DEQ
Montana Department
of Environmental Quality

March 1, 2016

Mines Management Inc.
905 W. Riverside Ave., Suite 311
Spokane, WA 99201

Dear Mr. Klepfer:

Montana Air Quality Permit #3788-00 is deemed final as of March 1, 2016, by the Department of Environmental Quality (Department). 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

Craig Henrikson, P.E.
Environmental Engineer
Air Quality Bureau
(406) 444-6711

JM:CH
Enclosures

Montana Department of Environmental Quality
Permitting and Compliance Division

Montana Air Quality Permit #3788-00

Eric Klepfer
Mines Management Inc.
905 W. Riverside Ave., Suite 311
Spokane, WA 99201

March 1, 2016

MONTANA AIR QUALITY PERMIT

Issued to: Mines Management Inc.
Montanore Mine
905 W. Riverside Ave., Suite 311
Spokane, WA 99201

MAQP #3788-00
Application Complete: 05/18/2011
Initial Preliminary Determination (PD) Issued: 08/30/2006
Supplemental PD Issued: 09/07/2011
Supplemental PD (2) Issued: 8/28/2015
Department's Decision Issued: 2/12/2016
Permit Final: 3/1/2016
AFS#: 053-0016

A Montana Air Quality Permit (MAQP), with conditions, is hereby granted to Mines Management, Inc. (Mines Management), 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 Equipment

Mines Management operates a 20,000 ton per day (tpd) (7,000,000 tons per year (tpy)) underground silver and copper mine and processing facility known as the Montanore Mine.

B. Source Description

The Montanore Mine is located 15 miles south-southwest of the city of Libby, Montana. The mine covers portions of Sections 23, 24, 25, 26, 35 and 36 in Township 28 North, Range 31 West, and Sections 1, 2, 11, 14, and 15 in Township 27 North, Range 31 West, in Lincoln County, Montana. The Libby Creek plant site is located in Sections 2 and 11 Township 27 North, Range 31 West.

Section II: Conditions and Limitations

A. Emission Limitations

1. The maximum ore production (measured as throughput at the primary crusher) shall be limited to 20,000 tons during any 24-hour rolling period (ARM 17.8.749).

2. The maximum ore production (measured as throughput at the primary crusher) shall be limited to 7,000,000 tons during any rolling 12-month time period (ARM 17.8.749).

3. The maximum diesel fuel consumption by underground equipment shall be limited to 3,576 gallons during any rolling 24-hour time period (ARM 17.8.749).

4. The maximum diesel fuel consumption by underground equipment shall be limited to 1,305,279 gallons during any rolling 12-month time period (ARM 17.8.749).

5. The maximum diesel fuel consumption by surface equipment shall be limited to 3,769 gallons during any rolling 24-hour time period (ARM 17.8.749).

6. The maximum diesel fuel consumption by surface equipment shall be limited to 1,375,712 gallons during any rolling 12-month time period (ARM 17.8.749).

7. The maximum propane consumption by the propane fired heaters shall be limited to 488,448 gallons during any rolling 12-month time period (ARM 17.8.749).

8. The maximum RU Emulsion explosive use shall be limited to 4,770.5 tons during any rolling 12-month time period (ARM 17.8.749).

9. The maximum High Explosive use shall be limited to 5.0 tons during any rolling 12-month time period (ARM 17.8.749).

10. Until the underground electric transmission line is operational at the mine site, Mines Management shall not operate more than two, EPA Tier 3, diesel engine(s)/generator(s) at any given time and the combined total maximum rated design capacity of the diesel engine/generators shall not exceed 1,500 brake horsepower (bhp) (ARM 17.8.749).

11. The stack height of the diesel engine/generator shall be a minimum of 10 feet above ground level (ARM 17.8.749).

12. Once the underground electric transmission line is operational at the mine site, the operation of the diesel engine(s)/generator(s) in section II.A.10 shall not exceed 16 hours during any rolling 12-month time period (ARM 17.8.749).

13. The emissions from the Libby #1 Exhaust Ventilation Adit shall be limited to (ARM 17.8.749):

    - 8.74 tpy of particulate matter with an aerodynamic diameter of 10 microns or less (PM_{10});
    - 2.03 tpy of particulate matter with an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$);
    - 23.22 tpy of oxides of nitrogen (NO_x); and
    - 1.91 tpy of oxides of sulfur (SO_X).

14. The Libby #1 and Libby #2 Exhaust Ventilation Adits shall not exhaust more than a total of 700,000 cubic feet per minute (cfm) of air (ARM 17.8.749).

15. Emissions from the baghouses used to control emissions from the surface ore handling activities at the SAG mill and at the Libby Load-Out facility shall be limited to 0.05 grams per dry standard cubic meter (g/dscm) or 0.020 grains/dscm (ARM 17.8.749 and 40 CFR 60, Subpart LL).

16. Emissions from the wet venturi scrubber used to control emissions from the coarse ore stockpile transfer to the apron feeders shall be limited to 0.05 g/dscm or 0.020 grains/dscm (ARM 17.8.749 and 40 CFR 60, Subpart LL).

17. Mines Management shall not cause or authorize to be discharged into the atmosphere stack emissions that exhibit 7% opacity or greater averaged over 6 consecutive minutes from the baghouse (ARM 17.8.340 and 40 CFR 60, Subpart LL).

18. Mines Management shall not cause or authorize to be discharged into the atmosphere any fugitive emissions from process equipment that exhibit 10% opacity or greater averaged over 6 consecutive minutes (ARM 17.8.340 and 40 CFR 60, Subpart LL).

19. Mines Management 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).

20. Water shall be available and used, as necessary, to maintain compliance with the opacity limitations (ARM 17.8.752).

21. Detailed descriptions of the baghouses and wet Venturi scrubbers (make, model, flowrate, etc.) shall be submitted to the Department prior to the commencement of construction (ARM 17.8.749).

22. Mines Management shall install, calibrate, maintain, and operate monitoring devices for the continuous measurement of the following on the wet Venturi scrubber (ARM 17.8.340 and 40 CFR 60, Subpart LL):

    a. Change in pressure of the gas stream through the scrubber. The monitoring device must be certified by the manufacturer to be accurate within ±250 pascals (±1 inch water) gauge pressure and must be calibrated on an annual basis in accordance with manufacturer's instructions.

    b. Scrubbing liquid flow rate to the wet scrubber. The monitoring device must be certified by the manufacturer to be accurate within ±5 percent of design scrubbing liquid flow rate and must be calibrated on at least an annual basis in accordance with manufacturer's instructions.

23. Mines Management shall comply with all applicable standards, limitations, and the reporting, recordkeeping, and notification requirements contained in 40 CFR 60, Subpart LL, for all affected facilities (ARM 17.8.340 and 40 CFR Part 60).

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

25. Mines Management shall treat all unpaved portions of the haul roads, access roads, parking lots, or the general plant area with water and/or chemical dust suppressant, as necessary, to maintain compliance with the reasonable precautions limitation in Section II.A.24 (ARM 17.8.749).

26. Mines Management shall develop a general operating plan for the tailings impoundment site including a fugitive dust control plan to control wind erosion from the tailings impoundment site. Prior to the commencement of operation, Mines Management shall submit to the Department for review and approval a general operation plan for the tailings impoundment site including the fugitive dust control plan. The plan must include, at a minimum, the embankment and cell (if any) configurations, a general sprinkler arrangement, and a narrative description of the operation, including tonnage rates, initial area, and timing of future enlargement (ARM 17.8.749 and 17.8.752).

27. Tailings wind erosion control shall be maintained during the interim period after the end of active tailings deposition and prior to final reclamation of the site (ARM 17.8.749 and 17.8.752).

28. If constructed, Mines Management shall use the Rock Lake ventilation raise only as an air intake adit. Any pollutant emissions from the Rock Lake ventilation raise are prohibited (ARM 17.8.749).

29. Mines Management shall comply with all applicable standards and limitations, and the reporting, recordkeeping, and notification requirements contained in 40 CFR 60, Subpart IIII, *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines* and 40 CFR 63, Subpart ZZZZ, *National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*, for any applicable diesel engine (ARM 17.8.340; 40 CFR 60, Subpart IIII; ARM 17.8.342 and 40 CFR 63, Subpart ZZZZ).

B. Emission Control Requirements

Mines Management shall utilize the following emission control requirements:

1. Underground Primary Crusher – Water sprays shall be used at the primary crusher (ARM17.8.752).

2. Underground Coarse Ore Conveyor Transfers – Water sprays shall be used at the five underground coarse ore conveyor transfer points to be located along the conveyor route from the primary crusher to the Libby #1 portal (ARM 17.8.752).

3. Conveyor Transfer to Coarse Ore Stockpile – Water sprays shall be used at the transfer of ore from the underground conveyor system to the coarse ore stockpile (ARM 17.8.752).

4. Overland Conveyor – conveyor emissions from the Libby portal to Mill shall be controlled by a utilizing a fully enclosed conveyor. All three transfer points on this conveyor shall also be fully enclosed (ARM 17.8.752).

5. Coarse Ore Stockpile – The coarse ore stockpile shall be surrounded by a pole structure with an enclosure on the top and two sides (ARM 17.8.752).

6. Apron Feeders – A wet scrubber shall control particulate emissions from the coarse ore stockpile transfer to the apron feeders (ARM 17.8.752).

7. Conveyor Discharge to Semi-Autogenous Grinding (SAG) Mill – The conveyor discharge to the SAG Mill shall occur inside the Mill Building (ARM 17.8.752).

8. Concentrate Transfer and Loading - The concentrate transfer and loading of concentrate into highway trucks for shipment to the Libby Load-out facility shall be entirely enclosed within the Mill Building (ARM 17.8.752).

9. Oversize Transfer to Hopper and Reclaim Belt – The oversize material transferred to the oversize hopper and oversize reclaim belt originate from the SAG Mill, which shall be a wet process. The material passes through a sump and pump to the reclaim route and shall be wet material (ARM 17.8.752).

10. Oversize Screen and Crusher and SAG Mill Transfer – A baghouse shall control emissions from the oversize screen, crusher, and transfer to the SAG Mill (ARM 17.8.752).

11. Tailings Impoundment – The tailings from the mill shall be slurried through a pipeline to a tailings impoundment site. Excess water shall be returned to the mill for re-use. Spigots distributing wet tailings material and water shall cover about one-half of the total tailings at any time. The spigots shall be moved regularly and shall cause wetting of all non-submerged portions of the tailings impoundment to occur each day. This wetting shall be supplemented by sprinklers as necessary when weather conditions could exist to cause fugitive dust (ARM 17.8.752).

12. Libby Load-Out Facility – Concentrate shall be transported to the load-out facility from the mine by highway trucks and shall be transferred to the storage pile within the building. A truck ramp shall be constructed as part of the load-out building. A portion of the ramp shall be enclosed. The load-

out building's exhaust air outlet shall be controlled by a baghouse. Telescoping chutes shall be used while loading each rail car. Loaded rail cars waiting for consolidation into a unit train shall be covered (ARM 17.8.752).

13. Rock Lake Ventilation Raise – The Rock Lake ventilation raise, if constructed, will supplement air flow in the mine and shall function as air intake only. The Rock Lake ventilation raise shall be equipped with a ventilation fan to force air into the mine to supplement ventilation, and air doors shall be installed and closed when the intake ventilation fan is not operational, eliminating exhaust air from exiting at that location (ARM 17.8.752).

14. US Forest Service Road 231 – Concentrate shall be transported to the Libby Load-Out facility using US Forest Service Road 231 and Montana Highway 2. US Forest Service Road 231 shall be upgraded for year-round use by applying a chip-and-seal surface (Reference: Kootenai National Forest Record of Decision).

C. Testing Requirements

1. The affected facilities, under 40 CFR 60, Subpart LL, shall be tested and demonstrate compliance with the emission limitations contained in Section II.A. 15, Section II.A.16, Section II.A.17, and Section II.A.18 within 60 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial start up of the system (ARM 17.8.105, ARM 17.8.340, and 40 CFR Part 60.8).

2. Mines Management shall perform particulate and NO_X emissions testing of the Libby #1 and Libby #2 Ventilation Adits to demonstrate compliance with the emission limitations contained in Section II.A.13. Concentrations should be measured near the point of generation inside the mine and at the point of exhaust to the atmosphere. The testing methodology must be approved in advance by the Department (ARM 17.8.749).

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

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

D. Operational Reporting Requirements

1. Mines Management 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 to calculate operating fees, based on actual emissions from the facility, and/or to verify compliance with permit limitations (ARM 17.8.505). Mines Management shall submit the following information annually to the Department by March 1 of each year; the information may be submitted along with the annual emission inventory (ARM 17.8.505):

a. Amount of ore and waste handled.

b. Amount of diesel fuel used (surface equipment and underground equipment separately).

c. Amount of propane used.

d. Amount of explosives used (RU Emulsion explosive and High Explosive separately).

e. Hours of operation of the diesel engine(s)/generators.

f. An estimate of vehicle miles traveled on on-site access roads.

g. Amount of disturbed acreage (including tailings impoundment area).

h. Other emission related information the Department may request (ARM 17.8.749).

