performance tests conducted in accordance with the requirements of 40 CFR Part 60, Subpart D, 40 CFR 60.7, 60.8, 60.11, 60.13, and 40 CFR 60, Appendix B Performance Specifications #1, #2 and #3, subject to the following:

   a. The requirements of 40 CFR 60.48da - Compliance Provisions (40 CFR 60, Subpart Da) shall apply to Units 3 and 4 (40 CFR 52.21).

   b. The requirements of 40 CFR 60.49da - Emission Monitoring (40 CFR 60, Subpart Da) shall apply to Units 3 and 4 (40 CFR 52.21).

   c. The requirements of 40 CFR 60.50da - Compliance Determination Procedures and Methods (40 CFR 60, Subpart Da) shall apply to Units 3 and 4 (40 CFR 52.21).

   d. The requirements of 40 CFR 60.51da - Reporting Requirements (40 CFR 60, Subpart Da) shall apply to Units 3 and 4 (40 CFR 52.21).

   e. Talen shall operate the required monitors in accordance with the CEMS quality assurance (QA) plan submitted to the Environmental Protection Agency (EPA) in May 1998. This plan may be revised by Talen with the approval of the Department (40 CFR 52.21).

f. Compliance requirements of 40 CFR 60.11(a) shall be amended per Section II.D (40 CFR 52.21).

g. Each monitor modular part (i.e., opacity, SO2, NOx, diluent, and data handling units) of a continuous monitoring system shall attain a minimal annual on-line availability time of 85% and a minimal quarterly availability time of 75% for each individual quarter. Should any given yearly or quarterly availability time drop below these respective limits, Talen shall, within 90 days of the end of the first unexcused year or quarter in question, cause to be delivered to the facility factory-tested and compatible monitor module(s) able to replace the monitor module(s) that had unacceptable availability times, unless Talen can excuse the unacceptable performance by demonstrating within 10 calendar-days of the end of such year or quarter, that the reason for the poor availability time has not caused another previous occurrence of unacceptable availability, and the reason for the particular unavailability in question will be prevented in the future by a more effective maintenance/inventory program (40 CFR 52.21).

h. Upon two non-overlapping periods of unexcused, unacceptable availability of a module (yearly, quarterly, or combination), Talen shall (within 30 days of the end of the year or quarter of the second unacceptable availability period) install, calibrate, operate, maintain, and report emission data using the second compatible module required by Section II.C.2.g. above (40 CFR 52.21).

i. Within 60 days of the end of the year of the quarter causing the second unacceptable availability period under Section II.C.2.h., Talen shall conduct a complete performance evaluation of the entire CEMS for that pollutant under 40 CFR 60.13(c) showing acceptability of the entire CEMS in question unless the module was the data handling unit alone. Within 75 days of the end of the year or quarter causing the second unacceptable availability period, Talen shall furnish the Department with a written report of such evaluations and tests demonstrating acceptability of the system (40 CFR 52.21).

j. In the event of a conflict between the requirements of the referenced federal regulations and the requirements of this permit, the requirements of this permit shall apply.

D. Compliance

1. Compliance with the particulate emission limits in Section II.A.14 shall be based on the source tests required by Section II.B.1 (ARM 17.8.105).

2. Compliance with the SO2 emission limits in Section II.A.15 and 16 shall be based on the CEMS required by Section II.C.1.a and from any stack tests required by the state under the authority of ARM 17.8.104 (ARM 17.8.105 and 40 CFR 52.21).

3. Compliance with the SO2 emission limit in Section II.A.15.d shall be based on available daily composite coal samples as measured by 40 CFR 60, Appendix A, Method 19 or another sampling schedule as approved by the Department. Records shall be maintained according to II.E.7 (ARM 17.8.749).

4. Compliance with the NOx emission limits in Section II.A.17 shall be based on data from the CEMS required by Section II.C.1.b and from any stack tests required by the state under the authority of ARM 17.8.104 (ARM 17.8.105 and 17.8.104).

5. Compliance with the NOx emission limits in Section II.A.18 shall be based on data from the CEMS required by Section II.C.1.b and from any stack tests required by the state under the authority of ARM 17.8.104. The reference methods for determining NOx emission rates shall be those specified in 40 CFR Part 60. The NOx CEMS shall be used in accordance with the operating requirements in 40 CFR Part 75 (ARM 17.8.104, 17.8.105, and Consent Decree CV-07-40-BLG-RFC-CSO entered 5/14/07).

6. Compliance with the opacity limit in Section II.A.22 shall be based on data from the opacity monitor required by Section II.C.1.d and visual emissions observations in accordance with 40 CFR, Part 60, Appendix A, Method 9 Visual Determination of Opacity of Emissions from Stationary Sources (ARM 17.8.105).

7. Compliance with the heat input limit of Section II.A.23 shall be determined based on the total tons of coal combusted in each unit multiplied by a representative average British thermal unit (Btu) content for the coal (ARM 17.8.105).

8. Enforcement of Section II.A.24, where applicable, shall be determined by utilizing data taken from Mercury Emission Monitoring Systems (MEMS), as required in Section II.F, installed on each Unit 1-4. The MEMS shall be comprised of equipment as required in 40 CFR 75.81(a) and defined in 40 CFR 72.2. The above does not relieve Talen from meeting any applicable requirements of 40 CFR Part 75. Testing requirements shall be as specified in 40 CFR Part 75, Section II.D, and II.F of MAQP #0513-11 (ARM 17.8.771).

9. Talen shall document, by month, the hours of operation for each of the mechanical evaporators at the wastewater pond site. By the 25th day of each month, Talen shall total the hours of operation for each evaporator for the previous month. The monthly information will be used to demonstrate compliance with the rolling 12-month limitation in Section II.A.28 (ARM 17.8.749).

10. Talen shall document the meteorological conditions corresponding to the operational controls as described in Section II.A.30 while the mechanical evaporators are operating. This information will be used to demonstrate compliance with the requirement to not operate the evaporators during meteorological conditions that fall outside of the operational controls as described in Section II.A.30 (ARM 17.8.749).

11. Talen shall document the combined amount of coal processed through the truck and railcar unloading facilities. By the 25th of each month, Talen shall total this amount of coal received via truck and railcar for the previous month. This monthly information will be used to demonstrate compliance with the rolling 12-month limitation in Section II.A.31.a (ARM 17.8.749).

12. Talen shall maintain a log recording each time the paved roads for transporting coal received from an offsite mine to the point of unloading are flushed with water and swept. This log will be used to demonstrate compliance with the requirement stated in Section II.A.31.d (ARM 17.8.749).

13. Talen shall maintain a log recording each time chemical surfactant is applied to an inactive portion of the storage pile for coal received from an offsite mine. This log will be used to demonstrate compliance with the requirement stated in Section II.A.31.e (ARM 17.8.749).

14. Talen shall maintain a log recording each time chemical dust suppressant is applied to the unpaved area surrounding the storage pile for coal received from an offsite mine. This log will be used to demonstrate compliance with the requirement stated in Section II.A.31.f (ARM 17.8.749).

E. Operational and Emission Inventory Reporting Requirements

1. Talen shall submit a written report of excess emissions and monitoring system performance as required by 40 CFR 60.7(c). For the purposes of the report, excess emissions shall be defined as any 6-minute, 3-hour, 24-hour or 30-day period, as applicable, in which the average emissions of the period of concern for opacity, NOx, or SO2 as measured by the CEMS, exceed the applicable emission limitation in Section II.A. For the purposes of reporting excess emissions for the periods:

   a. 6-minute average applies to each 6-minute non-overlapping period starting on the hour.

   b. 3-hour period applies to any running 3-hour period containing three contiguous 1-hour periods, starting on the hour.

   c. 24-hour period applies to any calendar-day.

   d. 30-day period applies to any running period of 30 consecutive calendar-days.

2. Talen shall submit the following information along with the excess emission reports:

   a. The fuel feed rate and associated production figures corresponding to all periods of excess emissions (40 CFR 52.21);

   b. The proximate analysis of the weekly composite sample of the fuel fired in each unit (40 CFR 52.21); and

c. Date, time, and initial calibration values for each required calibration adjustment made on any monitor during the quarter, including any time that the monitor was removed or inoperable for any reason (40 CFR 52.21).

3. Talen will meet the performance standards and emission limitations established under Section II.A.18, to the number of significant digits provided. Talen shall report data to at least the number of significant digits in which the standard or limit is expressed (ARM 17.8.749 and Consent Decree CV-07-40-BLG-RFC-CSO entered 5/14/07).

4. Talen shall document, by month, the total Btu value of the fuel combusted in Units 3 and 4, based on the total tons of coal combusted in each unit multiplied by a representative average Btu content for the coal. By the 25th day of each month, Talen shall calculate the total amount of fuel combusted in Units 3 and 4 during the previous month. The monthly information will be used to verify compliance with the rolling 12-month limitation in Section II.A.23. The information for each of the previous months shall be submitted along with the annual emission inventory (ARM 17.8.749).

5. Talen shall document, by month, the amount of Syncoal used. By the 25th day of each month, Units 1 and 2 shall total the amount of Syncoal used during the previous month. The monthly information will be used to verify compliance with the rolling 12-month limitation in Section II.A.8. The information for each of the previous months shall be submitted along with the annual emission inventory (ARM 17.8.749).

6. Talen shall document, by month, the amount of petroleum coke used. By the 25th day of each month, Units 1 and 2 shall total the amount of petroleum coke used during the previous month. The monthly information will be used to verify compliance with the rolling 12-month limitation in Section II.A.9. The information for each of the previous months shall be submitted along with the annual emission inventory (ARM 17.8.749).

7. Talen 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 required in the emission inventory request. Information 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).

8. Talen shall submit a written report to verify compliance with the limitation in Section II.A.13. The written report shall be submitted quarterly to the Department (ARM 17.8.749).

9. Talen 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 emissions unit, change of 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 startup 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(1)(d) (ARM 17.8.745).

10. All records compiled in accordance with this permit must be maintained by Talen 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).

11. All records compiled in response to Consent Decree CV-07-40-BLG-RFC-CSO shall be retained (Consent Decree CV-07-40-BLG-RFC-CSO entered 5/14/07):

    a. Until December 31, 2020, for records concerning physical or operational changes undertaken in accordance with the require elements contained in Section II.A.18 – II.A.21; and

    b. Until December 31, 2017, for all other records.

12. Talen shall report to the Department within 30 days after the end of each calendar quarter, as described in Attachment 2 (ARM 17.8.749):

    a. For each Unit 1-4, the monthly average lb/TBtu mercury emission rate, for each month of the quarter;

    b. For each Unit 1-4, the 12-month rolling average lb/TBtu mercury emission rate, for each month of the reporting quarter;

    c. The 12-month facility-wide rolling average lb/TBtu mercury emission rate, calculated according to II.A.24, for each month of the reporting quarter; and

    d. For each Unit 1-4, the number of operating hours that the MEMS were unavailable or not operating within quality assurance limits (monitor downtime).

    e. The first quarterly report must be received by the Department by April 30, 2010, but shall not include 12-month rolling averages. The first quarterly report to include 12-month rolling averages must be received by the Department by January 30, 2011.

F. Mercury Emissions Monitoring Systems

A MEMS shall be installed, certified, and operating on each Unit 1-4 stack outlet on or before January 1, 2010. MEMS shall comply with the applicable provisions of 40 CFR Part 75. The monitors shall also conform with requirements included in Attachment 2 (ARM 17.8.771).

SECTION III: General Conditions

A. Inspection – Talen 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 (MEMS, continuous emission monitoring system – CEMS, continuous emission rate monitoring system – CERMS) or observing any monitoring or testing, and otherwise conducting all necessary functions related to this permit.

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

C. Compliance with Statutes and Regulations – Nothing in this permit shall be construed as relieving Talen 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 action 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 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 the Department at the location of the source.

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

Attachment 2 (MEMS)

MEMS

a. For each Unit 1-4, Talen shall install, calibrate, certify, maintain, and operate a MEMS to monitor and record the rate of mercury emissions discharged into the atmosphere from all mercury emitting generating units (units) as defined in the Administrative Rules of Montana 17.8.740.

(1) The MEMS shall be comprised of equipment as required in 40 CFR 75.81(a) and defined in 40 CFR 72.2.

(2) The MEMS shall conform to all applicable requirements of 40 CFR Part 75.

(3) The MEMS data will be used to demonstrate compliance with the emission limitations contained in Section II.A.24.

b. Talen shall prepare, maintain and submit a written MEMS Monitoring Plan to the Department.

(1) The monitoring plan shall contain sufficient information on the MEMS and the use of data derived from these systems to demonstrate that all the gaseous mercury stack emissions from each unit are monitored and reported.