2. Mines Management 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 in control equipment, stack height, stack diameter, stack flow, stack gas temperature, source location, or fuel specifications, or would result in an increase in source capacity above its permitted operation. The notice must be submitted to the Department, in writing, 10 days prior to 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(l)(d) (ARM 17.8.745).

3. All records compiled in accordance with this permit must be maintained by Mines Management 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).

4. Mines Management shall record the measurements of both the pressure drop across the scrubber and the scrubbing liquid flow rate during the initial performance test of the scrubber and at least weekly thereafter. Mines Management shall submit semiannual reports to the Department of occurrences when the measurements of the scrubber pressure loss (or gain) and liquid flow rate differ by more than ±30 percent from those measurements recorded during the most recent performance test. These reports must be submitted within 30 days following the end of the second and fourth calendar quarters (40 CFR 60, Subpart LL).

5. Mines Management shall document, by day, the ore production levels (measured as throughput at the primary crusher). Mines Management shall sum the total ore production during the previous 24 hours to verify compliance with the limitations in Section II.A.1. A written report of the compliance verification shall be submitted annually to the Department along with the annual emission inventory (ARM 17.8.749).

6. Mines Management shall document, by month, the ore production levels (measured as throughput at the primary crusher). By the 25th day of each month, Mines Management shall calculate the total ore production level from the facility for the previous month. The monthly information will be used to verify compliance with the rolling 12-month limitation in Section II.A.2. The information for each of the previous months shall be submitted along with the annual emission inventory (ARM 17.8.749).

7. Mines Management shall document, by day, the diesel fuel consumption by underground equipment. Mines Management shall sum the total diesel fuel consumption by underground equipment during the previous 24 hours to verify compliance with the limitations in Section II.A.3. A written report of the compliance verification shall be submitted annually to the Department along with the annual emission inventory (ARM 17.8.749).

8. Mines Management shall document, by month, the diesel fuel consumption by underground equipment. By the 25th day of each month, Mines Management shall calculate the total diesel fuel consumption by underground equipment for the previous month. The monthly information will be used to verify compliance with the rolling 12-month limitation in Section II.A.4. The information for each of the previous months shall be submitted along with the annual emission inventory (ARM 17.8.749).

9. Mines Management shall document, by day, the diesel fuel consumption by surface equipment. Mines Management shall sum the total diesel fuel consumption by surface equipment during the previous 24 hours to verify compliance with the limitations in Section II.A.5. A written report of the compliance verification shall be submitted annually to the Department along with the annual emission inventory (ARM 17.8.749).

10. Mines Management shall document, by month, the diesel fuel consumption by surface equipment. By the 25th day of each month, Mines Management shall calculate the total diesel fuel consumption by surface equipment for the previous month. The monthly information will be used to verify compliance with the rolling 12-month limitation in Section II.A.6. The information for each of the previous months shall be submitted along with the annual emission inventory (ARM 17.8.749).

11. Mines Management shall document, by month, the propane fuel consumption by the propane fired heaters. By the 25th day of each month, Mines Management shall calculate the total propane fuel consumption by the propane fired heaters for the previous month. The monthly information will be used to verify compliance with the rolling 12-month limitation in Section II.A.7. The information for each of the previous months shall be submitted along with the annual emission inventory (ARM 17.8.749).

12. Mines Management shall document, by month, the amount of RU Emulsion explosive used at the mine. By the 25th day of each month, Mines Management shall calculate the total RU Emulsion explosive used for 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).

13. Mines Management shall document, by month, the amount of High Explosive used at the mine. By the 25th day of each month, Mines Management shall calculate the total High Explosive used for 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).

14. Mines Management shall document, by month, the hours of operation of the emergency diesel engine(s)/generator(s). By the 25th day of each month, Mines Management shall calculate the hours of operation of the diesel engine/generator for the previous month. The monthly information will be used to verify compliance with the rolling 12-month limitation in Section II.A.12. The information for each of the previous months shall be submitted along with the annual emission inventory (ARM 17.8.749).

E. Ambient Air Monitoring

Mines Management shall operate an ambient air monitoring network as described in Attachment 1 of this MAQP. The monitoring plan will be periodically reviewed by the Department and revised, if necessary (ARM 17.8.749).

F. Notification Requirements

1. Mines Management shall supply the Department the following notification (ARM 17.8.749):

   a. Date when the underground electric transmission line is operational and postmarked within 15 days after such date.

   b. Date when adit advancement or construction commenced, postmarked no later than 30 days after such date.

   c. Anticipated date of initial start up of milling operations, postmarked not more than 60 days nor less than 30 days prior to such date.

   d. Actual date of initial start up of milling operations postmarked within 15 days after such date (ARM 17.8.340, 40 CFR Part 60).

Section III: General Conditions

A. Inspection – Mines Management shall allow the Department's representatives access to the source at all reasonable times for the purpose of making inspections or surveys, collecting samples, obtaining data, auditing any monitoring equipment (Continuous Emissions Monitoring System (CEMS), Continuous Emissions 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 all the terms, conditions, and matters stated herein shall be deemed accepted if Mines Management fails to appeal as indicated below.

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

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

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

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

G. Permit Fee – Pursuant to Section 75-2-220, MCA, as amended by the 1991 Legislature, failure to pay the annual operation fee by Mines Management 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 1

Mines Management, Inc.
Ambient Air Monitoring Plan
Montana Air Quality Permit (MAQP) #3788-00

1. This ambient air monitoring plan is required by MAQP #3788-00, which applies to Mines Management Inc. (Mines Management) underground silver and copper mine and processing facility known as the Montanore Mine Project. This monitoring plan may be changed by the Department of Environmental Quality (Department). All current requirements of this plan are considered conditions of MAQP #3788-00.

2. Mines Management shall install, operate, and maintain three air monitoring sites in the vicinity of the mine and facilities. The exact location of the monitoring sites must be approved by the Department and meet all siting requirements contained in the Montana Quality Assurance Manual, including revisions; the EPA Quality Assurance Manual, including revisions; and Parts 50, 53, and 58 of the Code of Federal Regulation; or any other requirements specified by the Department.

3. Mines Management shall commence air monitoring at the commencement of mill facilities or the tailings impoundment and continue air monitoring for at least one year after normal production is achieved. Mines Management will analyze for metals as described below on the PM_{10} filters once the mill facilities and tailings impoundment are operational. At that time, the air monitoring data will be reviewed by the Department and the Department will determine if continued monitoring or additional monitoring is warranted. The Department may require continued air monitoring to track long-term impacts of emissions for the facility or require additional ambient air monitoring or analyses if any changes take place in regard to quality and/or quantity of emissions or the area of impact from the emissions.

4. Mines Management shall monitor the following parameters at the sites and frequencies described below:

Location	Site	Parameter	Frequency
Plant Area 30-053-0014	Site #1	PM-10[1] As, Cu,Cd,Pb,Zn[2] PM-2.5[3]	Every 3rd day according to EPA monitoring schedule
Tailings Area (Up-drainage) 30-053-0015	Site #2	PM-10[1] As, Cu,Cd,Pb,Zn[2] PM-2.5[3]	Every 3rd day according to EPA monitoring schedule
Tailings Area (Down-drainage) 30-053-0016	Site #3	PM-10[1] / PM-10[1] Collocated As, Cu,Cd,Pb,Zn[2] PM-2.5[3] / PM-2.5[3] Collocated Windspeed: 61101 Wind Direction: 61102 Sigma theta[4]: 61106	Every 3rd day according to EPA monitoring schedule (Collocated every 6th day) Continuous

[1] PM-10 = particulate matter less than 10 microns.
Local Conditions: 85101
Standard Conditions: 81102
[2] As = Arsenic, Cu = Copper, Cd = Cadmium, Pb = Lead, Zn = Zinc

[3] PM-2.5 = particulate matter less than 2.5 microns.
Local Conditions: 88101
Sample Flow Rate CV: 68101
Sample Volume: 68102
Ambient Min. Temperature: 68103
Ambient Max. Temperature: 68104
Ambient Avg. Temperature: 68105
Sample Min. Baro. Pressure: 68106
Sample Max. Baro. Pressure: 68107
Sample Avg. Baro. Pressure: 68108
Elapsed Sample Time: 68109
[4] Sigma Theta = Standard Deviation of Horizontal Wind Direction

5. Data recovery (DR) for all parameters shall be at least 80 percent, computed on a quarterly and annual basis. The Department may require continued monitoring if this condition is not met. The data recovery shall be calculated using the following equation(s), as applicable:

$$Manual\ Methods\ \%\ DR = \left[\frac{total\ number\ of\ valid\ samples\ collected}{total\ number\ of\ samples\ scheduled} \right] X\ 100$$

or

$$Automated\ Methods\ \%\ DR = \left[\frac{total\ number\ of\ hours\ possible - hours\ lost\ to\ QA/QC\ checks - hours\ lost\ to\ downtime}{total\ number\ of\ hours\ possible} \right] X\ 100$$

6. Any ambient air monitoring changes proposed by Mines Management must be approved in writing by the Department.

7. Mines Management shall utilize air monitoring and quality assurance procedures which are equal to or exceed the requirements described in the Montana Quality Assurance Manual, including revisions; the EPA Quality Assurance Manual, including revisions; 40 CFR Parts 53 and 58 of the Code of Federal Regulations; and any other requirements specified by the Department.

8. Mines Management shall submit quarterly data reports within 45 days after the end of the calendar quarter and an annual data report within 90 days after the end of the calendar year. The annual report may be substituted for the fourth quarterly report if all information in Item 9 below is included in the report.

9. The quarterly report shall consist of a narrative data summary and a data submittal of all data points in AIRS format. This data shall be submitted on a 3" diskette or a compact disc (CD). The narrative data summary shall include:

   a. A topographic map of appropriate scale with UTM coordinates and a true north arrow showing the air monitoring site locations in relation to the plant, any nearby residences and/or businesses, and the general area;

   b. A hard copy of the individual data points;

   c. The quarterly and monthly means for PM_{10}, $PM_{2.5}$, and wind speed;

d. The first and second highest 24-hour PM_{10}, $PM_{2.5}$ concentrations and dates;

e. A quarterly and monthly wind roses;

f. A summary of the data collection efficiency;

g. A summary of the reasons for missing data;

h. A precision and accuracy (audit) summary;

i. A summary of any ambient air standard exceedances;

j. Calibration information.

10. The annual data report shall consist of a narrative data summary containing:

a. A topographic map of appropriate scale with universal transverse Mercator (UTM) coordinates and a true north arrow showing the air monitoring site locations in relation to the plant, any nearby residences and/or businesses, and the general area;

b. A pollution trend analysis;

c. The annual means for PM_{10}, $PM_{2.5}$, and wind speed;

d. The first and second highest 24-hour PM_{10}, $PM_{2.5}$ concentrations and dates;

e. The annual wind rose;

f. An annual summary of data collection efficiency;

g. An annual summary of precision and accuracy (audit) data;

h. An annual summary of any ambient standard exceedance;

i. Recommendations for future monitoring.

11. The Department may audit, or may require Mines Management to contract with an independent firm to audit, the air-monitoring network, the laboratory performing associated analyses, and any data handling procedures at unspecified times. Based on the audits and subsequent reports, the Department may recommend or require changes in the air monitoring network and associated activities in order to improve precision, accuracy, and data completeness.

Permit Analysis
Mines Management, Inc.
Montana Air Quality Permit (MAQP) #3788-00

I. Introduction/Process Description

A. Permitted Equipment

Mines Management, Inc. (Mines Management) operates an underground silver and copper mine and ore processing facility known as the Montanore Mine. The Montanore Mine is located 15 miles south-southwest of the city of Libby, Montana. The mine covers portions of Sections 23, 24, 25, 26, 35 and 36 in Township 28 North, Range 31 West, and Sections 1, 2, 11, 14, and 15 in Township 27 North, Range 31 West, in Lincoln County, Montana. The Libby Creek plant site is located in Sections 2 and 11 Township 27 North, Range 31 West. A complete listing of equipment and activities is included in Section I.B. of this permit analysis.

B. Source Description

The Montanore Mine is designed to mine 20,000 tons per day (tpd) of copper and silver ore in an underground ore deposit underlying the Cabinet Mountains Wilderness. The ore deposit will be mined using room-and-pillar methods, with both diesel and diesel-electric underground equipment. Propane fired heaters will be operated, as necessary, in the mine. Mining would occur 24 hours per day, seven days per week, for 350 days per year to yield a maximum of 7 million tons of ore annually. Access to the mine site will be by US Forest Service Road 231.

Two mine portals, both adits will be located in Libby Creek drainage, Libby #1 and Libby #2. Both adits will exhaust ventilation air from the underground mine and provide mine access. A third portal (Libby #3) will be located north of the Libby Adit and will provide the primary intake air during construction and operations. Supplemental intake air may be provided from the Rock Lake Ventilation Raise. Ore will be crushed underground by a primary crusher and brought to the surface by conveyors through the Libby #1 portal. The ore will travel from the portal to the coarse ore stockpile via conveyor, then from the stockpile to a classifier/oversize crushing/screening train by underground apron feeders, and then transferred to a Semi-Autogenous Grinding (SAG) mill. Dust emissions from these ore handling activities will be controlled with water sprays, wet Venturi scrubbers, and enclosures.

The SAG mill will undergo commissioning by the vendor/contractor for 30 to 60 days after start-up, during which time the mine will not yet be at full production, and all emission controls at the mill will be operational. Mines Management will take possession of the mill following completion of the commissioning process. Like the mine, the mill will operate 24 hours per day, seven days per week, for 350 days per year. The mill will be powered by electricity supplied by a 230-kV electric transmission line and no continuous on-site power generation will be needed. Up to two (not to exceed 1500 hp), diesel electric generators will be located on-site for emergency backup use. Ore grinding operations at the SAG mill will be fully enclosed and wet, with water pumped into the SAG mill at a rate of 7,780 gallons per

minute (gpm). Copper and silver will be separated from the ore by flotation techniques. The resulting concentrate will be thickened and pressure filtered to remove excess water, and transported by truck using US Forest Service Road 231 and Montana Highway 2 to a rail siding in the city of Libby.

All underground emissions from the Montanore Mine will exit to the atmosphere through both the Libby portals, while Libby #3 portal will provide intake air. The mine will not be ventilated from only one portal. Even under a condition where the ventilation system would be interrupted (i.e., power outage) the volume of air that would naturally flow through the system would be reduced. Under this condition, natural air flow would still occur through both portals. Some variation could occur in the distribution between the two portals; however, the portion of total mine air volume that could be exhausted from the Libby#1 portal would be no greater than 350,000 cubic feet per minute (cfm) (50% of total volume flow) due to the physical restraints (flow turbidity, volume, etc.) of the portal dimensions and air control mechanisms.

Due to the large volume of air required to ventilate the mine, all emissions, regardless of release location underground, are assumed to be well mixed with the ventilation air. Total exhaust air from the mine will be 700,000 cfm based on ventilation design. 350,000 cfm will exhaust through the Libby#1 portal, while the remaining 350,000 cfm will exhaust through the Libby #2 portal. Therefore, with the assumption the emissions are well mixed with the air, about 50% of underground emissions will exhaust through the Libby #1 portal and 50% will exhaust through the Libby #2 portal.

Underground sources contributing to the portal exhaust emissions are blasting, propane heaters, primary crushers, coarse ore conveyor transfers, and underground mobile sources. The Libby #2 portal diameter is calculated to be equivalent to the 350,000 cfm volume exhaust rate from the portal exiting at 0.0328 feet per second (fps), for a portal diameter of 475.7 feet.

The tailings from the mill will be slurried through a pipeline to a tailings impoundment site located at the Poorman Impoundment Site, located between Little Cherry Creek and Poorman Creek. Excess water will be returned to the mill for re-use. Although the tailings will be wetted with a sprinkler system, some drying may occur in the summer months. Water utilized by the sprinklers will be obtained from the water reclaim system which returns water to the mill from the tailings impoundment. Although the tailings will be wetted with a sprinkler system, some drying may occur in the summer months. To control fugitive dust on the tailings impoundment, a fugitive dust control plan will be employed by Mines Management.

The decision to operate sprinklers at the tailings impoundment will be made based on regular inspection of the tailings impoundment during the day and on weather criteria to be established as part of the fugitive dust control plan. The presence of visible emissions, observed through shift inspection of the tailings impoundment on a regular basis during the day by environmental personnel trained in visual opacity monitoring and by shift operators staffing the tailings impoundment would prompt sprinkler operation. In addition, specific thresholds for weather conditions such as

wind speed, precipitation, humidity, etc. would be developed as part of the fugitive dust control plan to indicate the potential for fugitive dust emissions to occur, prompting sprinkler operation.

All transfer operations and storage areas at the Libby rail siding will be completely enclosed. Concentrate transported by the haul trucks to the Libby siding will be dumped to an enclosed storage bin which will transfer the concentrate to rail cars. Loaded rail cars waiting for consolidation into a unit train will be covered to prevent wind losses. When a sufficient number of railcars have been loaded, they will be coupled to a mainline engine for transport to an off-site smelter. The trucks would enter this area and dump the concentrate into the main area of the load-out facility. The transfer and loading of concentrate onto rail cars is conducted within the pressurized load-out building. The load-out building's exhaust air outlet will be controlled by a baghouse. The concentrate's high moisture content (16-20%) will assist in controlling particulate emissions. One rail car is routed through door flaps into the building on the rail siding that passes through the building. The rail car is loaded using telescoping chutes to reduce product loss and to assist in controlling airborne dust concentrations within the building. Upon completion of loading one rail car, the rail car is covered and awaits sufficient cars to connect to a train.

During mine development, some waste rock will be transported by truck from the portal to a temporary storage area east of the mill site. This waste rock will be used as a construction material for the tailings dam and mill site areas. Waste rock generated in the advancement of the mine will remain underground or used in dam construction.

Construction and Operation Schedule

The construction and operation schedule for the Montanore Mine will consist of several phases:

- The project is divided into two main phases. The first phase is the construction phase and the second phase is the operations phase. Within the construction phase, there is also an evaluation phase where two Tier II diesel generators will likely move to the site under an "intent to transfer" notification which are permitted as portable generators for temporary power. These generators are not specifically covered under the Montanore air quality permit. Three diesel generators have been permitted under this portable permit identified as Cummins USA MAQP #4063-00. As part of the Montanore modeling analysis, two of these generators along with adit emissions were modeled to demonstrate compliance with the 1-hour NO_2 standard. This period is expected to be about 12 months but may be longer or shorter depending upon the transmission line construction schedule or whether Tier III units permitted under the Montanore permit move to the site.

- The next part of the construction phase persists until the transmission line power is installed or until Tier III engines replace the temporary portable generators. The project may install a smaller underground power line from the City of Libby that could reduce engine/generator use until the main

transmission line is constructed. During this phase, access roads will be upgraded, the Libby adits will be advanced, and an underground electric transmission line from the city of Libby may be installed. No major surface construction will occur during this phase and the Libby portal air emissions would be less than during later phases of construction or during production. During this phase, the adits will continue to be advanced, roads to portals and tailings impoundment dam will be constructed, and the Libby Plant site preparation will begin

- In additional phases of construction, surface facilities such as the mill and support facilities will be constructed, the electric transmission line to the Libby Plant will be constructed, the tailings impoundment will be constructed, and advancement of all the Libby tunnels will continue. Initial mining and milling will take place during the first two years of mine life. During this time period, construction will continue as well as limited production with up to 15,700 tpd of ore being mined and milled. Once transmission line power to the Libby Plant site is complete, standby generators will provide backup power (up to 16 hours per 12-month time period). If the underground line is installed it could provide backup power to all facilities. In either case, the diesel generators will remain on-site at the Libby Plant area to provide emergency power in the event of primary and secondary line power failure.

- Full production of 20,000 tpd of ore removal and processing will take place at about year 15.

- Production mining will continue for about 8 years after full development at a rate of 7,000,000 tons per year (tpy).

C. Current Permit Action

On January 17, 2006, the Montana Department of Environmental Quality – Air Quality Bureau (Department) received a MAQP application from Mines Management for a proposed underground silver and copper mine with an associated mill facility. On March 17, 2006, the Department sent a letter to Mines Management requesting additional information. On May 12, 2006, the Department received a revised MAQP application from Mines Management. On June 7, 2006, the Department received information from Mines Management that additional emitting units (engines/generators) would be located at the mine site. These generators were not identified in the MAQP applications submitted to the Department on January 17, 2006, and May 12, 2006. On July 7, 2006, the Department sent Mines Management a letter requesting Mines Management to update the MAQP application to include information about the new generators. On July 21, 2006, the Department received additional information from Mines Management stating that Mines Management would not be operating the additional emitting units. On July 21, 2006, the MAQP application was considered complete. On August 30, 2006, the Department issued the preliminary determination. This remained as preliminary pending a final Environmental Impact Statement (EIS).

On June 29, 2009, the Department received comments from the Environmental Protection Agency (EPA) regarding the Draft EIS. On February 18, 2010, the Department, in conjunction with the Forest Service, sent a response to EPA. On May 10, 2010, EPA responded by expressing satisfaction with the Department/Forest Service submittal. However, at that time, EPA suggested that the Department require Mines Management to address the new National Ambient Air Quality Standards (NAAQS) for oxides of nitrogen (NOx) and sulfur dioxide (SO_2).

The Department continued to work closely with Mines Management regarding the new NAAQS. On August 17, 2010, and November 23, 2010, Mines Management submitted information to demonstrate compliance the NAAQS. The Department requested additional information and on February 14, 2011, and March 14, 2011, the Department arranged for conference calls to go over remaining deficiencies with respect to the modeling demonstration. On April 5, 2011, Mines Management submitted additional information electronically and hard copies of this information were received on April 6, 2011. On April 6, 2011, the Department contacted Mines Management with questions regarding the latest submittal.

At the Department's request, on April 15, 2011, Mines Management sent potential changes of the initial MAQP including: plant location, number and size of diesel engines/generators, engine stack height, and replacement of the Ramsey Exhaust Ventilation Adit with Libby #1 Adit. Additionally, Mines Management submitted a change to the source description in the permit analysis. On April 20, 2011, at the Department's request, Mines Management sent the required AERSURFACE input and output files.

On April 25, 2011, the Department requested additional information via email and Mines Management provided the information the same day. At that time, the Department had enough information to complete review of the modeling demonstration with respect to the new NAAQS (NOx and SO_2) and the potential permit changes.

In June 2015, additional modeling was conducted to include off-site emissions from both the Rock Creek Mine and Troy mine. The additional modeling demonstration results were added to the permit. Additional comments have also been added to address the earlier part of the construction phase where Tier II engines will be temporarily used at the site under an existing air quality permit but only after an "intent to transfer" process has been initiated to bring the engines onto the site. Finally, a review of the Best Achievable Control Technology was completed as the previous BACT analysis had expired since the previous draft permits had never become final.

D. Department Edits from Preliminary Determination

Upon review of supporting documentation, several minor corrections were made by the Department from the earlier issued Preliminary Determination. These include eight places where reference to US Forest Service Road 278 was changed to US Forest Service Road 231. Additionally, a minor correction was made to the description of the Township, Range, and Section to better align with the final EIS

and Record of Decision. Section 1 within Township 27 North, Range 31 West was added to the location description on page 1 of the permit and also in the permit analysis. Finally, the expected schedule to reach full production and the period of years operating at full production were changed to indicate full production would be reached in year 15 and operate at full production for 8 years.

II. Applicable Rules and Regulations

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

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

1. ARM 17.8.101 Definitions. This rule is 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 Montana Clean Air Act, 75-2-101, *et seq*., Montana Code Annotated (MCA).

   Mines Management 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 four hours.

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

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

1. ARM 17.8.204 Ambient Air Monitoring
2. ARM 17.8.210 Ambient Air Quality Standards for Sulfur Dioxide
3. ARM 17.8.211 Ambient Air Quality Standards for Nitrogen Dioxide
4. ARM 17.8.212 Ambient Air Quality Standards for Carbon Monoxide
5. ARM 17.8.213 Ambient Air Quality Standard for Ozone
6. ARM 17.8.214 Ambient Air Quality Standard for Hydrogen Sulfide
7. ARM 17.8.220 Ambient Air Quality Standard for Settled Particulate Matter
8. ARM 17.8.221 Ambient Air Quality Standard for Visibility
9. ARM 17.8.222 Ambient Air Quality Standard for Lead
10. ARM 17.8.223 Ambient Air Quality Standard for PM_{10}
11. ARM 17.8.230 Fluoride in Forage

Mines Management must maintain compliance with the applicable ambient air quality standards.

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

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

2. ARM 17.8.308 Particulate Matter, Airborne. (1) This rule requires an opacity limitation of 20% for all fugitive emission sources and that reasonable precautions be taken to control emissions of airborne particulate matter. (2) Under this rule, Mines Management 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, suffer, allow, or permit to be discharged into the atmosphere particulate matter caused by the combustion of fuel in excess of the amount determined by this rule.

4. ARM 17.8.310 Particulate Matter, Industrial Processes. This rule requires that no person shall cause, allow, or permit to be discharged into the outdoor atmosphere particulate matter in excess of the amount set forth in this rule.

5. ARM 17.8.322 Sulfur Oxide Emissions--Sulfur in Fuel. This rule requires that no person shall burn liquid, solid, or gaseous fuel in excess of the amount set forth in this rule.

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

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

b. 40 CFR 60, Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (CI ICE). Owners and operators of stationary CI ICE that commence construction after July 11, 2005, where the stationary CI ICE are manufactured after April 1, 2006, and are not fire pump engines, and owners and operators of stationary CI ICE that modify or reconstruct their stationary CI ICE after July 11, 2005, are subject to this subpart.

c. 40 CFR 60, Subpart LL – Metallic Mineral Processing Plants – Requires opacity limitations of 10% on process fugitive emissions and 7% on baghouse stack emissions and a stack particulate limitation of 0.05 grams per dry standard cubic meter.

7. ARM 17.8.342 Emission Standards for Hazardous Air Pollutants for Source Categories. This rule incorporates, by reference, 40 CFR Part 63, National Emission Standards for Hazardous Air Pollutants (NESHAPs) for Source Categories. Matriarch is considered an NESHAP-affected facility under 40 CFR Part 63 and is subject to the requirements of the following subparts.

a. 40 CFR 63, Subpart A – General Provisions apply to all equipment or facilities subject to a NESHAPs 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 RICE at a major or area source of HAP emissions is subject to provisions of this subpart, except if the stationary RICE is being tested at a stationary RICE test cell/stand. As an area source, the diesel RICE will be subject to this rule.