(2) Whenever Talen makes a replacement, modification, or change in a MEMS or alternative monitoring system under 40 CFR 75 subpart E, including a change in the automated data acquisition and handling system (DAHS) or in the flue gas handling system, that affects information reported in the monitoring plan (e.g. a change to a serial number for a component of a monitoring system), then the owner or operator shall update the monitoring plan.

(3) If any monitoring plan information requires an update pursuant to Section b.(2), submission of the written monitoring plan update shall be completed prior to or concurrent with the submittal of the quarterly report required in c. below for the quarter in which the update is required.

(4) The initial submission of the Monitoring Plan to the Department shall include a copy of a written Quality Assurance/Quality Control (QA/QC) Plan as detailed in 40 CFR 75 Appendix B, Section 1. Subsequently, the QA/QC Plan need only be submitted to the Department when it is substantially revised. Substantial revisions can include items such as changes in QA/QC processes resulting from rule changes, modifications in the frequency or timing of QA/QC procedures, or the addition/deletion of equipment or procedures.

(5) The Monitoring Plan shall include, at a minimum, the following information:

(a) Facility summary including:

(i) A description of each mercury emitting generating unit at the facility.

(ii) Maximum and average loads (in megawatts (MW)) with fuels combusted and fuel flow rates at the maximum and average loads for each unit.

(iii) A description of each unit's air pollution control equipment and a description of the physical characteristics of each unit's stack.

(b) Mercury emission control summary including a description of control strategies, equipment, and design process rates.

(c) MEMS description, including:

(i) Identification and description of each monitoring component in the MEMS including manufacturer and model identifications; monitoring method descriptions; and normal operating scale and units descriptions. Descriptions of stack flow, diluent gas, and moisture monitors (if used) in the system must be described in addition to the mercury monitor or monitors.

(ii) A description of the normal operating process for each monitor including a description of all QA/QC checks.

(iii) A description of the methods that will be employed to verify and maintain the accuracy and precision of the MEMS calibration equipment.

(iv) Identification and description of the DAHS, including major hardware and software components, conversion formulas, constants, factors, averaging processes, and missing data substitution procedures.

(v) A description of all initial certification and ongoing recertification tests and frequencies; as well as all accuracy auditing tests and frequencies.

(d) The Maximum Potential Concentration (MPC), Maximum Expected Concentration (MEC), span value, and range value as applicable and as defined in 40 CFR 75 Appendix A, 2.1.7.

(e) Examples of all data reports required in c. below.

c. Talen shall submit written, Quarterly Mercury Monitoring Reports. The reports shall be received by the Department within 30 days following the end of each calendar quarter, and shall include, at a minimum, the following:

(1) Mercury emissions. The reports shall include:

(a) For each Unit 1-4, the monthly average lb/TBtu mercury emission rate for each month of the quarter;

(b) For each Unit 1-4, the 12-month rolling average lb/TBtu emission rate for each month of the reporting quarter. The rolling 12-month basis is an average of the last 12 individual calendar monthly averages, with each monthly average calculated at the end of each calendar month;

(c) For each Unit 1-4, the total heat input to the boiler (in TBtu) for each 12-month rolling period of the quarter; and

(d) The 12-month facility-wide rolling average lb/TBtu mercury emission rate, calculated according to Permit Section II.A.24, for each month of the quarter.

(2) Mercury excess emissions. The report shall describe the magnitude of excess mercury emissions experienced during the quarter, including:

(a) The date and time of commencement and completion of each period of excess emissions. Periods of excess emissions shall be defined as those emissions calculated on a rolling 12-month basis which are greater than the limitation established in II.A.24.

(b) The nature and cause of each period of excess emissions and the corrective action taken or preventative measures adopted in response.

(c) If no periods of excess mercury emissions were experienced during the quarter, the report shall state that information.

(3) MEMS performance. The report shall describe:

(a) The number of operating hours that the MEMS was unavailable or not operating within quality assurance limits (monitor downtime) during the reporting quarter, broken down by the following categories:

- Monitor equipment malfunctions;
- Non-Monitor equipment malfunctions;
- Quality assurance calibration;
- Other known causes; and
- Unknown causes.

(b) The percentage of unit operating time that the MEMS was unavailable or not operating within quality assurance limits (monitor downtime) during the reporting quarter. The percentage of monitor downtime in each calendar quarter shall be calculated according to the following formula:

$$MEMSDowntime\% = \left(\frac{MEMSDownHours}{OpHours} \right) \times 100 \quad \text{where}$$

MEMSDowntime% =	Percentage of unit operating hours classified as MEMS monitor downtime during the reporting quarter.
MEMSDownHours =	Total number of hours of MEMS monitor downtime during the reporting quarter.
OpHours =	Total number of hours the unit operated during the reporting quarter.

(c) For any reporting quarter in which monitor downtime exceeds 10%, a

description of each time period during which the MEMS was inoperative or operating in a manner defined in 40 CFR Part 75 as "out of control." Each description must include the date, start and end times, total downtime (in hours), the reason for the system downtime, and any necessary corrective actions that were taken. In addition, the report shall describe the values used for any periods when missing data substitution was necessary as detailed in 40 CFR 75.30, *et seq*.

(4) The quarterly report shall include the results of any QA/QC audits, checks, or tests conducted to satisfy the requirements of 40 CFR Part 75 Appendices A, B or K.

(5) Compliance certification. Each quarterly report shall contain a certification statement signed by the facility's responsible official based on reasonable inquiry of those persons with primary responsibility for ensuring that all of the unit's emissions are correctly and fully monitored. The certification shall indicate:

(a) Whether the monitoring data submitted were recorded in accordance with the applicable requirements of 40 CFR Part 75 including the QA/QC procedures and specifications of that part and its appendices, and any such requirements, procedures and specifications of an applicable excepted or approved alternative monitoring method as represented in the approved Monitoring Plan.

(b) That for all hours where data are substituted in accordance with 40 CFR 75.38, the add-on mercury emission controls were operating within the range of parameters listed in the quality-assurance plan for the unit, and that the substitute values do not systematically underestimate mercury emissions.

(6) The format of each component of the quarterly report may be negotiated with the Department's representative to accommodate the capabilities and formats of the facility's DAHS.

(7) Each quarterly report must be received by the Department within 30 days following the end of each calendar reporting period (January-March, April-June, July-September, and October-December).

(8) The electronic data reporting detailed in 40 CFR Part 75 shall not be required unless Montana is able to receive and process data in an electronic format.

d. Talen shall maintain a file of all measurements and performance testing results from the MEMS; all MEMS performance evaluations; all MEMS or monitoring device calibration checks and audits; and records of all adjustments and maintenance performed on these systems or devices recorded in a permanent form suitable for inspection. The file shall be retained on site for at least five years following the date of such measurements and reports. Talen shall make these records available for inspection by the Department and shall supply these records to the Department upon request.

Attachment 3
Wastewater Pond Site Wind Fence Locations
(Wind fences shown as blue lines)

Source: Talen Montana, LLC Montana Air Quality Permit modification application #0513-10 (May 2018), Appendix D, Figure 4, Wind Fence Locations

Montana Air Quality Permit (MAQP) Analysis
Talen Montana, LLC – Colstrip Steam Electric Station
MAQP #0513-12

I. Introduction/Process Description

A. Facility Description

Talen Montana, LLC (Talen) operates Colstrip Steam Electric Station (Colstrip) Units 1, 2, 3 and 4 tangential coal-fired boilers and associated equipment for the generation of electricity. The Talen Colstrip facility is located in Section 34**,** Township 2 North, Range 41 East, in Rosebud County, Montana. A complete listing of facility equipment is found in the Permit Analysis.

B. Permitted Equipment

Talen operates the following equipment, including, but not limited to:

<u>Units 1 and 2</u>

- Unit #1 Tangential Coal-Fired Boiler
- Unit #2 Tangential Coal-Fired Boiler
- Coal Handling System
- Coal Piles
- Emergency Diesel Generators
- Internal Combustion Engine
- Plant Roads
- Process Ponds
- Underground Gasoline Tank
- Syncoal facility
- Petroleum Coke rail dump system
- Petroleum Coke truck dump system
- Unit #1 mercury emission control system (oxidizer/sorber injection system)
- Unit #2 mercury emission control system (oxidizer/sorber injection system)
- Units 1&2 mercury oxidizer/sorber handling system (one mercury sorbant storage silo that accommodates both Units 1&2, and associated fill and conveyance lines)

<u>Units 3 and 4</u>

- Unit #3 coal-fired boiler (778 Megawatts (MW))
- Unit #4 coal-fired boiler (778 MW)
- 16 venturi-type wet scrubbers (8 per unit) for particulate and sulfur dioxide (SO2) control
- Two stacks - 692 feet in height
- Coal transportation, storage and handling facilities
- Coal sampling facilities
- Auxiliary equipment
- Unit #3 mercury emission control system (oxidizer/sorber injection system)
- Unit #4 mercury emission control system (oxidizer/sorber injection system)

- Units 3&4 mercury oxidizer/sorber handling system (two mercury sorbant storage silos and associated fill and conveyance lines)
- Coal Unloading Facilities – Alternate Coal

Mechanical Evaporation System
- 8 Minetek (or demonstrated equivalent) evaporator units
- 31 Slimline (or demonstrated equivalent) evaporator units

C. Permit History

On April 23, 1973, Montana Air Quality Permit **(MAQP) #513-111472 (#0513-00)** was issued to the Montana Power Company (MPC) Colstrip (Colstrip) for the construction of Colstrip Units 1&2, and on August 26, 1981, a permit with the same number was issued to Colstrip for the operation of Colstrip Units 1&2.

MAQP #0513-01 was issued to Colstrip to include the installation and operation of a Syncoal Truck Dump and a lime silo bin vent. Syncoal fines and coarse product are combined to form a blend product that will be supplied to Units 1&2. The installation and operation of these sources will increase the allowable particulate emissions for Units 1&2 by 1.12 ton per year (TPY). MAQP #0513-01 replaced MAQP #0513-00 (513-111472).

MAQP #1187 was issued to MPC on January 20, 1977, for the construction of Colstrip Units 3&4. Because the proposed facility was a major source under the Prevention of Significant Deterioration (PSD) program, the additional review requirements of the PSD program applied to the project. The state did not have authorization to implement the PSD program at the time of the application; therefore, the PSD review was conducted by the Environmental Protection Agency (EPA). EPA issued a PSD permit for the construction of the facility on September 11, 1979.

State **MAQP #1187-M** was issued on February 5, 1980, and **MAQP #1187-M2** was issued on May 26, 1981. The modifications were completed because of changes to the applicable rules and standards of the Administrative Rules of Montana (ARM).

On October 13, 1996, **MAQP #1187-03** was issued and correctly identified the actual maximum heat input capacity of Colstrip Units 3&4. The units are each rated at a heat-input capacity of 7,573 MMBtu/hour with a production capacity of 778 MW. These are nominal capacities for the facility and, depending on plant operating conditions, actual heat input to the facility may be as high as 8,000 MMBtu/hr.

MAQP #1187-M2 and the EPA permit contained emission limits for particulate, SO_2, and oxides of nitrogen (NO_x) with units of pounds per million British thermal units (lb/MMBtu). To ensure that emissions from the facility were not higher than those that the original analysis was based, this permit established emission limits for these pollutants in the units of pounds per hour (lb/hour).

The new emission limits were established based on the nominal heat input to the boilers of 7,573 MMBtu/hr multiplied by the current emission limits in lb/MMBtu. MAQP #1187-03 also placed a yearly fuel consumption limit on each unit. The limit was equal to the heat input of each unit operating at the nominal heat input rate of 7,573 MMBtu/hr for 8,760 hr/yr. This ensured that emissions of pollutants, that do not have limits in the permit, were not increased above current levels. The permit also incorporated requirements from the PSD permit issued by EPA in 1979. These requirements were incorporated at the request of MPC for the purpose of developing a comprehensive document that contained pertinent requirements from both the state permit and the EPA PSD permit. MAQP #1187-03 replaced MAQP #1187-M2.

On September 30, 1998, **MAQP #1187-04** was issued to MPC for the Colstrip 3&4 facility. The alteration included incorporation of a 3-hour rolling average SO_2 limit, the 1% inlet sulfur standard that was inadvertently removed during the previous modification, and the removal of the inlet monitor requirement.

The 3-hour SO_2 limit was incorporated in the permit to ensure protection of the 3-hour SO_2 standard. During the last permit action, the maximum heat inputs for Units 3&4 were discovered to be 8,000 MMBtu/hr. Because these heat inputs were higher than those in the original permit, the Department of Environmental Quality Air Quality Bureau (Department) and MPC agreed that short-term SO_2 and NO_x emission limits would be implemented. The Department completed modeling for the short-term SO_2 emission limits. Colstrip was limited to a maximum of 4,273 lb/hr of SO_2, averaged over any rolling 3-hour period from both stacks combined. These limits allowed MPC the flexibility of operating Unit 3 or Unit 4 at a higher level at any one time, while continuing to ensure protection of the standard.