D. ARM 17.8, Sub-Chapter 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 section 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. Mines Management submitted the appropriate permit application fee to the Department.

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

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

E. ARM 17.8, Sub-Chapter 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, alter, or use any air contaminant sources that have the Potential to Emit (PTE) greater than 25 tpy of any pollutant. The Mines Management facility has a PTE greater than 25 tpy of particulate matter; 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, alteration, or use of a source. Mines Management 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. Mines Management submitted an affidavit of publication of public notice for the February 10, 2006, and February 15, 2006, issue of *The Western News*, a newspaper of general circulation in the city of Libby, Lincoln County, Montana, 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 used. The BACT analysis is discussed 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 Mines Management 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 17.8.760 Additional Review of Permit Applications. This rule describes the Department's responsibilities for processing permit applications and making permit decisions on those applications that require an environmental impact statement.

12. 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 one year after the permit is issued.

13. 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).

14. 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.

15. ARM 17.8.765 Transfer of Permit. This rules states that an air quality permit may be transferred from one person to another if written notice of Intent to Transfer, including the names of the transferor and the transferee, is sent to the Department.

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

1. ARM 17.8.801 Definitions. This rule is a list of applicable definitions used in this subchapter.
2. ARM 17.8.818 Review of Major Stationary Sources and Major Modifications – Source Applicability and Exemptions. The requirements contained in ARM 17.8.819 through 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 not a major stationary source since this facility is not a listed source and the facility's potential to emit is less than 250 tons per year of any pollutant (excluding fugitive emissions).

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 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 #3788-00 for Mines Management, the following conclusions were made:

   a. The facility's PTE is less than 100 tons/year for any pollutant (excluding fugitive emissions).

   b. The facility's PTE is less than 10 tons/year for any one HAP and less than 25 tons/year 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, Subpart LL and 40 CFR 60, Subpart IIII.

e. This facility is potentially subject to 40 CFR 63, Subpart ZZZZ.

f. This source is not a Title IV affected source

g. This source is not a solid waste combustion unit.

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

Based on these facts, the Department determined that Mines Management is a minor source of emissions as defined under Title V. Therefore, Mines Management is not required to obtain a Title V Operating Permit. However, if minor sources subject to NSPS are required to obtain a Title V Operating Permit in the future, Mines Management will be required to obtain a Title V Operating Permit.

III. Best Available Control Technology (BACT) Determination

A BACT determination is required for each new or modified source. Mines Management 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.

A BACT analysis was previously submitted by Mines Management addressing some available methods of controlling emissions from the sources used at the Montanore Mine. The Department previously reviewed these methods, as well as previous BACT determinations in order to make the following BACT determination.

Diesel Generator BACT Analysis

During the production phase of operation, operation of the emergency engines shall not exceed 16 hours during any rolling 12-month time period and the annual emissions of all criteria pollutants were projected to be less than 1 ton per year. During this type of operating scenario, Mines Management does not believe and the Department agrees, that applying any control technology would be economically infeasible.

During the construction phase of operation, which includes construction that occurs up until the underground electric transmission line is operational, Mines Management proposes to use the above mentioned engines as a power source. As currently proposed, Mines Management would use these engines for approximately one year.

The Department determined that additional controls for particulate matter (PM), particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10}), volatile organic compounds (VOC), carbon monoxide (CO), and oxides of sulfur (SO_x) would be technically or economically infeasible. Therefore, the Department determined that proper operation and maintenance with no additional controls for PM, PM_{10}, VOC, CO, and SOx would constitute BACT for the diesel generators/engines.

Additionally, control options required for the diesel generators/engines are similar to other recently permitted similar sources and are capable of achieving the appropriate emission standards. The new diesel stationary engines would be required to meet EPA's Tier 3 NOx emission standards and comply with the federal engine emission limitations including, for example, 40 CFR 60, Subpart IIII and/or 40 CFR 63, Subpart ZZZZ.

Mines Management proposes BACT as proper operation and maintenance of up to two, diesel fired engines with a combined capacity not to exceed 1500 brake-horsepower (bhp).

Mill Building BACT Analysis

This section provides a BACT analysis for material transfer and processing activities from underground ore operations through the SAG Mill. Particulate control is the focus of this analysis because particulate and lead (as a fraction of particulate) are the only pollutants emitted from these activities. All underground and surface material transfers and material processing equipment/activities will be equipped with emission controls to limit particulate emissions.

For all material transfers and processing activities, high material moisture content will inherently control particulate emissions. High-moisture ore for metallic minerals processing is defined by EPA in AP-42, Chapter 11.24, Metallic Minerals Processing:

> "Test data collected in the mineral processing industries indicate that the moisture content of ore can have a significant effect on emissions from several process operations. High moisture generally reduces the uncontrolled emission rates, and separate emission rates are provided for primary crushers, secondary crushers, tertiary crushers, and material handling and transfer operations that process high-moisture ore…
>
> For most metallic minerals covered in this section, high-moisture ore is defined as ore whose moisture content, as measured at the primary crusher inlet or at the mine, is 4 weight percent or greater. Ore defined as high-moisture at the primary crusher is presumed to be high-moisture ore at any subsequent operation for which high-moisture factors are provided unless a drying operation precedes the operation under consideration…"

The inherent moisture in raw ore mined at the Montanore Mine will be 10-12% by weight. Water application will occur during loading operations at the face, primary crushing, conveyor transfers, and other appropriate places that will inherently increase this moisture content as the ore moves through the material handling system to the wet grinding circuit. This water application will assist in maintaining and increasing the moisture content of the ore.

An additional level of emission control for underground emission sources will occur following installation of an air re-circulation/water mister/de-mister system. The system will be installed at the mine upon full production (approximately year 4) and will re-circulate 350,000 cfm of air from the underground mine. Although an exact emission control efficiency is not known, as each system is custom built by mine site, the mister is estimated to be able to remove nearly 100% of particulate greater than 5 microns in size as well as up to 90% of water soluble pollutants such as NOx and SOx. The demister system will remove the water along with the entrained and dissolved pollutants before the air is re-introduced to the mine. Because of the uncertainty in the control efficiency, no reduction in emissions due to this system was assumed. However, once the system is installed, emissions from the mine portals due to underground sources will be reduced significantly.

Particulate will be controlled from 90% to 99% at underground and surface sources, depending upon the technology utilized. The technology proposed to be utilized for each of these sources and a BACT discussion is provided in the sections that follow.

Primary Crusher

Water sprays are proposed at the primary crusher, and are estimated to reduce particulate emissions by 90%. Other control options include a wet scrubber, a baghouse, or enclosure of the primary crusher. Each of these three options is technically infeasible due to the mobility required of the primary crusher, which operates underground, and the limited spaces within which the crusher operates, a complete enclosure of the crusher which allows capture of air emissions and routing to a control device is not possible. Therefore, water sprays are considered BACT for the primary crusher.

Underground Coarse Ore Conveyor Transfers

Water sprays are proposed at the underground coarse ore conveyor transfer points, and are estimated to reduce particulate emissions by 90%. Another control option is the enclosure of each of the five transfer points to be located along the conveyor route from the primary crusher to the Libby portal. This control option is technically infeasible due to the low air velocities within the mine, an enclosure is not estimated to control emissions significantly enough to warrant full enclosure on these mobile transfer points. Therefore, water sprays are considered BACT for the underground coarse ore conveyor transfer points.

Conveyor Transfer to Coarse Ore Stockpile

Water sprays are proposed at the transfer of ore from the underground conveyor system to the coarse ore stockpile, and are estimated to reduce particulate emissions by 90%. Other control options include complete enclosure of the coarse ore stockpile and/or routing emissions to a baghouse. The coarse ore stockpile will be partially enclosed by a pole structure with a top and two sides enclosed to reduce material loss. Mines Management will use this cover structure to mitigate the majority of the emissions from the coarse ore stockpile. Access to a majority of the pile by heavy equipment is required periodically to manage the pile. In addition, waste rock will be discharged at this location and loaded into trucks requiring easy access for heavy equipment. These access requirements prohibit further enclosure of the structure. Without complete enclosure, a baghouse would be technically infeasible because emissions cannot be routed to a baghouse. Therefore, water sprays are considered BACT for material transfer to the coarse ore stockpile.

Overland Ore Conveyor

This conveyor was requested by Mines Management (on April 4, 2011) to replace the 40-ton haul trucks that were originally proposed to transport ore from the Libby Portal to the Mill. Three material transfer points are proposed along the conveyor route. As such, several emission control options were evaluated by Mines Management to include: water fogging sprays at each transfer point; complete enclosure of each transfer point, partial enclosure or each transfer point and no control. Mines Management selected the top control option (complete enclosure of the conveyor and the transfer points) and no further analysis is required. Therefore, enclosed conveyors and conveyor transfer points are considered BACT for material transfer.

Coarse Ore Stockpile

The coarse ore stockpile will be surrounded by a pole structure with an enclosure on the top and two sides to reduce wind-blown dust. No control efficiency is assigned to this control for this source because emissions were found to be negligible without application of controls; however, a 50% control is typically applied for a partial enclosure such as a stilling shed at a surface coal mine. The inherent material moisture content of the ore (10-12%) will assist in controlling fugitive dust from the stockpile, and water sprays are proposed at the conveyor transfer to the coarse ore stockpile which will maintain or increase this moisture. Another control option is complete enclosure, which is prohibitive for the reasons described above in the Conveyor Transfer to Coarse Ore Stockpile BACT discussion. Therefore, a pole structure with an enclosure on the top and two sides is considered BACT for this source.

Apron Feeders

A wet scrubber is proposed to control particulate emissions from the coarse ore stockpile transfer to the apron feeders, and is estimated to control particulate emissions by 95%. This transfer occurs underground. A baghouse is technically infeasible because of operational considerations of the underground transfer. While the area is contained, the apron feeder's configuration is such that a baghouse would not be effective in this situation. Each end of the system is open (coarse ore stockpile and SAG Mill), and the baghouse system would have to be able to overcome these conditions which could not be accomplished without significant air control devices to minimize pressurization of the area. These devices would impact access to the apron feeder by maintenance equipment. Therefore, the wet scrubber is considered BACT for the apron feeders.

Conveyor Discharge to SAG Mill

The conveyor discharge to the SAG Mill occurs just inside the Mill Building. That enclosure is estimated to provide a 99% control efficiency. Adding to the controls on this source is the introduction of water into the SAG Mill at a pump rate of 7,780 gallons per minute which will further control any particulate generated from this transfer. This control method is considered BACT for this source.

Concentrate Transfer and Loading

Concentrate transfer and loading into highway trucks for shipment to the Libby Load-out facility are entirely enclosed within the Mill Building, effecting an estimated control efficiency of 99%. In addition, material moisture is expected to be 16-20%. This control method is considered BACT for this source.

Oversize Transfer to Hopper and Reclaim Belt

Oversize material transferred to the oversize hopper and oversize reclaim belt originate from the SAG Mill, which is a wet process. The material passes through a sump and pump to the reclaim route and is wet material, which is estimated to completely control particulate emissions from these two transfer points (100% control). No more effective control options are available; therefore, this control method is considered BACT for this source.

Oversize Screen and Crusher and SAG Mill Transfer

Wet oversize material from the SAG Mill passes from the reclaim hopper and along the reclaim belt to the oversize screen, to the oversize crusher, and back to the SAG Mill. The oversize screen, crusher, and transfer to the SAG Mill are controlled by a baghouse which is estimated to control particulate emissions by 99%. No more effective control options are available than the baghouse control proposed; therefore, this control method is considered BACT for these sources.

Libby Load-Out Facility BACT Analysis

Particulate emissions are the focus of this analysis because particulate is the only pollutant with a potential to be emitted by the transfer and loading operations proposed at the Libby rail siding.

Concentrate is transported to the load-out facility from the mine by highway trucks, and is transferred to the storage pile within the building. A truck ramp would be constructed as part of the loadout building. A portion of the ramp would be enclosed. The trucks would enter this area and dump the concentrate into the main area of the loadout facility. The transfer and loading of concentrate onto rail cars is conducted within the pressurized load-out building. The load-out building's exhaust air outlet will be equipped with a baghouse which is estimated to control particulate emissions by 99%. The concentrate possesses a high moisture content (16-20%) which will assist in controlling particulate emissions. Product loss must be minimal from an economic standpoint; however, any product loss from trucks outside the load-out facility will be swept promptly. One rail car is routed through door flaps into the building on the rail siding that passes through the building. The rail car is loaded using telescoping chutes to reduce product loss, which also serves to control airborne dust concentrations within the building. Upon completion of loading one rail car, the car is covered and awaits sufficient cars to connect to a train. The complete enclosure of the handling and transfer operations within the pressurized building, the operation of a baghouse on the building's exhaust air outlet, combined with the other product loss control methods described above, is considered BACT for controlling emissions from the transfer and loading operations.

Miscellaneous Source Controls

Underground Mobile Sources

Fugitive emissions from the movement of mobile sources in the underground mine will be negligible due to the high moisture content of the traveled surfaces underground.

US Forest Service Road 231

Concentrate shall be transported to the Libby Load-Out facility using US Forest Service Road 231 and Montana Highway 2. US Forest Service Road 231 shall be upgraded for year-round use by applying a chip-and-seal surface. It is anticipated that applying a chip-and-seal surface will reduce emissions to near the levels of paved roads. The Department would typically consider water and/or chemical dust suppressant to be BACT for haul roads; however, Mines Management proposed applying a chip-and-seal surface. Therefore, this is above and beyond BACT requirements for recently permitted similar sources.

Tailings Impoundment

The tailings from the mill will be slurried through a pipeline to a tailings impoundment site. Excess water will be returned to the mill for re-use. Spigots distributing wet tailings material and water will cover about one-half of the total tailings at any time. The spigots will be moved regularly and will cause wetting of all non-submerged portions of the tailings impoundment to occur each day. This wetting will be supplemented by sprinklers as necessary when weather conditions could exist to cause fugitive dust. Water utilized by the sprinklers will be obtained from the water reclaim system which returns water to the mill from the tailings impoundment. Although the tailings will be wetted with a sprinkler system, some drying may occur in the summer months. To control fugitive dust on the tailings impoundment, a fugitive dust control plan will be submitted by Mines Management for review and approval by the Department. Therefore, an approved fugitive dust control plan is considered BACT for this source.

Rock Lake Ventilation Raise

The Rock Lake ventilation raise, if constructed, will supplement air flow in the mine and would function as air intake only. The Rock Lake ventilation raise would be equipped with a ventilation fan to force air into the mine to supplement ventilation, and air doors would be installed and closed when the intake ventilation fan was not operational, eliminating exhaust air from exiting at that location. Operating the ventilation fan to force air into the mine and operating the air doors is considered BACT for controlling emissions from the Rock Lake ventilation raise.

2015 BACT Update

The previous BACT analysis was reviewed and determined to still represent BACT conditions for the proposed project.

IV. Emission Inventory and Control Technology Review

Table 1. Point Source Emissions Inventory.

Point Source Emissions (tpy)								
Mine Sources	**TSP**	**PM_{10}**	**$PM_{2.5}$**	**NOx**	**CO**	**SO_2**	**VOC**	**Lead**
Space Heating Propane Combustion	0.10	0.10	0.10	3.42	0.46	0.004	0.12	--------
Primary Crushers	7.25	3.26	0.65	--------	--------	--------	--------	1.63E-04
Coarse Ore Conveyor Transfers	28	11.2	2.24	--------	--------	--------	--------	5.60E-04
Conveyor to Coarse Ore Stockpile	3.5	1.4	0.28	--------	--------	--------	--------	7.00E-05
Apron Feeders	1.75	0.7	0.14	--------	--------	--------	--------	3.50E-05
Conveyor Discharge to SAG Mill	0.35	0.14	0.03	--------	--------	--------	--------	7.00E-06
Concentrate Transfer	0.01	2.94E-03	5.88E-04	--------	--------	--------	--------	1.29E-05

Point Source Emissions (tpy)								
Mine Sources	**TSP**	**PM_{10}**	**$PM_{2.5}$**	**NOx**	**CO**	**SO_2**	**VOC**	**Lead**
Concentrate Loading	0.01	2.94E-03	5.88E-04	--------	--------	--------	--------	1.29E-05
Oversize Transfer to Hopper	0	0	0	--------	--------	--------	--------	0.00E+00
Oversize Reclaim Belt Transfer	0	0	0	--------	--------	--------	--------	0.00E+00
Oversize Crusher	0.11	0.04	0.01	--------	--------	--------	--------	1.75E-06
Oversize Screen	0.02	0.01	0	--------	--------	--------	--------	3.50E-07
Belt Transfer Back to SAG Mill	0.02	0.01	0	--------	--------	--------	--------	3.50E-07
Emergency Generator	0.00198	0.00198	0.000198	0.0741	0.0688	0.0320	0.00529	--------
Laboratory Crusher	0.49	0.03	0.01	--------	--------	--------	--------	--------
Total	**41.59**	**16.88**	**3.46**	**3.49**	**0.53**	**0.036**	**0.125**	**0.00863**

Table 2. Fugitive Source Emissions Inventory.

Fugitive Source Emissions (tpy)							
Mine Sources	**TSP**	**PM_{10}**	**$PM_{2.5}$**	**NOx**	**CO**	**SO_2**	**Lead**
Blasting (particulate emissions)	0.78	0.40	0.02				0.000202
Topslice	0.59	0.31	0.02	--------	--------	--------	1.54E-05
Bench	0.11	0.06	3.33E-03	--------	--------	--------	2.88E-06
Development	0.07	0.04	2.16E-03	--------	--------	--------	1.87E-06
Blasting (gaseous emissions)	-------	--------	--------	--------	--------	--------	--------
RU Emulsion	-------	--------	--------	1.19	64.4	0.14	--------
High Explosive	-------	--------	--------	0.13	0.26	0.00	--------
Coarse Ore Stockpile Wind Erosion	1.06	0.53.	0.08	neg	neg.	neg.	2.66E-05
Haul Truck Travel	703.2	137.15	20.53	--------	--------	--------	1.37E-03
Tailings Impoundment Wind Erosion*	23.3	11.65	3.49	neg	neg.	neg.	5.82E-04
Total	**727.28**	**149.21**	**24.04**	**1.33**	**64.66**	**0.14**	**.00139**

*Department Tailings Impoundment Wind Erosion Emissions from 2006 and carried over to 2011

V. Existing Air Quality

The following air quality analysis is broken into two sections, one that addresses the modeling demonstration that was completed in 2006, and the other modeling demonstration that was completed in 2011. For the most part, all of the emitting units and emissions presented in 2006 remained the same as that of 2011, and the Department determined that it was not necessary to complete a full remodel. However, Mines Management submitted

information to demonstrate compliance with the new NO_2 and SO_2 NAAQS and the Department also completed additional modeling to demonstrate compliance with PM_{10} and $PM_{2.5}$ NAAQS. Because the EIS for the project is not finalized and it is unclear at this time where the mine would locate, both scenarios and modeling demonstrations are included in this analysis.

In the 2006 scenario, the Montanore Mine (Alternative 2 – Draft EIS) is situated 15 miles south-southwest of the city of Libby, Montana. The mine covers portions of Sections 13, 14, 15, 23, 24, 26, and 35 in Township 28 North, Range 31 West, and Sections 1, 2, 3, 6, 11, 14, and 15 in Township 27 North, Range 31 West, in Lincoln County, Montana. The Ramsey plant site is located in Section 9, Township 27 North, Range 31 West. This scenario includes two mine portals, one in the Ramsey Creek drainage (Ramsey portal) and one in the Libby Creek drainage (Libby portal) will exhaust ventilation air from the underground mine and provide mine access.

Under the current permit action, the Montanore Mine is located 15 miles south-southwest of the city of Libby, Montana. The mine covers portions of Sections 23, 24, 25, 26, 35 and 36 in Township 28 North, Range 31 West, and Sections 2, 11, 14, and 15 in Township 27 North, Range 31 West, in Lincoln County, Montana. The Libby plant site is located in Sections 2 and 11 Township 27 North, Range 31 West. The two mine portals are both located in the Libby Creek (Libby #1 and Libby #2) drainage and will exhaust ventilation air from the underground mine and provide mine access.

2006 Modeling Demonstration

Mines Management operated an air monitoring site from July 1, 1988, through June 30, 1989. The site was located at Ramsey Creek near the proposed mine/mill site. Monitoring at the Ramsey Creek site included PM_{10}, wind speed, wind direction, sigma theta, and temperature. From the Total Suspended Particulate (TSP) filters, the following trace metals were analyzed: antimony (Sb), arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), iron (Fe), lead (Pb), and zinc (Zn).

The PM_{10} data collected at the sites were fairly typical of remote background sites. At the Ramsey Creek site, the annual PM_{10} average was 14 micrograms per cubic meter ($\mu g/m^3$) and the maximum 24-hour concentration was 35 $\mu g/m^3$. Anomalous data which was recorded during the forest fires in the fall of 1988 was not included in the development of this summary. The metal concentrations were all very low and below the Montana guideline values. The ambient background concentrations data is shown below in Table 3.

There would also be short-term emissions associated with the development of the evaluation adit (approximately 1 year). These would occur prior to the operational phase emissions listed above. The pollutant of most concern would be NOx from diesel generator used to supply power at the Ramsey portal. Total NOx emissions from the generator were estimated at 100.24 tpy. At that time, the stack height of each generator was required to be a minimum of 9 feet. (CO, VOC, and SOx emissions were estimated at 4.86, 2.98, and 2.55 tpy, respectively. In the 2006 scenario, the particulate emissions from the Ramsey portal development operations and material handling were 2.10 tpy.

A specific air quality concern is the potential for wind erosion from the tailings disposal area. When tailings are allowed to dry, there is a significant potential for wind erosion to occur. To control fugitive dust on the tailings impoundment, a fugitive dust control plan will be employed by Mines Management. The effectiveness of the fugitive dust control plan will be evaluated by the Department through ongoing air quality monitoring and visual observation.

Another specific concern is the potential air quality impact to the Cabinet Mountains Wilderness. This area is designated as Class I under the Prevention of Significant Deterioration (PSD) regulations. The review of PSD requirements is carried out primarily through the analysis of permit applications for "major stationary sources." The Montanore Mine project is not classified as a major stationary source because estimated emissions by individual pollutant types are less than 250 tons per year. Although the PSD regulations do not apply directly to the Montanore Mine project, many of the specific PSD requirements have been analyzed. These include:

- Preconstruction and post-construction ambient air monitoring;
- Computer simulation modeling of emission impacts; and
- Visibility impacts.

The impact analyses in Section VI summarize the predicted air quality impact at the wilderness boundary. Compliance with the Class I and II increments has been demonstrated. (Note: The Department's position is that increment consumption is not applicable to this project because it is a minor source in an area where the baseline has not been triggered. The Environmental Protection Agency's (EPA) position is that the baseline is triggered for the entire state and all sources consume increment).

Previously, in the initial preliminary determination (2006) section II.A.7 (currently Section II.A.13) of the permit required emissions testing of the Ramsey portal for NO_X and particulate (currently Section II.A.13 pertains to the Libby portal). The purpose of this testing was to evaluate and verify the emission estimates used in the initial permit application. Of special concern were the estimates of deposition rates in the Ramsey portal prior to release to the atmosphere. By measuring the concentrations just downstream of the generation point and at the outlet, deposition and/or absorption rates as well as actual emissions can be determined.

Concentrations of potentially toxic trace metals in the particulate emissions were also analyzed in the initial permit application. Specific metals included were Sb, As, Cd, Cr, Cu, Fe, Pb, and Zn. This type of analysis is required for most large mining operations to identify whether any of these metals are present in sufficient quantities in the ore and/or tailings to create a hazardous condition from airborne particulate levels. The modeled TSP concentrations were multiplied by the mass fraction (percentage) of each metal in the ore and tailings. (Metals contents were based on data from the Troy Project.) The resulting metals concentrations were then added to the measured background levels in the area. Predicted concentrations of lead were well below the state and federal ambient air quality standards. There are no standards for the other metals.

Concentrations for those metals are, therefore, compared against guideline values used by the Department. All concentrations were predicted to be below the guideline values.

Table 3. 2006 Ambient Background Concentrations.

Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$)	Data Source
PM_{10}	Annual	14	1988-1989 Montanore Mine
	24-Hour	35	1988-1989 Montanore Mine
$PM_{2.5}$	Annual	3.5	Cabinet Mtns Wilderness IMPROVE
	24-Hour	10.4	Cabinet Mtns Wilderness IMPROVE
NO_2	Annual	6	Department
	1-Hour	75[1]/40[2]	Department
SO_2	Annual	3	Department
	24-Hour	11	Department
	3-Hour	26	Department
	1-Hour	35	Department
Lead	Annual	0.006	1988-1989 Montanore Mine

Mines Management will be required to perform post-construction monitoring as a condition of MAQP #3788-00. Attachment 1 describes the current ambient air monitoring plan.

VI. Ambient Air Quality Impact Analysis

The Montanore Mine is classified as a minor source under the Title V and PSD regulations. Potential emissions of regulated pollutants from the project during peak operations (year 4) are listed in this section. Emissions include the criteria air pollutants, which are NO_X, SO_2, VOCs, CO, Pb, PM_{10}, and $PM_{2.5}$. Table 4 groups the emissions into point source emissions, fugitive emissions and mobile source emissions. Emissions are expressed in units of tpy.

Table 4. 2006 - Summary of Mines Management Operation Emissions.

Pollutant	Point Source Emissions (tpy)	Fugitive Emissions (tpy)	Mobile Source Emissions (tpy)
PM_{10}	12.7	138	5.07
$PM_{2.5}$	2.62	20.6	5.07
NOx	3.60	1.33	163
CO	0.47	64.7	56.6
SO_2	0.01	0.14	6.32
VOC	0.13	0.00	9.01

Mines Management production and processing facilities and tailings area are located in an area designated as attainment for all regulated pollutants. The city of Libby and surrounding area has been designated as non-attainment area for both $PM_{2.5}$ and PM_{10}. The closest boundary of the PM_{10} non-attainment area is 8.9 miles north of the tailings impoundment, which is the northernmost mine activity. The closest boundary of the $PM_{2.5}$ non-attainment area is only 1.5 miles north of the tailings impoundment. The concentrate rail load-out facility is located within the Libby PM_{10} and $PM_{2.5}$ non-attainment area boundaries. All transfer operations and storage areas at the Libby rail siding will be enclosed.