The 1% inlet sulfur limit existed in the original permit, but was inadvertently removed during a previous permit action. MPC continued to maintain compliance with the 1% inlet sulfur limit, even though it was not stated in the permit.

The requirement for the inlet sulfur monitor as a compliance demonstration for the inlet sulfur content was replaced with an on-going fuel-sampling analysis. The on-going fuel-sampling analysis yielded a more accurate account of the sulfur content of the fuel, as compared to the sulfur content being correlated to SO_2 emissions.

The permitting action was an alteration of MAQP #1187-03 because of the change in the compliance demonstration for the 1% sulfur content limit. The 1% sulfur content limit and demonstration of compliance was included in the February 28, 1978, Board of Health and Environmental Sciences Findings of Fact and Conclusions of Law and Order. The alteration process allowed public involvement in the change in the compliance demonstration method. However, the permitting action did not result in any change in the emissions from the facility. MAQP #1187-04 replaced MAQP #1187-03.

In letters dated June 18, 1999, and August 16, 1999, the Montana Power Company and PPL Montana, LLC requested that the permits for Colstrip Units 1&2 and Colstrip Units 3&4 be transferred to reflect the new ownership. The transfer of the permits was to occur when the transfer of ownership to PPL Montana, LLC was

final. Through the Department's review, it was determined that Colstrip Units 1, 2, 3, and 4 would now be defined as one source. Therefore, the permit modification transferred ownership, as well as combined MAQPs #0513-01 and #1187-04. The permit conditions remained the same, but were simply combined into one permit. **MAQP #0513-02** replaced MAQPs #0513-01 and #1187-04.

On September 10, 2000, **MAQP #0513-03** was issued to Colstrip to conduct a test burn of petroleum coke/Syncoal/Rosebud coal fuel combination in Units 1&2. A petroleum coke consumption limit was placed in the permit to ensure that the proposed test burn did not exceed 15 tons per year of any pollutant. Because the emissions from this project were less than 15 tons per year of any pollutant, the project occurred in accordance with the ARM 17.8.745(1)(d). MAQP #0513-03 replaced MAQP #0513-02.

On July 7, 2001, **MAQP #0513-04** was issued to Colstrip to add petroleum coke to the list of fuels to be used in Units 1 and 2 that are currently permitted to burn Syncoal and Rosebud coal. The permitting action limited the amount of petroleum coke that may be burned in Units 1 and 2 and was not considered a major modification under the PSD regulations because the facility was capable of accommodating petroleum coke. The conditions associated with this permitting action are Section II.A.9, 10, 11, 12, and 13, Section II.B.3 and Section II.E. MAQP #0513-04 replaced MAQP #0513-03.

On January 11, 2005, Arnold & Porter LLP, on behalf of Colstrip, submitted a request for an administrative amendment to MAQP #0513-04. The request was to reduce the 3-hour rolling average SO_2 emissions limit (combined stack limit) for Units 3&4 from 4,273 lb/hr to 4,140 lb/hr.

The request was submitted in response to an outstanding concern of the Department and the Northern Cheyenne Tribe regarding emissions modeling for SO_2 increment consumption conducted for the issuance of the 1979 PSD permit for Units 3 and 4. Included in the permit application, Colstrip submitted AERMOD modeling to demonstrate compliance with the Class I PSD increment for SO_2 on the Northern Cheyenne Reservation. The Department, in consultation with EPA Region VIII and the Northern Cheyenne Tribe, requested an additional sensitivity analysis be conducted at a 75% load scenario to comply with national modeling guidance and the model's demonstrated sensitivity to plume rise. Colstrip submitted the sensitivity analysis demonstrating that the proposed SO_2 limit of 4,140 lb/hr would protect the 3-hour increment on the Northern Cheyenne Reservation.

In addition, Colstrip submitted a request to the Department on November 20, 2000, to remove the ambient air quality monitoring requirements from MAQP #0513-04 for Units 3&4. Based on the request and additional information submitted on October 3, 2001, the Department approved the removal of the monitoring requirements. The Department sent a letter on October 19, 2001, after PPL demonstrated that the potential to cause a violation of the ambient standard is minimal at all sites and monitoring may be removed as provided for in the October 1998 Department guidance.

The permit format, language, and rule references were updated to reflect current Department permit format, language and rule references. **MAQP #0513-05** replaced MAQP #0513-04.

On October 23, 2007, PPL Montana, LLC submitted a request for an administrative amendment to MAQP #0513-05. The request was to incorporate revised NO_x standards for Colstrip's Units 3 and 4, as stipulated by Consent Decree CV-07-40-BLG-RFG-CSO entered on May 14, 2007 (Consent Decree). In addition, the Department was requested to clarify that the compliance demonstration for the revised limits would be demonstrated for an "operating day" firing any fuel, which would go beyond the Consent Decree requirements. **MAQP #0513-06** replaced MAQP #0513-05.

On December 31, 2008, PPLM submitted an application to modify MAQP #0513-06, with additional information submitted on January 8, 2009. The modification was to establish a mercury emission limit for each of PPLM Colstrip Units 1-4, pursuant to ARM 17.8.771, and to provide an analysis of potential mercury control options including, but not limited to, boiler technology, mercury emission control technology, and any other mercury control practices. The application also included a proposed mercury emission control strategy. MAQP #0513-07 established a mercury emission limit and associated operating requirements for Colstrip Units 1-4 in order to comply with ARM 17.8.771. **MAQP #0513-07** replaced MAQP #0513-06.

On January 28, 2010, PPLM requested an administrative amendment to MAQP #0513-07. The amendment was to update a compliance date for NO_x emissions from Colstrip Unit 4 pursuant to its Consent Decree. A stipulation to the Consent Decree was filed on December 22, 2009, due to the occurrence of a Force Majeure incident, such that a new compliance date for installation and operation of the digital controls, low-NO_x burners and overfire air was established to be March 31, 2010 or seven days after the completion of NO_x emission controls tuning, whichever date is earlier. Tuning was completed on Unit 4 NO_x control systems on January 12, 2010. This amendment updated the permit to reflect the changes to the Consent Decree; specifically, the applicable compliance dates in Sections II.A.18 and 20 were updated to January 19, 2010. **MAQP #0513-08** replaced MAQP #0513-07.

On May 7, 2015, the Department received an administrative amendment request to change the company name from PPL Montana, LLC to Talen Montana, LLC. Except for the name, the company continued with the same legal ownership interest and operator role concerning the Colstrip Steam Electric Station. Personnel, assets, and organization remained unchanged. The MAQP was also updated to reflect the current Department format and references to applicable federal regulations. **MAQP #0513-09** replaced MAQP #0513-08.

On May 7, 2018, the Department received a permit application from Talen to authorize the operation of a mechanical evaporation system for the existing wastewater ponds. Additional information was provided on May 24, 2018. The existing wastewater ponds are located approximately 2.5 miles southeast of the main power plant. The pond area is approximately 367 acres and contains several wastewater cells. Talen installed mechanical evaporators for the existing wastewater

ponds between 2006 and 2017 to aid in the reduction of excess water, to reduce potential of seepage from the ponds and help protect the groundwater, and to help ensure compliance with the United States Environmental Protection Agency (EPA) rules on disposal of Coal Combustion Residuals (CCR) from electric utilities under subtitle D of the Resource Conservation and Recovery Act (RCRA). As the water currently stored in the pond contains dissolved solids, the mechanical evaporation of water forms droplets that may result in the formation of PM as the water droplets evaporate. Talen had not considered the evaporation system to be a new source of air emissions since the wastewater ponds were already accounted for in the Title V Operating Permit. In October 2017, Talen conducted an emission factor development study to measure the ambient particulate matter concentrations resulting from emissions from these units and to reverse-model an emission rate for the two models of evaporators on site. These emission rates, in conjunction with the proposed limits on operation of the evaporators, were used to determine the maximum potential emissions from the evaporators. Talen had ceased operation of the evaporators since discovering that they trigger the need for an MAQP modification and did not restart them until issuance of this permit. Based on comments received during the public comment period on the draft permit, the Department added the specific operational parameters for wind speed, wind direction, ambient air temperature, and relative humidity that are part of the strategy to contain the potential evaporation drift within the pond to the permit condition related to best management practices before issuing the Department Decision. The condition at Section II.D.10 of the draft permit, which had required that Talen document these operational parameters and provide them to the Department upon request, was eliminated because they are now included in the enforceable permit condition at Section II.A.30. **MAQP #0513-10** replaced MAQP #0513-09.

On January 22, 2019, the Department received a permit application from Talen for the construction of a coal unloading facility. The application provided six different alternate operating scenarios and estimated the maximum potential increase in emissions from each scenario. The maximum amount of coal to be brought to the Colstrip facility via truck and/or railcar is 7 million tons per year. The scenarios summarized in the following table show the rank by particulate matter (PM) emissions from each throughput scenario. The maximum emissions scenario is ranked "1st".

Scenario	Coal Throughput (Tons Per Year)	Delivery Method	PM Emissions Rank
1	1 Million	Haul Truck	6th (Low)
2	3.5 Million	Haul Truck	3rd
3	7 Million	Haul Truck	1st (High)
4	1 Million	Railcar	5th
5	3.5 Million	Railcar	4th
6	7 Million	Railcar	2nd

The coal would be unloaded from truck and/or rail and transferred via conveyor(s) or front end loader (FEL) to a coal storage pile and/or directly to the existing plant conveyor and coal storage system. Only a portion of the new storage pile would be active at any given time, and the remainder would be inactive and have chemical surfactants applied in order to create a crust and prevent wind erosion. A FEL

would be used to move the coal around the new storage pile. Coal would be transported via FEL to conveyors from the new storage pile into the existing plant conveyor and storage system. Only one new storage pile would be constructed as part of this project for Scenarios 2-6. Scenario 1 would use existing storage piles. Emissions would be generated from the new paved haul road, truck/railcar unloading, unpaved FEL path, conveyor material transfers, and wind erosion from the storage pile. **MAQP #0513-11** replaced MAQP #0513-10.

D. Current Permit Action

On April 8, 2019, the Department received an MAQP application in accordance with the requirements of ARM 17.8.771(9) to address the Best Available Control Technology (BACT) requirement for mercury emissions. ARM 17.8.771(9) requires that no later than 10 years after issuance of a permit containing a mercury emission limit under ARM 17.8.771(1)(b)(i), and every 10 years thereafter, the affected facility must file an application to establish a revised mercury emission limit. PPL Montana, LLC, the name of the operators of the Colstrip facility at the time, was issued an MAQP establishing a mercury emissions limit for Units 1 – 4 on April 9, 2009. The current application is intended to fulfill the ARM 17.8.771(9) requirement. Talen proposed to retain the mercury emission limit of 0.9 pounds per trillion British thermal units (lb/TBtu) on a rolling 12-month average basis. The Department concurred with the findings of the BACT analysis and maintained the mercury emission limit of 0.9 lb/TBtu on a rolling 12-month average basis in the MAQP. **MAQP #0513-12** replaces MAQP #0513-11.

E. Response to Public Comments

Person/Group Commenting	Permit Reference	Comment	Department Response
NO COMMENTS RECEIVED			

F. 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 ARM and are available, upon request, from the Department. Upon request, the Department will provide references for location 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).

   Talen shall comply with the requirements contained in the Montana Source Test Protocol and Procedures Manual, including, but not limited to, 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 of 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 as to create a public nuisance.

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

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

Talen 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. (1) This rule requires that no person may cause or authorize emissions to be discharged into the outdoor

atmosphere from any sources installed on or before November 23, 1968, that exhibit an opacity of 40% or greater averaged over 6 consecutive minutes. (2) 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 less than 20% for all fugitive emission sources and that reasonable precautions be taken to control emissions of airborne particulate matter. (2) Under this rule, Talen 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 Process. 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.

5. ARM 17.8.322 Sulfur Oxide Emissions--Sulfur in Fuel. (4) Commencing July 1, 1972, no person shall burn liquid or solid fuels containing sulfur in excess of 1 pound of sulfur per million British thermal units (Btu) fired. (5) Commencing July 1, 1971, no person shall burn any gaseous fuel containing sulfur compounds in excess of 50 grains per 100 cubic feet of gaseous fuel, calculated as hydrogen sulfide at standard conditions.