[1] 75 ug/m^3 applied to the 1-hour (MAAQS) (as modeled in 2006)
[2] 40 ug/m^3 applies to the 1-hour NAAQS (as modeled in 2011)

MODELING SUMMARY

A number of modeling analyses were performed for the Montanore Mine, as summarized in Table 5. Some analyses are required by regulation while others were performed for informational purposes as requested by the Department. Visibility impact assessment, acid deposition impact assessment and comparison of modeled concentrations to PSD Class I Increments are not explicitly required for minor source (non-PSD) Montana Air Quality Permit applications. The Department has requested these analyses because the mine is within ¼ mile of the Cabinet Mountains Wilderness Area and Mines Management agreed.

Table 5. Summary of Mines Management Air Quality Impact Analyses.

Modeling Objective	Model Used	Comments
Demonstration of compliance with MAAQS and NAAQS during peak year of operation. *Required*	ISCST3 with onsite met data from the Ramsey site and Spokane upper air.	Compliance demonstrated for all pollutants and averaging times.
MAAQS/NAAQS compliance during construction with generator operating. *Required*	ISCST3 with onsite met data from the Ramsey site and Spokane upper air.	Compliance demonstrated for all pollutants and averaging times.
PM_{10} non-attainment area impact analysis. *Required*	CALPUFF with Ramsey met, modeling direct emissions and secondary particulate formation.	Impacts below significance levels.
$PM_{2.5}$ non-attainment area impact analysis. *Required*		Impacts less than or equal to 5% of NAAQS.
Class I PSD Increment analysis, Cabinet Mountains. *Requested*	ISCST3, Class I Receptors	Impacts below Class I PSD increments (not required)
Nitrogen and sulfate deposition at sensitive lakes in Cabinet Mountains. *Requested*	CALPUFF with Ramsey met, deposition calculations with CALPOST.	Modeled deposition rates acceptable. Receptors too close to source for definitive analysis.
Terrain-induced downwash evaluation. *Requested*	ISC and BPIP test runs	No terrain-induced downwash predicted
HAP Impact Analysis. *Informational*	ISCST3	Negligible risk demonstrated.
Plume visual impacts in Class I area. *Requested*	PLUVUE II	Evaluated plume perceptibility and color difference

MODELING PARAMETERS

For the initial application, emissions of NO_X, SO_2, $PM_{10,}$ $PM_{2.5}$ and Pb were modeled to demonstrate compliance with the NAAQS and the Montana Ambient Air Quality Standards (MAAQS). CO was not modeled due to low emission rates as per the Department's guidance. The modeling was performed in accordance with the methodology outlined in the New Source Review Workshop Manual, EPA, October 1990, Draft and Appendix W of 40 CFR Part 51, Guideline on Air Quality Models (revised), April 15, 2003 and November 9, 2006.

Mines Management submitted an initial modeling protocol on September 27, 2005, and incorporated the Department's comments into the final modeling. The modeling included point sources and area sources using source parameters that are consistent with accepted practice. The Department ran the modeling files obtained from Mines Management to verify the modeling results.

Modeled Emission Sources

Two mine portals, one in the Ramsey Creek drainage (Ramsey portal) and one in the Libby Creek drainage (Libby portal) will exhaust ventilation air from the underground mine and provide mine access. Portal emissions are modeled as point source emissions, regardless of the manner of generation underground. The mine portals and associated facilities will be constructed before line power is available to the site. Therefore the emissions inventory contains a construction phase emissions and operations phase emissions. Although the construction phase is a temporary operating scenario, modeling analyses have been completed to verify compliance while the diesel-fired electrical generator is operating during construction. Operations for year 4, the first year of maximum production, are modeled as the highest operations phase emissions scenario.

The permit application and modeling rely on the assumption that the backup generators will not operate more than 4 hours per day during mine operations. The modeling is based on operations of 8 hours per day to cover the case when the generators operate 4 hours at the end of one day and 4 hours at the beginning of the next.

Meteorological Data

Onsite meteorological data was collected at a site in the upper Ramsey Creek drainage at the Montanore Mine mill site from July 1, 1988, through June 30, 1989. A 10-meter tower collected wind speed, wind direction, sigma-theta and temperature in a forest clearing at this site. The Ramsey Creek surface data was combined with twice-daily upper air mixing height data from the Spokane airport and was processed using EPA's Meteorological Processor for Regulatory Models (MPRM). The processed met data file was provided to the Department by Mines Management.

2006 Receptor Set

Receptors for criteria pollutant compliance and HAP modeling were placed at 50-meter intervals along the public access boundaries surrounding the Ramsey portal and Mill facility, the Lobby portal, the Land Application Development (LAD) areas, and the tailings area. A 100-meter Cartesian receptor grid extends to 1 km in each direction beyond the boundaries, and 250-meter Cartesian grid extends to 3 km in each direction, and a 500-meter Cartesian grid extends to 5 km in each directions. Receptors were placed at 100-meter intervals along the Cabinet Mountains Wilderness Area boundary. Receptors were placed at 100-mter intervals along the PM_{10} and $PM_{2.5}$ non-attainment area boundaries. Additional discrete receptors were placed at prominent terrain features located between 6-10 kilometers from the mine portals, outside of the grid. A receptor was also placed at the Libby Courthouse Annex $PM_{2.5}$ monitoring site. Receptor elevations were determined digital elevation model (DEM) files using the using 7.5-minute United States Geological Survey (USGS) topographical maps.

The USDA Forest Service (USFS) requested that deposition modeling be performed for lake acidification analyses at three sensitive alpine lakes within the Cabinet Mountain Wilderness Area where acid deposition is of concern. As requested, Mines Management placed discrete receptors at Upper Libby Lake, Lower Libby Lake and Rock Lake.

Emissions Inventory

The emission inventory used in the modeling is slightly different from the emissions inventory used for permitting purposes because Mines Management took emission reductions due to deposition within the mine.

The Department has revised emissions estimates for wind blown dust from the tailings area. Mines Management estimated wind erosion emissions from the tailings impoundment based on equations contained in AP-42 Section 13.2.5. Assumptions made in the wind erosion calculation resulted in an estimate of zero emissions from the tailings, although the permit application acknowledges that emissions do occur on a short-term basis.

Due to concerns about 24-hour $PM_{2.5}$ impacts on the Libby $PM_{2.5}$ non-attainment area, the Department has revised the estimates to provide a more conservative analysis. The Department estimated the worst-case $PM_{2.5}$ emissions from the tailings area on a 24-hour basis to be 486 pounds per day and used this emission rate in the CALPUFF model to re-evaluate the 24-hour $PM_{2.5}$ impacts on the Libby $PM_{2.5}$ non-attainment area.

The Department previously estimated annual emissions from tailings wind erosion based on the methodology used in the 1993 permit application for this mine (Noranda). The 1993 application stated that the tailings will be subject to some wind erosion, which could lead to dust becoming entrained into the air and contributing to particulate concentrations downwind of the tailings impoundment. Uncontrolled TSP emissions from the tailings area were estimated to be 46.6 tpy using the universal soil loss equation. The 1993 application assumed 50% control of TSP from watering and precipitation. The Department has determined that 50% control would also be appropriate for PM_{10} and 0% control would be appropriate for $PM_{2.5}$. Estimated annual wind erosion emissions from the tailings area are: 23.3 tpy TSP, 11.7 tpy PM_{10} and 3.5 tpy $PM_{2.5}$.

MODELING RESULTS

NAAQS/MAAQS Compliance Demonstration

NAAQS/MAAQS modeling was conducted for PM_{10}, $PM_{2.5}$, SO_2, NO_2 and Pb emissions from Mines Management, based on the maximum estimated emissions. Model results are compared to the applicable NAAQS and MAAQS in Table 6. Modeled concentrations show the impacts from Mines Management sources and include the background values. As shown in Table 6, the modeled concentrations were below the NAAQS/MAAQS applicable in 2006.

Table 6. 2006 - NAAQS/MAAQS Compliance Demonstration update.

Pollutant	Avg. Period	Modeled Conc.[a] (µg/m³)	Background Conc. (µg/m³)	Ambient Conc. (µg/m³)	NAAQS (µg/m³)	% of NAAQS	MAAQS (µg/m³)	% of MAAQS
PM_{10}	24-hr	21.7	35[e]	56.7	150	38	150	38
	Annual	4.09	14[e]	18.1	Revoked	-----	50	36
$PM_{2.5}$	24-hr	14.0	10.4[f]	24.4	35	70	------	------
	Annual	2.10	3.5[f]	5.60	15	37	------	------

Pollutant	Avg. Period	Modeled Conc.[a] (µg/m³)	Background Conc. (µg/m³)	Ambient Conc. (µg/m³)	NAAQS (µg/m³)	% of NAAQS	MAAQS (µg/m³)	% of MAAQS
NO_2	1-hr	364[b]	75	439	------	------	564	78
	Annual	19.8[c]	6	25.8	100	26	94	27
SO_2	1-hr	51.4	35	86.4	------	------	1,300	6.65
	3-hr	42.2	26	68.2	1,300	5.24	------	-----
	24-hr	12.2	11	23.2	365	6.39	262	8.88
	Annual	1.92	3	4.92	80	6.15	52	9.47
Pb	Quarterly[d]	0.00026	Not. Avail.	0.00026	1.5	0.017	-----	-----
	90-day[d]	0.00026	Not. Avail.	0.00026	-----	-----	1.5	0.017

[a] Concentrations are high-second high values.
[b] The ozone limiting method has been applied to this result.
[c] The ambient ratio method has been applied to this result.
[d] The 1-month average impact is used for compliance demonstration.
[e] 1988-1989 Montanore Mine monitoring data.
[f] $PM_{2.5}$ data from the Cabinet Mountains Wilderness IMPROVE Site.

The annual modeled NO_X impact was 26.5 µg/m³, which converts to 19.8 µg/m³ of NO_2 using the ambient ratio method. The maximum modeled 1-hour NO_X impact was 1761 µg/m³ which converts to 364 µg/m³ of NO_2 using the ozone limiting method.

Construction Modeling Including Generators

Construction activities at the mine will be temporary and will precede full production in year 4. During the first phase of construction, underground construction activities will begin, no major surface construction activities will occur, and one 1,622 horsepower diesel electric generator (with one identical collocated unit on standby) will operate continuously at the Libby site for construction support during electric utility installation. The diesel generator will be moved to the Ramsey portal for standby use during operation of the mine and mill.

Mines Management modeled construction emissions from the generator and from the Libby portal emissions resulting from underground construction activities emitting from the Libby portal. Libby portal emissions relied on underground deposition to reduce emissions. The generator(s) emissions were modeled at full time operation, 24 hours per day, 8,760 hours per year, for the construction phase modeling. Generator emissions and other construction emissions were modeled to show NAAQS/MAAQS compliance. Modeling of generator emissions included downwash.

NO_X was analyzed because it is emitted in the largest quantity and because NO_X concentrations in the production compliance modeling were the closest to their respective standards. The maximum modeled 1-hour NO_2 concentration (adjusted using OLM) was 364 µg/m³ and the maximum annual average NO_2 concentration was 19.8 µg/m³. The results show that the construction phase emissions would not result in a violation of the NO_2 NAAQS or MAAQS. Impacts are highest at the property boundary and drop off considerably at the Class I area boundary. Based on the NO_2 modeling, compliance with the other standards is expected.

PM_{10} and $PM_{2.5}$ Non-attainment Area Modeling

The Department requested that Mines Management use the CALPUFF model for the $PM_{2.5}$ non-attainment area impact modeling to evaluate the impacts of primary and secondary particulate. The results show that the $PM_{2.5}$ impacts are actually higher than the PM_{10} impacts, primarily because the $PM_{2.5}$ non-attainment area boundary is only 1.5 miles north of the tailings area. Total $PM_{2.5}$ emissions include primary $PM_{2.5}$, SO_4 and NO_3 (sulfates and nitrates); POSTUTIL is used to process the CALPUFF outputs to calculation total $PM_{2.5}$.

Mines Management set the receptor elevations and the source elevations to 0, causing the model to treat the site as simple terrain. The Department requested this modeling approach because the receptors are actually at lower elevation than the source. By modeling the receptors as simple terrain, the model accounts for the worst-case situation where the plume may follow the terrain downslope.

The Department has reviewed all the CALPUFF, POSTUTIL and CALPOST post-processor input and output files. Table 7 contains the results of the nonattainment area modeling. The PM_{10} impacts were well below the significant impact levels for non-attainment areas contained in 50 CFR 51Appendix S. Significant impact levels have not been established for $PM_{2.5}$ non-attainment areas. The modeled $PM_{2.5}$ impacts, including wind erosion emissions from the tailings area, are 1.3% of the annual $PM_{2.5}$ standard and 2.7% of the 24-hour $PM_{2.5}$ standard.

Table 7. Modeled Nonattainment Area Impacts.