6. ARM 17.8.324 Hydrocarbon Emissions--Petroleum Products. (3) 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, or is a pressure tank 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).

   a. Subpart A, General Provisions. This subpart applies to all equipment or facilities subject to an NSPS Subpart as listed below:

   b. Subpart Y, Standards of Performance for Coal Preparation Plants. This subpart applies to the Syncoal truck dump and silo bin vent which are considered NSPS affected facilities because these sources meet the definition of a coal storage system and transfer and loading system constructed after October 24, 1974.

c. Subpart D, Standard of Performance for Fossil-Fuel Fired Steam Generators. This subpart does apply to Units 1, 2, 3, and 4 because they have the capabilities of firing fossil fuel at a heat input rate of more than 250 MMBtu/hr and were constructed after August 17, 1971.

d. Subpart Da, Standards of Performance for Electric Utility Steam Generating Units for Which Construction is Commenced After September 18, 1978. This section does not apply to Units 3 and 4 because construction on the units had commenced prior to 1978. However, some sections of Subpart Da have been incorporated by reference into this permit.

8. ARM 17.8.342 Emission Standards for Hazardous Air Pollutants for Source Categories. The source, as defined and applied in 40 CFR Part 63, shall comply with the requirements of 40 CFR Part 63, as listed below:

a. 40 CFR 63, Subpart A – General Provisions apply to all equipment or facilities subject to an NESHAP Subpart as listed below:

b. 40 CFR 63, Subpart ZZZZ – National Emissions Standards for Hazardous Air Pollutants (HAPs) for Stationary Reciprocating Internal Combustion Engines (RICE). An owner or operator of a stationary reciprocating internal combustion engine (RICE) at a major or area source of HAP emissions is subject to this rule except if the stationary RICE is being tested at a stationary RICE test cell/stand. An area source of HAP emissions is a source that is not a major source. The emergency RICE at Talen Colstrip are subject to this regulation.

c. 40 CFR 63, Subpart UUUUU – National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units. Units 1, 2, 3, and 4 meet the definition of an affected source under this subpart.

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. Talen 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 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 pro-rate 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 air quality permit or permit modification to construct, modify, or use any air contaminant sources that have the potential to emit (PTE) greater than 25 tpy of any pollutant. Talen Colstrip has the PTE greater than 25 tons per year of NOx, SO_2, carbon monoxide (CO), volatile organic compounds (VOC), particulate matter (PM), and particulate matter with an aerodynamic diameter of 10 microns or less (PM_{10}); therefore, an air quality permit is required.

3. ARM 17.8.744 Montana Air Quality Permits--General Exclusions. This rule identifies the activities that are not subject to the Montana Air Quality Permit 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 Montana Air Quality Permit 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. Talen 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. Talen published a public notice in the April 10, 2019 issue of the *Billings Gazette*, a newspaper of general circulation in the Town of Billings in Yellowstone County, as well as in the April 11, 2019 issue of the *Independent Press*, a newspaper of general circulation 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 air quality permits 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 Talen 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 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 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 air quality permit 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 air quality permit 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 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.

15. ARM 17.8.771 Mercury Emission Standards for Mercury-Emitting Generating Units. This rule identifies mercury emission limitation requirements, mercury control strategy requirements, and application requirements for mercury-emitting generating units. (9) No later than ten years after issuance of the permit containing the mercury emission limit, and every ten years thereafter, the owner or operator of a mercury-emitting generating unit, for which the Department has established a mercury emission limit under this rule, shall file an application with the Department to establish a revised mercury emission limit. The application associated with MAQP #0513-12 fulfills this requirement.

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 ARM 17.8.827 shall apply to any major stationary source and any major modification, with respect to each pollutant subject to regulation under the FCAA that it would emit, except as this subchapter would otherwise allow.

   This facility is a listed source and has a PTE of 100 tpy or more of pollutants subject to regulation under the FCAA; therefore, the facility is major. However, this permit action will not result in a significant net emissions increase and therefore does not require a Prevention of Significant Deterioration (PSD) analysis.

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. PTE > 100 tpy of any pollutant;

   b. PTE > 10 tpy of any one hazardous air pollutant (HAP), PTE > 25 tpy of a combination of all HAPs, or lesser quantity as the Department may establish by rule; or

   c. PTE > 70 tpy of PM_{10} in a serious PM_{10} nonattainment 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 #0513-12 for Talen, the following conclusions were made:

   a. The facility's PTE is greater than 100 tpy for several pollutants.

b. The facility's PTE is greater than 10 tpy of any one HAP and less than 25 tpy of all HAPs.

c. This source is not located in a serious PM_{10} nonattainment area.

d. This facility is subject to 40 CFR 60, Subparts A, D, and Y.

e. This facility is subject to 40 CFR 63, Subparts A, UUUUU, and ZZZZ.

f. This source is a Title IV affected source.

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

Based on these facts, the Department has determined that Talen Colstrip is a major source of emissions as defined under Title V. Talen was issued a final and effective renewal of their Title V Operating Permit (#OP0513-14) on July 17, 2018.

III. BACT Determination

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

The current permit action addresses the BACT requirement for mercury emissions pursuant to ARM 17.8.771(9). ARM 17.8.771(9) requires that no later than 10 years after issuance of a permit establishing a mercury emission limit under ARM 17.8.771(1)(b)(i), and every 10 years thereafter, the affected facility must file an application to establish a revised mercury emission limit. There are no new or modified emitting units associated with this permit action; however, BACT is required based on ARM 17.8.771(9). The application included a review of mercury control information for other coal-fired electrical generating units in the Unites States and the control systems in place at Colstrip.

The existing controls on Units 1-4 include wet venturi scrubbers which control sulfur dioxide, particulate matter, mercury, and other hazardous air pollutants. The units are also equipped with mercury oxidizer and sorbent injection to facilitate the scrubbers' removal of mercury. This combination of controls has been achieving compliance with the Montana Mercury Rule emission limit as well as applicable federal regulations.

In order to optimize the removal of mercury from the exhaust gases at Colstrip, the high proportion of elemental mercury resulting from the combustion of the Powder River Basin coal must be oxidized. An oxidizer is added to the coal before it is ground in the mills and injected into the boiler. The oxidizer promotes formation of ionic forms of mercury that can then be sorbed by activated carbon injected into the flue gas before it passes through the air heaters. Mercury, the majority of which is bound on the carbon particles, is then removed in the scrubbers. The existing control system at Colstrip that oxidizes and sorbs emissions of mercury is considered the base-case for this BACT review. Other particulate matter control technologies are also capable of capturing and removing the mercury bound on the carbon particles and are a primary focus of this mercury emissions control analysis. Some other technologies are discussed which potentially improve the conversion of

elemental mercury to ionic form. In addition, the Department requested that Talen include fuel cleaning in this analysis.

A. Step 1 – Identify All Control Technologies

Talen considered the following types of mercury emission control technologies: electrostatic precipitators (ESP), selective catalytic or non-catalytic reduction (SCR/SNCR), wet or dry flue gas desulfurization (FGD), fabric filter (FF), and sorbent with oxidizer injection (OSI) or without oxidizer injection (SI). Talen also consulted the RACT/BACT/LAER Clearinghouse (RBLC) as part of the BACT review to determine what recent permit decisions have been made on a national level for mercury control.

1. Electrostatic Precipitator (ESP)

ESP utilize an electric field to ionize fine particulate matter in a flowing gas using high voltage electrodes. The ionized particles are then attracted to an oppositely charged tube or plate upon which layers of particles build over time. The ESP is typically composed of a large box-type structure with several sections of electrified parallel plates or tubes and rappers to periodically remove accumulated particulate. The collected material falls into a hopper and is disposed of. ESP technology is capable of particulate removal efficiencies of over 99%. Wet ESP are sometimes used where the plates are cleaned with water sprays.

2. Fabric Filters (FF)

FF, or baghouses, contain numerous woven, typically cylindrical bags with particle laden gases passing through the cloth material which acts as a filter. The solid particles deposit on the bag surface and create a cake which enhances the control efficiency of the cloth material. With time, the filter cake that develops will become too restrictive and need to be removed. The three common methods for removing the filter cake include blasts of reverse flow air injected into the bag, a mechanical shaking system, or a blast of sonic energy. FF are highly efficient on very small particles and are capable of particulate removal efficiencies of over 99%.

3. Sorbent Injection and Sorbent Injection with an Oxidizer (SI or OSI)

This technology is currently in use at Colstrip for mercury control and consists of the addition of an oxidizer to the low halogen coal, which promotes oxidation of the mercury and improves its chances of capture by a sorbent. A sorbent, commonly activated carbon, is injected into the flue gas using equipment designed and sited to ensure optimum mixing with the flue gas. Oxidized mercury is captured by the sorbent, which then is removed by a particulate or acid gas control device. These systems achieve over 80% mercury control efficiency when used with a downstream particulate control device. Based on coal sampling data during the 2010-2018 period and the measured mercury emissions by the continuous monitoring system in place, Colstrip has been achieving an 84% mercury control efficiency average.

4. Selective Catalytic Reduction or Selective Non-catalytic Reduction (SCR/SNCR)

SCR and SNCR are primarily for the control of NOx emissions. An SCR employs a highly porous honeycomb-type catalyst bed impregnated with catalytic metals or metal oxides, while an SNCR does not. Both systems function by using a nitrogen based reagent such as ammonia or urea that is injected into the flue gas downstream of the combustion unit. The reagent reacts selectively with the NOx in flue gas to form nitrogen and water. In an SNCR system, the temperature of the flue gas must be quite high and within a narrow range for this reaction to occur. In an SCR system, the flue gas with reagent are passed through the catalyst which allows this reaction to occur at a lower and broader range of temperatures. The application stated that there is some documentation indicating that for bituminous coals, SCR systems have the ability to promote conversion of elemental mercury into ionic mercury and thus allow easier capture in a downstream device. SNCR systems have not shown to have this same ability. Testing on the Powder River Basin subbituminous coal indicates that SCR is ineffective in improving mercury control because it contains relatively less sulfur and chlorine, and relatively more calcium, than bituminous coals. This lack of halogens inhibits the conversion of elemental mercury into ionic mercury.

5. Wet and Dry Flue Gas Desulfurization (FGD)

FGD is used extensively in industry for control of SO_2 and other soluble gas constituents. High amounts of particulate matter can also be removed in a design like Colstrip's scrubbers. To accomplish the removal, liquid or dry reagents such as lime are added to the flue gas. Removal efficiencies for FGD vary for each pollutant-reagent system and with the type of scrubber internals used. For SO_2, most FGD units have removal efficiencies in excess of 90%, and some may achieve efficiencies as high as 99.9%. Talen indicated that the scrubbers in use at Colstrip achieve approximately 99.5% particulate removal in addition to removing SO_2.

6. Fuel Cleaning

Where appropriate, raw coal can be processed (or cleaned) to reduce the ash content, increase the heating value, and potentially reduce content of sulfur and other impurities such as mercury. Fuel cleaning can be accomplished by each or some combination of washing with a suitable reagent, physical processing, or thermal treatment. Colstrip, through its coal mill pyritic rejection, conducts limited fuel cleaning. The pyritic component of the coal commonly contains some level of metals including mercury. According to information provided by Talen in the permit application, most of the information available for fuel cleaning comes from laboratory or small-scale field research and that no large scale commercially available technology exists that could be used at Colstrip.

B. Step 2 – Eliminate Technically Infeasible Options

OSI and FGD are already in place and operating at Colstrip and function together to control mercury emissions. SCR is eliminated from further analysis because it has proven ineffective in enhancing mercury control for Powder River Basin coals. Fuel cleaning beyond the pyritic rejection already being done at Colstrip is not commercially available at the scale needed for the facility. The remaining technologies in addition to OSI and FGD are fabric filters and electrostatic precipitators.

C. Step 3 – Rank Remaining Technologies by Control Effectiveness

Since Colstrip has wet FGD and OSI, ESP and FF are analyzed as potential additions to the facility. This method of analysis is appropriate because the wet FGD is the control strategy for other pollutants at Colstrip, such as SO_2, and required in order to achieve the applicable emissions standards and therefore must remain in place. Furthermore, the scrubbers have demonstrated particulate matter control efficiencies that are comparable to ESP and FF. Each of these technologies have control efficiencies greater than 99% for controlling particulate matter. Based on coal sampling data during the period 2010-2018 and the measured mercury emissions by the continuous mercury emissions monitoring system in place, Colstrip has been achieving an 84% mercury control efficiency average over that period.

D. Step 4 – Evaluate Most Effective Mercury Controls and Document Results

Talen has been achieving a unit-wide mercury control efficiency of 84% utilizing wet FGD in conjunction with OSI. Based upon RBLC data and further literature review, Talen estimated a unit-wide mercury control efficiency of 90% for an ESP and 95% for FF. This assumption represents an additional incremental control efficiency of 39% for ESP and 69% for FF over the current mercury emissions control strategy. Talen chose these potential control efficiency levels for ESP and FF based on pilot and full-scale studies that indicated they could achieve them. Emission rates based on these control efficiencies would be lower than the emission rates identified in the RBLC.