Non-attainment Area	Pollutant and Averaging Period	Maximum Modeled Concentration (µg/m³)	Non-attainment Area Significance Level (µg/m³)	% of NAAQS (Excluding Background)
Libby, MT PM_{10} (8.9 mi. from source)	PM_{10} Annual	0.042	1	0.07
	PM_{10} 24-hour	0.83	5	0.44
Libby, MT $PM_{2.5}$ (1.5 mi. from source)	$PM_{2.5}$ Annual	0.44	Not established	1.3
	$PM_{2.5}$ 24-hour	1.75		2.7

The Department used Mines Management's CALPUFF model to determine the worst-case $PM_{2.5}$ impacts, including the impacts from wind erosion of the tailings, as described above. The 24-hour PM_{10} model only included impacts modeled on the same day worst-case emissions estimates were predicted. This approach accounts for the fact that high winds cause both high wind erosion and increased dispersion.

Class I Concentration Modeling

PM_{10}, SO_2, and NO_X emissions were modeled using ISCST3 for the Class I area receptors (Cabinet Mountains). Class I increments do not apply to this minor source, but are a useful comparison point for examining impacts. ISCST3 was used rather than CALPUFF because of the close proximity of the project to the Class I area. The Class I area modeling results are shown in Table 8. All of the modeled impacts from the mine were below the PSD increments.

Table 8. Cabinet Mountain Class I Area Modeling Results.

Pollutant	Avg. Period	Class I Increment (μg/m³)	Class I Modeled Conc. (μg/m³)	% of Increment	Peak Impact Location
PM_{10}	24-hr	8	4.18	52	(603491, 5328713)
	Annual	4	0.25	6.4	(603573, 5328675)
SO_2	3-hr	25	7.97	32	(603372, 5328874)
	24-hr	5	2.24	45	(603491, 5328713)
	Annual	2	0.10	5.0	(603573, 5328675)
NO_2	Annual	2.5	1.62	65	(603573, 5328675)

Deposition at Sensitive Lakes

Maximum sulfur (S) and nitrogen (N) deposition impacts were modeled from Montanore Mine sources using CALPUFF. POSTUTIL was used to estimate total S and N fluxes from CALPUFF-predicted wet and dry fluxes of SO_2, SO_4, NO_x, NO_3 and HNO_3. Impacts were assessed at three sensitive lakes identified by the Department and the USDA Forest Service (USFS): Lower Libby Lake, Upper Libby Lake, and Rock Lake. Modeled deposition rates were compared to the NPS deposition analysis threshold (DAT) of 0.005 kilograms per hectare per year (kg/ha-yr) which was developed for S and adopted for N. Other values considered in the analysis were the USFS levels of concern for N of 3 kg/ha-yr, and deposition data the National Atmospheric Deposition Program (NADP) monitor near Priest River, Idaho.

The average annual measured deposition rates at the Priest River Experimental Station of 1.4 kg/ha/yr N and 0.48 kg/ha-yr S are considered representative of background conditions in the Montanore mine area. Modeled S deposition was 0.005 kg/ha-yr at Upper and Lower Libby Lakes and 0.004 kg/ha-yr at Rock Lake. Modeled N deposition was 0.05 kg/ha-yr at Upper and Lower Libby Lakes and 0.04 kg/ha-yr at Rock Lake. The modeled N and S deposition values are less than 5% of background levels and do not indicate a level of concern for this project.

The CALPUFF-predicted annual deposition fluxes of S and N were used to estimate the change in acid neutralizing capacity (ANC) at the sensitive lakes. The change in ANC was calculated following USFS guidance and using background ANC values for the individual lakes. The predicted change in ANC was below the USFS Level of Acceptable Change (LAC) thresholds for all three lakes.

Terrain-induced Downwash

At the Department's request, Mines Management analyzed the potential effects of terrain-induced downwash that could be caused by the hillside rising sharply near the Ramsey portal. Test model runs were completed using both elevated terrain and flat terrain receptors. The study results showed that hillside downwash had no effect on the maximum concentrations predicted by the dispersion model.

HAP Impact Analysis

Mines Management submitted modeling of the impacts from trace metals released during ore, tailings and concentration mining handling and processing. Montana does not have air toxics impact regulations and Mines Management is not explicitly required to assess human health risks from health emissions. However Mines Management provided a screening-type human health risk assessment for trace metals classified as HAPs to provide a full disclosure of potential HAP impacts.

The analysis predicted concentrations of lead, arsenic, antimony, cadmium and chromium, which were compared to several risk assessment levels. Arsenic, cadmium, and chromium modeled concentrations were predicted to be above the Department's carcinogenic incinerator risk assessment levels, and these compounds were carried forward in the analysis. Total combined cancer risk from these three HAPs was determined by summing the cancer risk for all and was found to be 5 in 1,000,000 based on a 70-year lifetime of exposure. Because the Montanore Mine is proposed to operate only 15 years, cancer risk was assumed to be proportionally reduced, to a combined cancer risk of 1 in 1,000,000.

Plume Visual Impacts

Visibility impairment due to the pollutant loading from a discrete plume, within a section of the atmosphere that becomes visible due to the contrast or color difference between the plume and viewed background is referred to as plume impairment. The Montanore Mine is a minor source under PSD regulations and as such is not explicitly required to analyze visibility impacts. PLUVUE II analyses were performed for the Montanore Mine point sources, Libby portal, Ramsey portal and the emergency generator. The PLUVUE II model was run with model default switch settings, seasonal relative humidity data applicable to the Cabinet Mountains Wilderness Area and background concentrations of NO_X, SO_2 and ozone from the Glacier National Park monitoring site. Hourly emission rates for NO_X, SO_2 and PM_{10} from the Ramsey and Libby portals and the emergency generator were used for all PLUVUE II analyses.

The PLUVUE II analyses predicted a few hours in which the impacts were above the FLAG threshold level of concern for plume impairment. Mines Management's visibility report evaluated contributing and mitigating factors related to the PLUVUE II modeling results. The Department has reviewed the analyses and concurs with the finding that visual plume impacts are not expected to interfere with visitor experience at the Cabinet Mountains Wilderness Area.

2011 Modeling Demonstration

In response to comments received during the Draft EIS, Mines Management submitted information to demonstrate compliance with the new NO_2 and SO_2 NAAQS. The Department also requested that in addition to updating the modeling that Mines Management review the current Montana Air Quality Permit #3788-00 for accuracy because the Department planned to issue a supplemental preliminary determination to coincide with the Supplemental EIS. Mines Management submitted additional information through May 25, 2011, to make the following changes: update the location (change to the EIS' Alternative 3), and update the proposed generator/engine size.

In 2006, the MDEQ reviewed and accepted the meteorology (met) data with the information pertaining to the surface characteristics surrounding the on-site met tower. Due to this fact, a current review was unnecessary. For the most part, the modeling demonstration completed in 2006 versus that in 2011 remained the same. However, Mines Management submitted information to demonstrate compliance based on locating in the preferred alternative location.

2011 Modeled Emission Sources

As mentioned previously, the mine activities will occur in two phases, construction and production. Two, 750 bhp engines/generators will be the only emission sources during the construction phase. In the production phase, above and below ground emissions will be produced. The engines/generators would be required to meet the non-road EPA Tier 3 emission standards for engines less than 750 bhp. These engines/generators will be limited to 16 hours during the production phase, and as such, were considered intermittent 1-hour NO_2 sources and were not modeled as emission sources. On-road mobile exhaust emissions are not evaluated in the Montana air quality permitting process, but since this mine will be located near a Class I area, all emissions were considered in order to be extremely conservative. All of the mobile exhaust emissions were based on engine horsepower ratings and these emissions will be distributed into three areas of the mine: Mill, tailings impoundment, and Libby portal. All underground emissions will be equally emitted from two exit adits, Libby Portals 1 and 2. In what MMI is calling the evaluation phase but also represents the early part of the construction phase, consideration was also given to three Tier II engines that will move onto the site under an "intent to transfer" notification. Of these Tier II engines, only two may operate continuously and these engines will be used only for temporary power until Tier III engines are put into service and/or until the transmission line is in place.

Emission Inventory

Table 9 lists the change in the hourly and annual emissions from the 2006 air quality permit application to the current one for the following air pollutants: CO, $PM_{2.5}$, PM_{10}, NOx, SO_2, and VOCs. Lead emissions were not included in this table due to extremely low emission rates. The same emissions methodologies were used to calculate the emissions for both applications; to reiterate, the MDEQ accepted the submitted 2006 emissions inventory with the associated methodology. The daily diesel generator emissions were based on 16 hours per day whereas the annual emissions comprised a total of 16 hours per year.

Table 9. Daily and Annual 2006 and 2011 Emissions.

Source	CO (tpy)[2]	$PM_{2.5}$ (tpy)	PM_{10} (tpy)	NO_x (tpy)	SO_2 (tpy)	VOCs (tpy)
2006						
Point	0.47	2.62	12.68	3.60	0.01	0.13
Mobile	56.57	5.07	5.07	162.77	6.32	9.01
Fugitive	64.66	20.55	137.56	1.33	0.14	0.00

Source	CO (tpy)[2]	$PM_{2.5}$ (tpy)	PM_{10} (tpy)	NO_x (tpy)	SO_2 (tpy)	VOCs (tpy)
TOTAL	121.71	28.24	155.31	167.70	6.47	9.14
2011						
Point	0.53	3.46	16.88	3.49	0.036	0.125
Mobile	49.99	1.49	1.49	64.74	5.48	4.21
Fugitive	64.66	20.55	137.56	1.33	0.14	0.00
TOTAL	115.18	25.5	155.93	69.56	5.656	4.335
DIFF.[3]	-6.53	-2.74	0.62	-98.14	-0.814	-4.805

1. lb/day = pounds per day.
2. tpy = tons per year.
3. DIFF. = difference; 2011 – 2006 emissions.

Over 99% of the fugitive CO and particulate emissions were haul road activities that will occur outside the mine property as haul trucks travel to the Libby rail load-out area. Within the mine boundaries, these emissions were conservatively estimated as 10% of the haul road emissions.

Compared to the 2006 emissions, the 2011 NOx emissions had the greatest increase due to the mobile emissions whereas the CO emissions daily emissions decreased significantly.

2011 Receptor Set

In this case, with respect to the NO_2 and $S0_2$ modeling demonstration, a Cartesian receptor grid was developed outside the fence line at 250 m spacing for a distance to 1 kilometer (km), 100 m spacing from 1 km to 3 km, and at 500 m spacing from 3 to 10 km. A total of 7,659 receptors were used. Receptors were placed along the facility fence line at 50 m.

MODELING RESULTS

2011 NAAQS/MAAQS Compliance Demonstration

For the 1-hour NO_2 analysis, the 8th (H8H) modeled highest daily maximum 1-hour concentration for each phase was compared to the 1-hour NO_2 NAAQS. These selected concentrations were equivalent to the 98th percentile of the annual distribution of the maximum daily 1-hour values. The modeled 1-hour NO_2 H8H concentrations were adjusted by a 0.80 factor, the default for an USEPA Tier 2 analysis[3]. The 4th (H4H) modeled highest daily maximum 1-hour SO_2 concentration was selected for each phase for comparison to the corresponding NAAQS. These selected concentrations were equivalent to the 99th percentile of the annual distribution of the maximum daily 1-hour values. Tables 10 and 11 list the 1-hour NO_2 and SO_2 modeling results for both construction and production phases and comparisons to the relevant NAAQS.

3 USEPA. 2010. Guidance Concerning the Implementation of the 1-hour SO_2 NAAQS for the Prevention of Significant Deterioration Program. August 23, 2010.

Table 10. Montanore Mine 1-Hour NO_2 Modeling Results.

Phase	1-Hour NO_2 Modeled Concentration ($\mu g/m^3$)[1]	1-Hour NO_2 Background Concentration ($\mu g/m^3$)	Total 1-Hour NO_2 Concentration ($\mu g/m^3$)	1-Hour NO_2 NAAQS[2] ($\mu g/m^3$)	Percent of NAAQS (%)
Construction	69.656 (87.07 * 0.8)	40	109.656	188.679	58.1
Production	58.664 (73.33 * 0.8)	40	98.664	188.679	52.3

1. $\mu g/m^3$ = micrograms per cubic meter.
2. NAAQS = National Ambient Air National Standard.

Table 11. MDEQ Montanore Mine 1-Hour SO_2 Modeling Results.

Phase	1-Hour SO_2 Modeled Concentration ($\mu g/m^3$)[1]	1-Hour SO_2 Background Concentration ($\mu g/m^3$)	Total 1-Hour SO_2 Concentration ($\mu g/m^3$)	1-Hour SO_2 NAAQS[2] ($\mu g/m^3$)	Percent of NAAQS (%)
Construction	0.0004	35	35.00	195.00	18.0
Production	17.82	35	52.82	195.00	27.1

1. $\mu g/m^3$ = micrograms per cubic meter.
2. NAAQS = National Ambient Air National Standard.

Other Pollutant NAAQS Modeling Analyses

In order to ensure that the new 2011 emissions and preferred U.S. Forest Service location will not cause a NAAQS violation, the daily and annual $PM_{2.5}$ and PM_{10} emissions were modeled using the new production phase locations. These pollutants were selected since the 2006 modeling analyses showed these emissions had the greatest impacts on their respective NAAQS. In the 2006 analyses, the total ambient concentrations including background for the 24-hour and annual $PM_{2.5}$ were 70 and 37% of their respective NAAQS, whereas for PM_{10}, the corresponding results were 38 and 36% of their respective NAAQS. The 2006 modeling results for the other criteria pollutants were less than 10% of their respective NAAQS, except for NO_2. In this case, the annual NO_2 total concentration was 26% of the corresponding NAAQS. Table 12 lists daily and annual modeled $PM_{2.5}$ and PM_{10} emissions.