Talen provided cost effectiveness calculations indicating that for Units 1 and 2, the cost effectiveness of operating an ESP to achieve the target control efficiency would be 60 times the current cost of achieving the current emission rate for those units. This would be over $6 billion per additional ton of mercury removed by the ESP. The ESP would be expected to remove an additional 6 pounds of mercury per year from Units 1 and 2. For a FF achieving the targeted control efficiency on Units 1 and 2, the cost effectiveness would be 39 times the current cost to achieve the current emission rate at over $4 billion per additional ton of mercury removed. The FF would be expected to remove an additional 11 pounds of mercury per year from Units 1 and 2.

For Units 3 and 4, the cost effectiveness of operating an ESP to achieve the target control efficiency would be 90 times the current cost to achieve the current emission rate at over $4 billion per additional ton of mercury removed. The ESP would be expected to remove an additional 19 pounds of mercury per year from Units 3 and 4. For the FF for Units 3 and 4, the cost effectiveness would be 58 times the current cost to achieve the current emission rate at over $2 billion per additional ton of mercury removed. The FF would be expected to remove an additional 34 pounds of mercury per year from Units 3 and 4.

This cost effectiveness assessment does not include additional provisions for flue gas reheat that would be necessary to achieve the operating temperatures for ESP and FF added after the scrubbers. Also not included are potential costs needed to replace the lost ash alkalinity necessary for SO_2 removal if an ESP or FF were installed prior to the scrubbers. These costs would have to be determined by site specific testing at Colstrip and are unknown at this time. However, they could be substantial.

E. Step 5 – Select BACT

Compared with the existing mercury control system in place at Colstrip, wet FGD and OSI, installing an additional ESP or FF would constitute a significant expenditure for a very small incremental increase in mercury removed. The existing mercury control system has demonstrated compliance with both the Montana Mercury Rule requirements as well as applicable federal regulations. In addition, Units 1 and 2 at Colstrip will be shut down by July 1, 2022, so any substantial investment into these units is uneconomical given their short remaining useful life. Therefore, Talen has proposed that wet FGD and OSI for all four units and the mercury emission limit of 0.9 lb/TBtu on a rolling 12-month average be retained as mercury BACT under ARM 17.8.771(9). The Department concurs that this remains BACT for mercury and establishes 0.9 lb/TBtu on a rolling 12-month average basis as the revised mercury emission limit in accordance with 17.8.771(9).

IV. Emission Inventory

The following emission inventory calculations are excerpts from the MAQP application for #0513-11.

Table D-1. Overview of Alternate Coal Scenarios

	Coal (tpy)	Transport Method	Control Efficiency % [2]					Hourly Emissions (lb/hr)			Annual Emissions (tpy)		
			Truck Unloading	Conveyor Transfer		Storage Pile	Haul Roads						
				To Conveyor	To Storage Piles			PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$
Scenario 1	1,000,000	truck - paved	75%	--	75%	50%	92.0%	0.69	0.15	0.03	3.02	0.65	0.15
Scenario 2	3,500,000	truck - paved	75%	90%	75%			2.78	0.75	0.15	12.18	3.30	0.66
Scenario 3	7,000,000	truck - paved	75%	90%	75%			5.56	1.51	0.30	24.37	6.60	1.33
	Coal (tpy)	Transport Method	Control Efficiency % [2]					Hourly Emissions (lb/hr)			Annual Emissions (tpy)		
			Rail Unloading	Conveyor Transfer		Storage Pile	Haul Roads [1]						
				To Lowering Well	To Storage Piles			PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$
Scenario 4	1,000,000	rail	50%	50%	50%	50%	95.0%	0.47	0.22	0.03	2.06	0.95	0.14
Scenario 5	3,500,000	rail	50%	50%	50%			1.16	0.54	0.08	5.09	2.36	0.35
Scenario 6	7,000,000	rail	50%	50%	50%			2.32	1.08	0.16	10.18	4.71	0.71

[1] Haul Roads for rail transport comes from the FEL (unpaved).

[2] Note that if a combination of truck and rail scenarios are used then the higher control scenario on common equipment/transfers will be used.

Table D-2. Facility Emissions Summary Scenario 1 — 1 million tons of coal per year by truck (PAVED)

Area	Daily Emissions (lb/day)		Annual Emissions (tpy)								
	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$	SO_2	NO_X	CO	VOC	Pb	HAPs
Material Transfer	0.47	0.07	0.18	0.09	0.01	--	--	--	--	--	--
Haul Roads - Paved	3.11	0.76	2.84	0.57	0.14	--	--	--	--	--	--
Totals	**3.59**	**0.84**	**3.02**	**0.65**	**0.15**	**--**	**--**	**--**	**--**	**--**	**--**
Major Source Modification SER [1]	**--**	**--**	**25**	**15**	**10**	**40**	**40**	**100**	**40**	**0.6**	**--**
Emissions Exceeding SER?	**--**	**--**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**--**
MAQP Threshold [2]	**--**	**--**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**--**	**--**
Project above MAQP Threshold?	**--**	**--**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**--**	**--**
Modeling Guidance Levels [3]	**274**	**63.9**	**--**	**50**	**12**	**50**	**100**	**100**	**--**	**--**	**--**
Project above Modeling Guidance Level?	**No**	**No**	**--**	**No**	**No**	**No**	**No**	**No**	**--**	**--**	**--**

[1] The SERs are obtained from 40 CFR 52.21(b)(23)(i) and 52.21(b)(49)(iv)(b).

[2] Per ARM 17.8.745, a Montana air quality permit is required for changes at a facility which increase PTE by more than five tons per year of any criteria pollutant.

[3] Per MDEQ Modeling Guideline for Air Quality Permit Applications, not Montana regulation. Also daily emission thresholds of 274 lbs PM10/day or 63.9 lbs PM2.5/day.

Table D-3. Facility Emissions Summary Scenario 2 — 3.5 million tons of coal per year by truck (PAVED)

Area	Daily Emissions (lb/day)		Annual Emissions (tpy)								
	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$	SO_2	NO_X	CO	VOC	Pb	HAPs
Storage Piles	4.87	0.74	1.88	0.89	0.13	--	--	--	--	--	--
Material Transfer	3.20	0.48	1.23	0.58	0.09	--	--	--	--	--	--
Haul Roads - Paved	10.02	2.41	9.07	1.83	0.44	--	--	--	--	--	--
Totals	**18.08**	**3.63**	**12.18**	**3.30**	**0.66**	**--**	**--**	**--**	**--**	**--**	**--**
Major Source Modification SER [1]	**--**	**--**	**25**	**15**	**10**	**40**	**40**	**100**	**40**	**0.6**	**--**
Emissions Exceeding SER?	**--**	**--**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**--**
MAQP Threshold [2]	**--**	**--**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**--**	**--**
Project above MAQP Threshold?	**--**	**--**	**Yes**	**No**	**No**	**No**	**No**	**No**	**No**	**--**	**--**
Modeling Guidance Levels [3]	**274**	**63.9**	**--**	**50**	**12**	**50**	**100**	**100**	**--**	**--**	**--**
Project above Modeling Guidance Level?	**No**	**No**	**--**	**No**	**No**	**No**	**No**	**No**	**--**	**--**	**--**

[1] The SERs are obtained from 40 CFR 52.21(b)(23)(i) and 52.21(b)(49)(iv)(b).

[2] Per ARM 17.8.745, a Montana air quality permit is required for changes at a facility which increase PTE by more than five tons per year of any criteria pollutant.

[3] Per MDEQ Modeling Guideline for Air Quality Permit Applications, not Montana regulation. Also daily emission thresholds of 274 lbs PM10/day or 63.9 lbs PM2.5/day.

Table D-4. Facility Emissions Summary Scenario 3 — 7 million tons of coal per year by truck (PAVED)

Area	Daily Emissions (lb/day)		Annual Emissions (tpy)								
	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$	SO_2	NO_X	CO	VOC	Pb	HAPs
Storage Piles	9.74	1.48	3.76	1.78	0.27	--	--	--	--	--	--
Material Transfer	6.39	0.97	2.47	1.17	0.18	--	--	--	--	--	--
Haul Roads - Paved	20.03	4.82	18.14	3.66	0.88	--	--	--	--	--	--
Totals	**36.17**	**7.26**	**24.37**	**6.60**	**1.33**	**--**	**--**	**--**	**--**	**--**	**--**
Major Source Modification SER [1]	**--**	**--**	**25**	**15**	**10**	**40**	**40**	**100**	**40**	**0.6**	**--**
Emissions Exceeding SER?	**--**	**--**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**--**
MAQP Threshold [2]	**--**	**--**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**--**	**--**
Project above MAQP Threshold?	**--**	**--**	**Yes**	**Yes**	**No**	**No**	**No**	**No**	**No**	**--**	**--**
Modeling Guidance Levels [3]	**274**	**63.9**	**--**	**50**	**12**	**50**	**100**	**100**	**--**	**--**	**--**
Project above Modeling Guidance Level?	**No**	**No**	**--**	**No**	**No**	**No**	**No**	**No**	**--**	**--**	**--**

[1] The SERs are obtained from 40 CFR 52.21(b)(23)(i) and 52.21(b)(49)(iv)(b).

[2] Per ARM 17.8.745, a Montana air quality permit is required for changes at a facility which increase PTE by more than five tons per year of any criteria pollutant.

[3] Per MDEQ Modeling Guideline for Air Quality Permit Applications, not Montana regulation. Also daily emission thresholds of 274 lbs PM10/day or 63.9 lbs PM2.5/day.

Table D-5. Facility Emissions Summary Scenario 4 — 1 million tons of coal per year by rail

Area	Daily Emissions (lb/day)		Annual Emissions (tpy)								
	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$	SO_2	NO_X	CO	VOC	Pb	HAPs
Storage Piles	2.79	0.42	1.07	0.51	0.08	--	--	--	--	--	--
Material Transfer	2.20	0.33	0.85	0.40	0.06	--	--	--	--	--	--
Haul Roads - Storage Pile Area	0.19	0.02	0.13	0.03	0.00	--	--	--	--	--	--
Totals	**5.18**	**0.77**	**2.06**	**0.95**	**0.14**	**--**	**--**	**--**	**--**	**--**	**--**
Major Source Modification SER [1]	**--**	**--**	**25**	**15**	**10**	**40**	**40**	**100**	**40**	**0.6**	**--**
Emissions Exceeding SER?	**--**	**--**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**--**
MAQP Threshold [2]	**--**	**--**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**--**	**--**
Project above MAQP Threshold?	**--**	**--**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**--**	**--**
Modeling Guidance Levels [3]	**274**	**63.9**	**--**	**50**	**12**	**50**	**100**	**100**	**--**	**--**	**--**
Project above Modeling Guidance Level?	**No**	**No**	**--**	**No**	**No**	**No**	**No**	**No**	**--**	**--**	**--**

[1] The SERs are obtained from 40 CFR 52.21(b)(23)(i) and 52.21(b)(49)(iv)(b).

[2] Per ARM 17.8.745, a Montana air quality permit is required for changes at a facility which increase PTE by more than five tons per year of any criteria pollutant.

[3] Per MDEQ Modeling Guideline for Air Quality Permit Applications, not Montana regulation. Also daily emission thresholds of 274 lbs PM10/day or 63.9 lbs PM2.5/day.

Table D-6. Facility Emissions Summary Scenario 5 — 3.5 million tons of coal per year by rail

Area	Daily Emissions (lb/day)		Annual Emissions (tpy)								
	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$	SO_2	NO_X	CO	VOC	Pb	HAPs
Storage Piles	4.87	0.74	1.88	0.89	0.13	--	--	--	--	--	--
Material Transfer	7.71	1.17	2.98	1.41	0.21	--	--	--	--	--	--
Haul Roads - Storage Pile Area	0.33	0.03	0.23	0.06	0.01	--	--	--	--	--	--
Totals	**12.92**	**1.94**	**5.09**	**2.36**	**0.35**	**--**	**--**	**--**	**--**	**--**	**--**
Major Source Modification SER [1]	**--**	**--**	**25**	**15**	**10**	**40**	**40**	**100**	**40**	**0.6**	**--**
Emissions Exceeding SER?	**--**	**--**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**--**
MAQP Threshold [2]	**--**	**--**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**--**	**--**
Project above MAQP Threshold?	**--**	**--**	**Yes**	**No**	**No**	**No**	**No**	**No**	**No**	**--**	**--**
Modeling Guidance Levels [3]	**274**	**63.9**	**--**	**50**	**12**	**50**	**100**	**100**	**--**	**--**	**--**
Project above Modeling Guidance Level?	**No**	**No**	**--**	**No**	**No**	**No**	**No**	**No**	**--**	**--**	**--**

[1] The SERs are obtained from 40 CFR 52.21(b)(23)(i) and 52.21(b)(49)(iv)(b).

[2] Per ARM 17.8.745, a Montana air quality permit is required for changes at a facility which increase PTE by more than five tons per year of any criteria pollutant.

[3] Per MDEQ Modeling Guideline for Air Quality Permit Applications, not Montana regulation. Also daily emission thresholds of 274 lbs PM10/day or 63.9 lbs PM2.5/day.

Table D-7. Facility Emissions Summary Scenario 6 — 3.5 million tons of coal per year by rail

Area	Daily Emissions (lb/day)		Annual Emissions (tpy)								
	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$	SO_2	NO_X	CO	VOC	Pb	HAPs
Storage Piles	9.74	1.48	3.76	1.78	0.27	--	--	--	--	--	--
Material Transfer	15.43	2.34	5.95	2.82	0.43	--	--	--	--	--	--
Haul Roads - Storage Pile Area	0.66	0.07	0.47	0.12	0.01	--	--	--	--	--	--
Totals	**25.83**	**3.88**	**10.18**	**4.71**	**0.71**	**--**	**--**	**--**	**--**	**--**	**--**
Major Source Modification SER [1]	**--**	**--**	**25**	**15**	**10**	**40**	**40**	**100**	**40**	**0.6**	**--**
Emissions Exceeding SER?	**--**	**--**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**--**
MAQP Threshold [2]	**--**	**--**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**--**	**--**
Project above MAQP Threshold?	**--**	**--**	**Yes**	**No**	**No**	**No**	**No**	**No**	**No**	**--**	**--**
Modeling Guidance Levels [3]	**274**	**63.9**	**--**	**50**	**12**	**50**	**100**	**100**	**--**	**--**	**--**
Project above Modeling Guidance Level?	**No**	**No**	**--**	**No**	**No**	**No**	**No**	**No**	**--**	**--**	**--**

[1] The SERs are obtained from 40 CFR 52.21(b)(23)(i) and 52.21(b)(49)(iv)(b).

[2] Per ARM 17.8.745, a Montana air quality permit is required for changes at a facility which increase PTE by more than five tons per year of any criteria pollutant.

[3] Per MDEQ Modeling Guideline for Air Quality Permit Applications, not Montana regulation. Also daily emission thresholds of 274 lbs PM10/day or 63.9 lbs PM2.5/day.

Talen Colstrip Facility
Storage Pile Potential Wind Erosion Calculations

Table D-8. Storage Pile Emission Calculations

Description	silt (s)[1] (%)	p[2]	f[3]	Pile Surface Area (Acres)[4]	Active Portion of Pile	Exposed Surface Area	Short Term Emission Factor (lb/hr/acre)[5]			Emission Factor (lb/hr/acre)[5]			Control Efficiency (%)[7]	Emissions (lb/hr)[8]			Emissions (lb/day)			Emissions (tpy)[9]		
							PM	PM_{10}[6]	$PM_{2.5}$[6]	PM	PM_{10}[6]	$PM_{2.5}$[6]		PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$
Coal storage pile - 1M scenario (RAIL ONLY)	2.20	95	27.54	3.36	0.667	2.24	0.219	0.104	0.016	0.219	0.104	0.016	50%	0.25	0.12	0.02	5.89	2.79	0.42	1.07	0.51	0.08
Coal storage pile - 3.5M scenarios	2.20	95	27.54	11.75	0.333	3.92	0.219	0.104	0.016	0.219	0.104	0.016	50%	0.43	0.20	0.03	10.30	4.87	0.74	1.88	0.89	0.13
Coal storage pile - 7M scenarios	2.20	95	27.54	23.50	0.333	7.83	0.219	0.104	0.016	0.219	0.104	0.016	50%	0.86	0.41	0.06	20.60	9.74	1.48	3.76	1.78	0.27
Totals (Scenario 4):														**0.25**	**0.12**	**0.02**	**5.89**	**2.79**	**0.42**	**1.07**	**0.51**	**0.08**
Totals (Scenario 2/5):														**0.43**	**0.20**	**0.03**	**10.30**	**4.87**	**0.74**	**1.88**	**0.89**	**0.13**
Totals (Scenario 3/6):														**0.86**	**0.41**	**0.06**	**20.60**	**9.74**	**1.48**	**3.76**	**1.78**	**0.27**

[1] Silt content obtained from EPA AP-42, Section 13.2.4, Table 13.2.4-1 - Storage Piles based on coal (as received).

[2] p is the number of days with greater than 0.01 in. of precipitation per year. The value of p is obtained from EPA AP-42, Section 13.2.2, Figure 13.2.2-1.

[3] f is the % of time the unobstructed wind speed exceeds 12 mph at the mean pile height. The value of f, 16.52%, is based on 2012-2014 meteorological data from the Colstrip Facility.

[4] Surface area of piles estimated from site plan for facility for the 7M tpy scenario and scaled down for smaller scenarios. Only a portion of the pile will be active and the remainder will be crusted over with no wind erosion emissions. The 1M Truck Scenario will use existing piles and will not result in a new storage pile.

[5] Emission factor for PM in lb/hr/acre calculated using the following equation from Chapter 4 of Control of Open Fugitive Dust Sources:

$$E = 1.7\left(\frac{s}{1.5}\right)\left(\frac{365 - p}{235}\right)\left(\frac{f}{15}\right)\left(\frac{1}{24}\right) \text{ (lbs / hr /acre)}$$

[6] PM_{10} and $PM_{2.5}$ emission factor obtained using ratios with respect to total PM from EPA AP-42, Section 13.2.4, particle size multiplier ratios on page 13.2.4-4.

[7] Control efficiencies based on controls including wet or chemical dust suppression or wind barrier during high wind events (as needed).

[8] Short term emissions based lb/hr/acre emission factor multiplied by exposed surface area in acres and 1 minus the control efficiency

[9] Emissions (tpy) = Emissions (lb/hr) x Annual Hours of Operation (8,760 hr/yr) / (2,000 lb/ton).

Talen Colstrip Facility
Material Transfers

Table D-9. Material Handling Emission Factors

Pollutant	k[1]	Emission Factor[2] (lb/ton)
PM	0.74	4.86E-04
PM_{10}	0.35	2.30E-04
$PM_{2.5}$	0.053	3.48E-05

[1] Particle size multiplier obtained from EPA AP-42, Section 13.2.4, Page 13.2.4-4.

[2] Emission factor calculated using EPA AP-42, Section 13.2.4, Equation 1:

$$E = k * (0.0032) * ((U/5)^{1.3})/((M/2)^{1.4})$$

U: mean wind speed (mph) = 10.14 Based on 3-year average of Colstrip Facility 2012-2014 meteorological data

M: material moisture content (%) = 11.95 Based on Coal Characteristics minimum moisture content

Table D-10. Loading, Unloading, and Material Transfer Emissions

Description	Number of Transfers	Process Type	Control Efficiency (%) [1]	Throughput [2] (ton/hr)	(ton/day)	(ton/yr)	Hourly Emissions (lb/hr) PM	PM_{10}	$PM_{2.5}$	Daily Emissions (lb/day) PM	PM_{10}	$PM_{2.5}$	Annual Emissions (tpy) PM	PM_{10}	$PM_{2.5}$
Scenario 1															
Coal Drop via Truck	1	Material Handling	75%	114	2,740	1,000,000	1.39E-02	0.01	9.93E-04	0.33	0.16	0.02	0.06	0.03	4.35E-03
Conveyor to Existing Coal Pile	2	Material Handling	75%	114	2,740	1,000,000	2.77E-02	1.31E-02	1.99E-03	0.67	0.31	0.05	0.12	0.06	0.01
Scenario 2															
Coal Drop via Truck	1	Material Handling	75%	400	9,589	3,500,000	0.05	0.02	3.48E-03	1.16	0.55	0.08	0.21	0.10	0.02
Transfer to Storage Pile via FEL or conveyor	2	Material Handling	75%	400	9,589	3,500,000	0.10	0.05	0.01	2.33	1.10	0.17	0.43	0.20	0.03
Transfer from Storage Pile to Grizzly/Conveyor	2	Material Handling	75%	400	9,589	3,500,000	0.10	0.05	0.01	2.33	1.10	0.17	0.43	0.20	0.03
Conveyor Transfers to Existing System	2	Material Handling	90%	400	9,589	3,500,000	0.04	0.02	2.78E-03	0.93	0.44	0.07	0.17	0.08	0.01
Scenario 3															
Coal Drop via Truck	1	Material Handling	75%	799	19,178	7,000,000	0.10	0.05	0.01	2.33	1.10	0.17	0.43	0.20	0.03
Transfer to Storage Pile via FEL or conveyor	2	Material Handling	75%	799	19,178	7,000,000	0.19	0.09	0.01	4.66	2.20	0.33	0.85	0.40	0.06
Transfer from Storage Pile to Grizzly/Conveyor	2	Material Handling	75%	799	19,178	7,000,000	0.19	0.09	0.01	4.66	2.20	0.33	0.85	0.40	0.06
Conveyor Transfers to Existing System	2	Material Handling	90%	799	19,178	7,000,000	0.08	0.04	0.01	1.86	0.88	0.13	0.34	0.16	0.02
Scenario 4															
Railcar Unloading	1	Material Handling	50%	114	2,740	1,000,000	0.03	0.01	1.99E-03	0.67	0.31	0.05	0.12	0.06	0.01
Transfer to Storage Pile via FEL or conveyor	2	Material Handling	50%	114	2,740	1,000,000	0.06	0.03	3.97E-03	1.33	0.63	0.10	0.24	0.11	0.02
Transfer from Storage Pile to Grizzly/Conveyor	2	Material Handling	50%	114	2,740	1,000,000	0.06	0.03	3.97E-03	1.33	0.63	0.10	0.24	0.11	0.02
Conveyor Transfers to Existing System	2	Material Handling	50%	114	2,740	1,000,000	0.06	0.03	3.97E-03	1.33	0.63	0.10	0.24	0.11	0.02
Scenario 5															
Railcar Unloading	1	Material Handling	50%	400	9,589	3,500,000	0.10	0.05	0.01	2.33	1.10	0.17	0.43	0.20	0.03
Transfer to Storage Pile via FEL or conveyor	2	Material Handling	50%	400	9,589	3,500,000	0.19	0.09	0.01	4.66	2.20	0.33	0.85	0.40	0.06
Transfer from Storage Pile to Grizzly/Conveyor	2	Material Handling	50%	400	9,589	3,500,000	0.19	0.09	0.01	4.66	2.20	0.33	0.85	0.40	0.06
Conveyor Transfers to Existing System	2	Material Handling	50%	400	9,589	3,500,000	0.19	0.09	0.01	4.66	2.20	0.33	0.85	0.40	0.06
Scenario 6															
Railcar Unloading	1	Material Handling	50%	799	19,178	7,000,000	0.19	0.09	0.01	4.66	2.20	0.33	0.85	0.40	0.06
Transfer to Storage Pile via FEL or conveyor	2	Material Handling	50%	799	19,178	7,000,000	0.39	0.18	0.03	9.32	4.41	0.67	1.70	0.80	0.12
Transfer from Storage Pile to Grizzly/Conveyor	2	Material Handling	50%	799	19,178	7,000,000	0.39	0.18	0.03	9.32	4.41	0.67	1.70	0.80	0.12
Conveyor Transfers to Existing System	2	Material Handling	50%	799	19,178	7,000,000	0.39	0.18	0.03	9.32	4.41	0.67	1.70	0.80	0.12
Totals (Scenario 1):							**0.04**	**0.02**	**0.00**	**1.00**	**0.47**	**0.07**	**0.18**	**0.09**	**0.01**
Totals (Scenario 2):							**0.28**	**0.13**	**0.02**	**6.76**	**3.20**	**0.48**	**1.23**	**0.58**	**0.09**
Totals (Scenario 3):							**0.56**	**0.27**	**0.04**	**13.51**	**6.39**	**0.97**	**2.47**	**1.17**	**0.18**
Totals (Scenario 4):							**0.19**	**0.09**	**0.01**	**4.66**	**2.20**	**0.33**	**0.85**	**0.40**	**0.06**
Totals (Scenario 5):							**0.68**	**0.32**	**0.05**	**16.31**	**7.71**	**1.17**	**2.98**	**1.41**	**0.21**
Totals (Scenario 6):							**1.36**	**0.64**	**0.10**	**32.62**	**15.43**	**2.34**	**5.95**	**2.82**	**0.43**

[1] Control efficiencies based on controls including enclosed conveyors, rail unloading structure, and wet dust suppression (as needed). When enclosed and wet dust suppression applied 90% control efficiency applied for conveyor to conveyor transfers. Wet dust suppression and/or chemical surfactants to minimize airborne emissions uses 75% control efficiency. For rail scenarios, the default control efficiency for wet dust suppression, as needed, to comply with MDEQ airborne fugitive dust limits was used.

[2] Throughput based on maximum annual throughput. 365 days per year operation, 24 hrs per day.

Talen Colstrip Facility
Fugitive Road Dust Emission Calculations

Table D-11. Unpaved Road Dust Emission Factors

	silt (s)[1] (%)	Unloaded Weight[2] (lb)	Loaded Weight[3] (lb)	Average Weight[4] (W) (tons)	Average Load Hauled per Truck[2] (tons)	Control[5] (%)	Controlled Emission Factor (lb/VMT)[6] PM	PM_{10}	$PM_{2.5}$
FEL	5.1	54,871	63,663	29.6	4.4	95.0%	0.37726	0.09732	0.00973

[1] Silt content of road surface material obtained from EPA AP-42, Section 13.2.2, Table 13.2.2-1 for Western surface coal mining, Plant road.

[2] Average load hauled per truck and unloaded weight of main plant FEL based on specifications for a Cat 972M, and an estimated average bituminous coal density of 0.7 tons/yd^3. Average load hauled per truck obtained from the average capacity of the offsite transport trucks for the wheel loader. Unloaded weight of trucks for product offsite transfer estimated from information obtained by DOT and other similar projects.

[3] Loaded weight estimated as the sum of the unloaded weight and the average load hauled per truck.

[4] Weight (tons) calculated as the average of the unloaded and loaded weights for each type of vehicle.

[5] Control efficiency for unpaved roads is an engineering estimate based on: 1) unpaved haul roads receive annual application of dust suppressant chemical; 2) all plant roads are watered for dust control as necessary, and 25 mph speed limit.

[6] Emission factor in lb/VMT calculated per EPA AP-42, Section 13.2.2, Equation 1a as follows:

$$E = k\,(s/12)^a\,(W/3)^b \qquad \text{Controlled } E = E * (1 - \text{Control } \%)$$

k: Particle Size Multiplier (lb/VMT)
W: Mean vehicle weight (tons)
s: Silt content of road surface material (%)

	PM	PM_{10}	$PM_{2.5}$
k	4.9	1.5	0.15
a	0.7	0.9	0.9
b	0.45	0.45	0.45

Table D-12. Paved Road Dust Emission Factors

	Silt Loading[1] (g/m^2)	Unloaded Weight[2] (lb)	Loaded Weight[3] (lb)	Weight[4] (W) (tons)	Average Load Hauled per Truck[5] (tons)	Control[6] (%)	Controlled Emission Factor (lb/VMT)[7] PM	PM_{10}	$PM_{2.5}$
Coal Truck	2.4	27,000	80,000	26.8	26.5	92%	0.056	0.011	0.003

1 Lowest silt loading value provided in AP-42 Table 13.2.1-4 for quarry operations. Since all loads hauled on or off site at Talen will be covered, the silt loading of plant paved roads will be significantly lower than those observed at a quarry and are more likely to approach the applicable public road silt loading in 13.2.1-3 (i.e., 0.2 g/m2). Therefore, using this silt loading value should provide a conservatively high estimate for PM emissions from plant haul roads.

[2] Unloaded weight of trucks for product offsite transfer estimated based on total maximum weight of truck.

[3] Loaded weight estimated as the sum of the unloaded weight and the capacity of each truck. Based on the expected minimum load trucks for conservatism (number of trucks would be significantly reduced if (DOT) specially permitted overweight trucks used)

[4] Weight (tons) calculated as the average of the unloaded and loaded weights.

[5] Average load hauled per truck obtained from the average capacity of the offsite transport trucks

[6] Control efficiency for covered loads, 25 mph speed limit, periodic water flushing followed by sweeping from Table 5 in Chapter 4 of the AWMA Air Pollution Control Engineering Manual pg 141 and Table 2-4 EPA Control of Open Fugitive Dust Sources.

[7] Emission factor in lb/VMT calculated per EPA AP-42, Section 13.2.1, Equation 1 as follows:

$$E = k\,(sL)^{0.91}\,(W)^{1.02}$$

k: Particle Size Multiplier (lb/VMT)

	PM	PM_{10}	$PM_{2.5}$
k	0.011	0.0022	0.00054

Talen Colstrip Facility
Table D-13. Emission Calculation for Paved Roads

	Paved/ Unpaved	Round Trip Distance (miles)	Potential Throughput [1]			Number of Trucks [2]			Vehicle Miles Travelled (VMT) [3]			Hourly Emissions (lb/hr)			Daily Emissions (lb/day)			Annual Emissions (tpy)		
			Hourly (ton/hr)	Daily (ton/day)	Annual (ton/yr)	Per Hour	Per Day	Per Year	Hourly VMT	Daily VMT	Annual VMT	PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$
FEL - Grizzly area travel [4] *Scenario 4*	Unpaved	0.08	-	-	-	1	24	8,760	0.08	1.94	709.50	0.03	0.01	7.88E-04	0.73	0.19	0.02	0.13	0.03	3.45E-03
FEL - Grizzly area travel [4] *Scenario 2/5*	Unpaved	0.14	-	-	-	1	24	8,760	0.14	3.40	1239.76	0.05	0.01	1.38E-03	1.28	0.33	0.03	0.23	0.06	0.01
FEL - Grizzly area travel [4] *Scenario 3/6*	Unpaved	0.28	-	-	-	1	24	8,760	0.28	6.79	2479.52	0.11	0.03	2.75E-03	2.56	0.66	0.07	0.47	0.12	0.01
Haul Trucks Entrance/ Exit [5] *Scenario 1*	Paved	2.70	114	2,740	1,000,000	4	103	37,736	11.63	279.14	101886.79	0.65	0.13	0.03	15.57	3.11	0.76	2.84	0.57	0.14
Haul Trucks Entrance/ Exit [5] *Scenario 2*	Paved	2.40	400	9,589	3,500,000	15	362	132,075	36.19	868.44	316981.13	2.02	0.40	0.10	48.43	9.69	2.38	8.84	1.77	0.43
Haul Trucks Entrance/ Exit [5] *Scenario 3*	Paved	2.40	799	19,178	7,000,000	30	724	264,151	72.37	1736.88	633962.26	4.04	0.81	0.20	96.85	19.37	4.75	17.68	3.54	0.87
Totals (Scenario 1):												**0.65**	**0.13**	**0.03**	**15.57**	**3.11**	**0.76**	**2.84**	**0.57**	**0.14**
Totals (Scenario 2):												**2.07**	**0.42**	**0.10**	**49.71**	**10.02**	**2.41**	**9.07**	**1.83**	**0.44**
Totals (Scenario 3):												**4.14**	**0.83**	**0.20**	**99.42**	**20.03**	**4.82**	**18.14**	**3.66**	**0.88**
Totals (Scenario 4):												**0.03**	**0.01**	**7.88E-04**	**0.73**	**0.19**	**0.02**	**0.13**	**0.03**	**3.45E-03**
Totals (Scenario 5):												**0.05**	**0.01**	**1.38E-03**	**1.28**	**0.33**	**0.03**	**0.23**	**0.06**	**0.01**
Totals (Scenario 6):												**0.11**	**0.03**	**2.75E-03**	**2.56**	**0.66**	**0.07**	**0.47**	**0.12**	**0.01**

[1] Potential throughput for the Haul Trucks is based on annual coal throughput.

[2] Number of FEL trucks is based on 1 dozer traveling around the area per hour for 24 hours a day. Number of haul trucks is based on potential throughput and average load per truck.

[3] Vehicle miles travelled calculated as the Number of Trucks x Round trip distance per truck.

[4] Round trip distance for FEL estimated based on the front end loader traveling the perimeter of the active storage pile area once per hour. The 1M tpy truck scenario will only use exisitng storage piles and no increase in loader activity is anticipated for this scenario. All other truck scenarios and all rail scenarios will use a new storage pile with new FEL activity. Pile size is generated based on 7M tpy scenario and scaled for smaller scenarios. Permiter of 7M tpy scenario is approximately 0.7 miles, but rounded up to 0.85 miles for conservatism, but only 1/3 of the pile will be active at a time for the 3.5M and 7M tpy scenarios and 2/3 of the pile will be active for the 1M tpy rail scenario.

[5] Round trip distance for Entrance/Exit obtained from unpaved truck route.

Evaporator Emission Factors based on Emission Factor Study

Evaporator Model	PM_{10} Emission Controlled Factor (lb/hr/unit)	$PM_{2.5}$ Controlled Emission Factor (lb/hr/unit)
Minetek Evaporators	0.51	0.42
Slimline Turbomist Evaporators	0.16	0.15

Evaporator Emissions for MAQP #0513-10

Evaporator Type	Number of Units	Flowrate (10^3 gal/hr)	Hours of Operation per Year	PM_{10} Emissions (tpy)	$PM_{2.5}$ Emissions (tpy)
Minetek Evaporators	8	168	2,000	4.07	3.39
Slimline Turbomist Evaporators	31	149	2,000	4.94	4.57
TOTAL	39	317	2,000	9.01	7.96

Emission Source	Tons per Year					
	Hg	PM_{10}	NO_x	CO	VOC	SO_2
Unit 1 boiler	0.013	89.1	5,994.0	428.1	59.9	17,982.1
Unit 2 boiler	0.013	89.1	5,994.0	428.1	59.9	17,982.1
Unit 3 boiler	0.03	224.0	5,970.5	999.1	139.9	3,333.2
Unit 4 boiler	0.03	224.0	5,970.5	999.1	139.9	3,333.2
Unit 1&2 Sorbent Handling System	--	0.00003	--	--	--	--
Unit 3&4 Sorbent Handling System	--	0.00005	--	--	--	--
Total Emissions	0.086	626.2	23,929.0	2,854.4	399.6	42,630.6

Note: The inventory is based on information provided in the mercury control application for #0513-07, and is specific to impacts from the operation of mercury control equipment.

<u>Boiler Units 1 and 2 (emission per boiler)</u>

Maximum nominal operating capacity: 195.5 tons coal per hour
Maximum operation: 8,760 hours per year
Heat content of coal (design value): 8,750 Btu/lb

Mercury Emissions
Emission Factor: 0.9 lb/TBtu (Montana limit)
Calculations: (195.5 tons coal/hr) * (8,760 hr/yr) * (2000 lb coal /ton coal) * (8,750 Btu / lb coal) * (TBtu / 10^{12} Btu) * (0.9 lb Hg/TBtu) * (ton/2000 lb) = 0.013 tons Hg/yr

PM_{10} Emissions
Percent ash in coal (accounting for added sorbent): 9.05%
Emission Factor: 2.3 lb PM_{10} per ton coal, per % ash (AP-42)
Control Efficiency: 99.5% (wet scrubber)
Calculations: (195.5 tons coal/hr) * (8,760 hr/yr) * 9.05 % ash in coal * (2.3 lb PM_{10}/ton coal/%ash) * (1 – 99.5/100) * (ton/2000 lb) = 89.1 tons PM_{10}/yr

NOx Emissions (No change with mercury control, but change because of new standard)
Emission Factor: 0.40 lb NOx / MMBtu (Acid Rain Standard, Phase II)
Calculations: (195.5 tons coal/hr) * (8,760 hr/yr) * (2000 lb coal /ton coal) * (8,750 Btu/lb coal) * (MMBtu/ 10^6 Btu) * (0.40 lb NOx/MMBtu) * (ton/2000 lb) = 5,994.0 tons NOx/yr

CO Emissions (No change with mercury control)
Emission Factor: 0.5 lb per ton coal (FIRE)
Calculations: (195.5 tons coal/hr) * (8,760 hr/yr) * (0.5 lb CO/ton coal) * (ton/2000 lb) = 428.1 tons CO/yr

VOC Emissions (No change with mercury control)
Emission Factor: 0.07 lb per ton coal (AP-42)
Calculations: (195.5 tons coal/hr) * (8,760 hr/yr) * (0.07 lb VOC/ton coal) * (ton/2000 lb) = 59.9 tons VOC/yr

SO_2 Emissions (No change with mercury control)
Emission Factor: 1.2 lb SO_2 /MMBtu (NSPS)
Calculations: (195.5 tons coal/hr) * (8,760 hr/yr) * (2000 lb coal/ton coal) * (8,750 Btu/lb coal) * (MMBtu/ 10^6 Btu) * (1.2 lb SO_2/MMBtu) * (ton/2000 lb) = 17,982.1 tons SO_2/yr

<u>Boiler Units 3 and 4 (emission per boiler)</u>

Maximum nominal operating capacity: 456.2 tons coal per hour
Maximum operation: 8,760 hours per year
Heat content of coal (design value): 8,300 Btu/lb

Mercury Emissions
Emission Factor: 0.9 lb/TBtu (Montana limit)
Calculations: (456.2 tons coal/hr) * (8,760 hr/yr) * (2000 lb coal/ton coal) * (8,300 Btu / lb coal) * (TBtu/
10^{12} Btu) * (0.9 lb Hg/TBtu) * (ton/2000 lb) = 0.03 tons Hg/yr

PM_{10} Emissions
Percent ash in coal (accounting for added sorbent): 9.75%
Emission Factor: 2.3 lb PM_{10} per ton coal, per % ash (AP42)
Control Efficiency: 99.5% (wet scrubber)
Calculations: (456.2 tons coal/hr) * (8,760 hr/yr) * 9.75 % ash in coal * (2.3 lb PM_{10}/ton coal/%ash) * (1 – 99.5/100) * (ton/2000 lb) = 224.0 tons PM_{10}/yr

NOx Emissions (No change with mercury control, but change because of May 14, 2007 Consent Decree standard)
Emission Factor: 0.18 lb NOx/MMBtu (May 14, 2007 Consent Decree standard)
Calculations: (456.2 tons coal/hr) * (8,760 hr/yr) * (2000 lb coal /ton coal) * (8,300 Btu/lb coal) * (MMBtu/ 10^6 Btu) * (0.18 lb NOx/MMBtu) * (ton/2000 lb) = 5,970.5 tons NOx/yr

CO Emissions (No change with mercury control)
Emission Factor: 0.5 lb per ton coal (FIRE)
Calculations: (456.2 tons coal/hr) * (8,760 hr/yr) * (0.5 lb CO/ton coal) * (ton/2000 lb) = 999.1 tons CO/yr

VOC Emissions (No change with mercury control)
Emission Factor: 0.07 lb per ton coal (AP-42)
Calculations: (456.2 tons coal/hr) * (8,760 hr/yr) * (0.07 lb VOC/ton coal) * (ton/2000 lb) = 139.9 tons VOC/yr

SO_2 Emissions (No change with mercury control)
Emission Factor: 761 lb SO_2 /hr (PSD Permit)
Calculations: (8,760 hr/yr) * (761 lb SO_2/hr) * (ton/2000 lb) = 3,333.2 tons SO_2/yr

Unit 1&2 Sorbent Handling System

Maximum operation: 8,760 hours per year
Maximum silo pass-through: 200 lb sorbent per hour
Emission Factor: 0.06 lb PM_{10} / ton sorbent (1998 and 2000 Syncoal and petroleum coke air quality permit amendments for Colstrip Units 1&2)
Control Efficiency: 99.9% (bin filter)

Note: There is one storage silo for mercury sorbent. The emissions from the silo will be generated when the silo is filled and are comprised of filtered emissions through the silo bin vent. The silo is pneumatically loaded through sealed connections from material trucks. The maximum consumption of mercury sorbent is estimated to be 200 lb/hr. A 99.9% control efficiency is assumed. This is the rated control efficiency of the bin vent filter. Because of the sealed nature of the silo, fill and conveyance lines, no other emissions are expected. The only regulated pollutant emissions anticipated from this source is PM_{10}.

Calculations: (200 lb sorbent / hr) * (8,760 hr/yr) * (t sorbent/2000 lb sorbent) * (0.06 lb PM_{10}/ton sorbent) *
(t/2000 lb) * (1 – 99.9/100) = 0.00003 tons PM_{10}/yr

Unit 3&4 Sorbent Handling System

Maximum operation: 8,760 hours per year
Maximum silo pass-through: 400 lb sorbent per hour
Emission Factor: 0.06 lb PM_{10}/ton sorbent (1998 and 2000 Syncoal and petroleum coke air quality permit amendments for Colstrip Units 1&2)
Control Efficiency: 99.9% (bin filter)

Note: There are two storage silos for mercury sorbent. The emissions from the silo will be generated when the silos are filled and are comprised of filtered emissions through the silo bin vents. The silos are pneumatically loaded through sealed connections from material trucks. The maximum consumption of mercury sorbent is estimated to be 400 lb/hr. A 99.9% control efficiency is assumed. This is the rated control efficiency of the bin vent filter. Because of the sealed nature of the silo, fill and conveyance lines, no other emissions are expected. The only regulated pollutant emissions anticipated from this source is PM_{10}.

Calculations: (400 lb sorbent/hr) * (8,760 hr/yr) * (t sorbent/2000 lb sorbent) * (0.06 lb PM_{10}/ton sorbent) * (t/2000 lb) * (1 – 99.9/100) = 0.00005 tons PM_{10}/yr

V. Existing Air Quality

The facility is located in Section 34, Township 2 N, Range 41 E in Rosebud County, Montana. The air quality of this area is classified as unclassified/attainment for the National Ambient Air Quality Standards (NAAQS) for criteria pollutants.

VI. Ambient Air Impact Analysis

There are no proposed increases to potential air emissions from the facility associated with this permit action. Therefore, the Department believes it will not cause or contribute to a violation of any ambient air quality standard.

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	
X		1. Does the action pertain to land or water management or environmental regulation affecting private real property or water rights?
	X	2. Does the action result in either a permanent or indefinite physical occupation of private property?
	X	3. Does the action deny a fundamental attribute of ownership? (e.g., right to exclude others, disposal of property)
	X	4. Does the action deprive the owner of all economically viable uses of the property?
	X	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?
	X	6. Does the action have a severe impact on the value of the property? (consider economic impact, investment-backed expectations, character of government action)
	X	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?
	X	7a. Is the impact of government action direct, peculiar, and significant?
	X	7b. Has government action resulted in the property becoming practically inaccessible, waterlogged or flooded?
	X	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?
	X	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
Air, Energy & Mining Division
Air Quality Bureau
P.O. Box 200901, Helena, Montana 59620
(406) 444-3490

ENVIRONMENTAL ASSESSMENT (EA)

Issued To: Talen Montana, LLC

Montana Air Quality Permit number (MAQP): #0513-12

EA Draft: 5/17/2019
EA Final: 6/6/2019
Permit Final: 6/22/2019

1. *Legal Description of Site:* The Talen Montana, LLC (Talen) Colstrip Steam Electric Station (CSES) is located in Section 34, Township 2 North, Range 41 East, in Rosebud County, Montana.

2. *Description of Project:* Administrative Rules of Montana (ARM) 17.8.771(9) requires that Talen submit an application for a modification to their MAQP to address the Best Available Control Technology (BACT) requirement for mercury within 10 years of the issuance of the MAQP containing the original mercury emission limit under ARM 17.8.771(1)(b). PPL Montana, LLC, the name of the operators of the Colstrip facility at the time, was issued an MAQP establishing a mercury emissions limit for Units 1 – 4 on April 9, 2009. The current application is intended to fulfill the ARM 17.8.771(9) requirement. Talen proposed to retain the mercury emission limit of 0.9 pounds per trillion British thermal units (lb/TBtu) on a rolling 12-month average basis.

3. *Objectives of Project:* To establish that the facility is utilizing the best available control technology for air emissions of mercury.

4. *Alternatives Considered:* In addition to the proposed action, the Department also considered the "no-action" alternative. However, the permit application is required by ARM 17.8.771(9) and Talen has complied with the requirements for a modification of the air quality permit. Therefore, the "no-action" alternative was eliminated from further consideration. Other alternatives considered were discussed in the BACT analysis, Section III, in the Permit Analysis.

5. *A Listing of Mitigation, Stipulations, and Other Controls:* A list of enforceable conditions, including a BACT analysis, would be included in MAQP #0513-12.

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. *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*

The proposed action would not result in any change to the level of potential air emissions, nor would any construction be required. Talen would be authorized to continue to operate their mercury control strategy with no changes. There would not be development of any land that would impact wildlife. This project is exempt from consultation with the Montana Sage Grouse Oversight Committee. There would be no impact to terrestrial and aquatic life and habitats with the current project.

B. *Water Quality, Quantity and Distribution*

The proposed action would not result in any change to the level of potential air emissions, nor would any construction be required. Talen would be authorized to continue to operate their mercury control strategy with no changes. There would be no impacts to the current status of water quality, quantity, or distribution based on increased usage for pollution control.

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

The proposed action would not result in any change to the level of potential air emissions, nor would any construction be required. Talen would be authorized to continue to operate their mercury control strategy with no changes. There would be no impacts to the geology or soil quality, stability, and moisture.

D. *Vegetation Cover, Quantity, and Quality*

The proposed action would not result in any change to the level of potential air emissions, nor would any construction be required. Talen would be authorized to continue to operate their mercury control strategy with no changes. There would be no impacts to the vegetation cover, quality, or quality.

E. *Aesthetics*

The proposed action would not result in any change to the level of potential air emissions, nor would any construction be required. Talen would be authorized to continue to operate their mercury control strategy with no changes. There would be no impact to the aesthetics.

F. *Air Quality*

The proposed action would not result in any change to the level of potential air emissions, nor would any construction be required. Talen would be authorized to continue to operate their mercury control strategy with no changes. MAQP #0513-12 would maintain the requirement to operate a mercury control system that oxidizes and sorbs emissions of mercury, as well as comply with a facility-wide mercury emissions limit of 0.9 pounds per trillion British thermal units (lb/TBtu) calculated as a rolling 12-month average. There would be no impacts to air quality.

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

The proposed action would not result in any change to the level of potential air emissions, nor would any construction be required. Talen would be authorized to continue to operate their mercury control strategy with no changes. Therefore, no impact would be expected.

H. *Sage Grouse Executive Order*

General Habitat Area
The proposed action would not result in any change to the level of potential air emissions, nor would any construction be required. Talen would be authorized to continue to operate their mercury control strategy with no changes. Therefore, consultation with the MSGOT is not required.

I. *Demands on Environmental Resource of Water, Air and Energy*

The proposed action would not result in any change to the level of potential air emissions, nor would any construction be required. Talen would be authorized to continue to operate their mercury control strategy with no changes. Therefore, no impact would be expected.

J. *Historical and Archaeological Sites*

The proposed action would not result in any change to the level of potential air emissions, nor would any construction be required. Talen would be authorized to continue to operate their mercury control strategy with no changes. Therefore, no impact would be expected.

K. *Cumulative and Secondary Impacts*

The proposed action would not result in any change to the level of potential air emissions, nor would any construction be required. Talen would be authorized to continue to operate their mercury control strategy with no changes. Therefore, no impact would be expected.

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

A. *Social Structures and Mores*

The proposed action would not result in any change to the level of potential air emissions, nor would any construction be required. Talen would be authorized to continue to operate their mercury control strategy with no changes. Therefore, no impact would be expected.

B. *Cultural Uniqueness and Diversity*

The proposed action would not result in any change to the level of potential air emissions, nor would any construction be required. Talen would be authorized to continue to

operate their mercury control strategy with no changes. Therefore, no impact would be expected.

C. *Local and State Tax Base and Tax Revenue*

The proposed action would not result in any change to the level of potential air emissions, nor would any construction be required. Talen would be authorized to continue to operate their mercury control strategy with no changes. Therefore, no impact would be expected.

D. *Agricultural or Industrial Production*

There would be no change to agricultural or industrial production associated with this project.

E. *Human Health*

The proposed action would not result in any change to the level of potential air emissions, nor would any construction be required. Talen would be authorized to continue to operate their mercury control strategy with no changes. Therefore, no impact would be expected.

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

There are no current opportunities for recreational and wilderness activities in the project area and there would be no change because of this project.

G. *Quantity and Distribution of Employment*

There would be no change to the quantity or distribution of employment because of this project.

H. *Distribution of Population*

There would be no impact to the distribution of population because of this project.

I. *Demands for Government Services*

There would be some demand for government services to review the application materials and to issue the air quality permit. However, this would be a minor impact to the demands for government services.

J. *Industrial and Commercial Activity*

The proposed action would not result in any change to the level of potential air emissions, nor would any construction be required. Talen would be authorized to continue to operate their mercury control strategy with no changes. Therefore, no impact would be expected.

K. *Locally Adopted Environmental Plans and Goals*

The Department is unaware of any locally adopted environmental plans or goals that would be impacted by this project.

L. *Cumulative and Secondary Impacts*

The Department found no significant cumulative or secondary impacts associated with this project.

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 the continued operation of a mercury control strategy. MAQP #0513-12 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: None.

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

EA prepared by: Ed Warner
Date: May 15, 2019