Table 12. 2011 Daily and Annual Modeled Production Phase $PM_{2.5}$ and PM_{10} Emissions.

Source	$PM_{2.5}$		PM_{10}	
	(lb/day)	(tpy)	(lb/day)	(tpy)
Point	24.39	3.46	101.12	16.88
Mobile	7.96	1.45	7.96	1.45
Fugitive	11.80	2.06	79.53	13.95
TOTAL	44.15	6.97	188.62	32.28

1. lb/day = pounds per day.
2. tpy = tons per year.

For modeling, the fugitive haul road and mobile highway truck emissions were both reduced by 90% to account for the emissions only within the mine boundaries, the remaining emissions will occur on highway roads.

The laboratory crusher and haul road activities particulate emissions were combined with the mill volume source emissions for modeling. The modeling results are listed in Table 13. In every case, the high second high (H2H) concentration was selected to be consistent with the 2006 modeling results; the background concentrations were also used for consistency. This table also compares the total modeled concentrations to the applicable NAAQS and MAAQS.

Table 13. Daily and Annual Modeled Production Phase $PM_{2.5}$ and PM_{10} Results.

Pollutant	Averaging Period	Modeled Conc.[1] ($\mu g/m^3$)[2]	Background Conc. ($\mu g/m^3$)	Total Conc. ($\mu g/m^3$)	NAAQS[3] ($\mu g/m^3$)	Percent of NAAQS (%)	MAAQS[4] ($\mu g/m^3$)	Percent of MAAQS (%)
$PM_{2.5}$	24-hour	9.7	10.4[5]	20.1	35	57.4	------	------
	Annual	1.2	3.5[5]	4.7	15	31.3	------	------
PM_{10}	24-hour	45.3	35[6]	80.3	150	53.5	150	53.5
	Annual	6.4	14[6]	20.4	------	------	50	40.8

1. Selected modeled concentrations are high second high (H2H) values.
2. $\mu g/m^3$ = micrograms per cubic meter.
3. NAAQS = National Ambient Air National Standard.
4. MAAQS = Montana Ambient Air National Standard.
5. $PM_{2.5}$ data from the Cabinet Mountains Wilderness Interagency Monitoring of Protected Visual Environments (IMPROVE) Site.
6. PM_{10} 1988-1989 Montanore Mine monitoring data.

The 24-hour and annual NAAQS/MAAQS were not exceeded using the corresponding $PM_{2.5}$ and PM_{10} emission rates. Based on these results that were lower than the corresponding 2006 results, through inference, no NAAQS or MAAQS violations will occur for the following ambient air criteria pollutants from the production phase emissions, regardless of the averaging period for CO, lead, NO_x, and SO_2.

Libby $PM_{2.5}$ and PM_{10} NAA Modeling Analyses: For completeness purposes, the annual $PM_{2.5}$ and 24-hour PM_{10} production phase AERMOD modeling was conducted to ensure that the proposed source will not cause or contribute to a NAAQS violation based on significance levels contained in 40 CFR Part 51, Appendix S. The receptor sets were obtained from the 2006 far-field (CALPUFF)

modeling demonstration; the coordinates were in universal transverse Mercator (UTM), Zone 11, North American Datum (NAD) 27. The Department developed corresponding receptor elevations and hill height elevations using AERMAP.

Table 14 lists the results of this modeling analysis with the high first high (H1H) concentration selected and background concentrations were not added in this type of analysis.

Table 14. 2011 Production Phase $PM_{2.5}$ and PM_{10} NAA Significance Level Results.

Pollutant	Averaging Period	Modeled Conc.[1] ($\mu g/m^3$)[2]	Significance Level ($\mu g/m^3$)	Percent of Level (%)
$PM_{2.5}$	Annual	0.02	0.3	6.7
PM_{10}	24-hour	0.05	5	1.0

[1] Selected modeled concentrations are high first high (H1H) values.
[2] $\mu g/m^3$ = micrograms per cubic meter.

As such, the production phase $PM_{2.5}$ and PM_{10} emissions will not cause or contribute to a $PM_{2.5}$ or PM_{10} NAAQs violation in the corresponding Libby NAAs.

PSD Cabinet Mountains Wilderness Area (WA) Class I Modeling Analysis: Although Montanore Mine will not be a PSD source, the Cabinet Mountains Wilderness Area is a Class I Area located nearby. The 2006 modeling showed no Class I, PSD increment was consumed. However, the greatest increase in the production emissions occurred in the NOx emissions relative to the 2006 emissions and in order to ensure that the Class I area will not be compromised, a PSD Class I increment modeling analysis was conducted.

Representative Cabinet Mountains WA receptors were obtained from the US National Park Service website (http://www.nature.nps.gov/air/maps/receptors/). These receptors were in geographic coordinates, NAD83. The US Army Corps of Engineers Corpscon, 6.0.1 software was used to convert the coordinates into UTM Zone 11, NAD27. Since there is no short-term NO_2 PSD Class I increment, the annual NO_x Production emissions were modeled and compared to the correspond PSD Class I increment. The background concentrations are not added in this analysis.

Table 15. 2011- Production Phase NO_x PSD Class I Increment Results.

Pollutant	Averaging Period	Modeled Conc.[1] ($\mu g/m^3$)[2]	PSD Class I Increment ($\mu g/m^3$)	Percent of Increment (%)
NO_2	Annual	0.12	2.5	4.8

[1] Selected modeled concentrations are high first high (H1H) values.
[2] $\mu g/m^3$ = micrograms per cubic meter.

The PSD, Class I, annual NO_2 increment will not be consumed by the production phase NO_x emissions. Through inference, none of the applicable criteria pollutants, regardless of the averaging period, will consume any PSD Class I increment.

SUMMARY

In 2006, modeling demonstrated that the project would not be expected to cause or contribute to a violation of the NAAQS or MAAQS. Further analyses showed that the project would not have impacts in the Class I area above accepted levels. PM_{10} non-attainment area impacts are very low. The mine and processing facilities, including wind erosion from the tailings area, will have a moderate impact at the $PM_{2.5}$ non-attainment area boundary. Because most of the $PM_{2.5}$ emissions are fugitive, impacts decrease with distance from the facility and the project is not expected to impact $PM_{2.5}$ concentrations at areas of most concern in and around the city of Libby.

Further, the Montanore 1-hour NO_x and SO_2 construction and production phase emissions will not violate the corresponding NAAQS. The daily and annual $PM_{2.5}$ and PM_{10} production phase emission will not violate the corresponding NAAQS/MAAQs. The annual $PM_{2.5}$ and 24-hour PM_{10} production phase emissions will not cause or contribute to a violation in the Libby $PM_{2.5}$ and PM_{10} NAAs. Finally, the annual NO_2 PSD Class I increment will not be consumed. Through inference with comparing these results with the 2006 modeling demonstration, no ambient air criteria pollutant will violate an applicable NAAQs or MAAQS or cause/contribute to a violation in the Libby particulate NAAs. Finally, no PSD Class I increment will be consumed.

Both the 2006 and the 2011 modeling demonstrations have shown that the project would not be expected to cause or contribute to a violation of the NAAQS or MAAQS.

2015 Additional Modeling Analysis

In June 2015, additional air quality modeling was performed to address the fact that a new air quality permit had been issued for the Rock Creek Mine – located on the other side of the CMWA. Specifically, the Montanore Mine emissions were re-evaluated together with the emissions from both the Rock Creek Mine MAQP #2414-03 and the Troy Mine MAQP #1690-03. While the Rock Creek Mine is not yet operating, it is possible that both the Montanore and Rock Creek Mines may operate simultaneously in the future. Additionally, while the Troy Mine is currently not in production, and planned for the reclamation phase, the Troy Mine permit still exists at this time, and therefore was also included in this evaluation of emissions from all three mines.

This additional compliance demonstration addresses the 1-hour NO_2 NAAQS, 24-hour PM_{10} NAAQS/MAAQS, annual PM_{10} MAAQS (the annual PM_{10} NAAQS was revoked in 2006; Federal Register 71 61144), 24-hour and annual $PM_{2.5}$ NAAQS; at this time, there are not any 24-hour or annual $PM_{2.5}$ state standards.

Receptors: For the initial Montanore Mine modeling analysis, a total of 7,659 receptors were used. Receptors were placed along the facility fenceline at 50 m. A Cartesian receptor grid was developed outside the fenceline at 250 m spacings for a distance to 1 kilometer (km), 100 m spacings from 1 km to 3 km, and at 500 m spacings from 3 to 10 km.

The Montanore Mine emissions were first modeled using this complete receptor set by pollutant and averaging period. The selection of the modeled concentration varied: high-eighth-high (H8H) for the 1-hour NO_2, and the high-second-high (H2H) for the 24-hour PM_{10} and $PM_{2.5}$. There can only be one annual value since only one year of meteorological data was used so in total there were 5 different model runs. The 1-hour H8H NO_2 concentrations were comparative to the corresponding NAAQS and the H2H 24-hour particulate concentrations were conservative estimates. After

modeling with the complete receptor set, five different receptor sets were developed by selecting the receptors with the highest 50 modeled concentrations for each pollutant and averaging period according to the selection methodology. All of these high concentration receptors occurred in the immediate vicinity of the Montanore Mine with the highest concentrations on the permit boundaries.

Source Groups: Nine different source groups were developed to determine the impacts of the off-site mine emissions with the Montanore Mine emissions on the maximum ambient pollutant concentrations from Montanore Mine. Each source group was modeled individually to assess their impacts:

- Montanore Mine emitting sources only (MONT);
- Montanore Mine emitting sources and all relevant Rock Creek (RC) emitting sources including the Exploratory Adit source without the RC Production Adit emissions (MONTRCEX);
- Montanore Mine (MONT) emitting sources and all relevant Rock Creek (RC) emitting sources including the Production Adit sources without the RC Exploratory Adit emissions (MONTRCPR);
- Montanore (MONT) and relevant Troy Mine (TROY) emitting sources (MONTTROY);
- All Montanore, Rock Creek and Troy Mine relevant emitting sources except for the Production Adit emissions (ALL_EXP);
- All Montanore, Rock Creek and Troy Mine relevant emitting sources except for the Exploratory Adit emissions (ALL_PRO);
- All relevant Rock Creek Mine emitting sources including the Exploratory Adit source without the RC Production Adit emissions (RC_EXP);
- All relevant Rock Creek Mine emitting sources including the Production Adit sources without the RC Exploratory Adit emissions (RC_EXP); and
- All relevant Troy Mine emitting sources (TROY).

Although nine different sources groups were modeled only the highest of the modeled concentrations from the off-site mine emissions were listed in Tables 16 and 17 for simplification.

Table 16. MDEQ Montanore Mine 1-Hour NO_2 Modeling Results

Phase	Individual Source Group	1-Hour NO_2 Modeled Concentration ($\mu g/m^3$)[1]	1-Hour NO_2 Background Concentration ($\mu g/m^3$)	Total 1-Hour NO_2 Concentration ($\mu g/m^3$)	1-Hour NO_2 NAAQS[2] ($\mu g/m^3$)	Percent of NAAQS (%)
Construction Phase	Montanore Mine Only	66.22 (82.78 * 0.8)	40	106.22	188.679	56.3
	Inclusion of Rock Creek and Troy Mines	66.23 (82.79 * 0.8)	40	106.23	188.679	56.3
Production Phase	Montanore Mine Only	62.51 (78.14 * 0.8)	40	102.51	188.679	54.3

Phase	Individual Source Group	1-Hour NO_2 Modeled Concentration ($\mu g/m^3$)[1]	1-Hour NO_2 Background Concentration ($\mu g/m^3$)	Total 1-Hour NO_2 Concentration ($\mu g/m^3$)	1-Hour NO_2 NAAQS[2] ($\mu g/m^3$)	Percent of NAAQS (%)
	Inclusion of Rock Creek and Troy Mines	62.55 (78.19 * 0.8)	40	102.55	188.679	54.4

1. $\mu g/m^3$ = micrograms per cubic meter.
2. NAAQS = National Ambient Air National Standard.

Table 16 clearly indicates that during the construction phase, the addition of Rock Creek and Troy mines to the 1-hour NO_2, results in only a 0.01 $\mu g/m^3$ increase, thereby indicating the other mines do not impact the Montanore receptors. Similarly for the production phase, the addition of Rock Creek and Troy mines results in only a 0.04 $\mu g/m^3$ increase. Furthermore, these NO_x emissions will not cause an exceedance of the 1-hour NO_2 NAAQS.

Particulate NAAQS/MAAQS Results: The daily and annual $PM_{2.5}$ and PM_{10} emissions were modeled using the Montanore Mine Production Phase locations and parameters since particulate emissions will not occur during the Construction stage. (In 2012, the EPA reduced the annual $PM_{2.5}$ standard to 12 $\mu g/m^3$. Unlike most new NAAQS, the EPA allowed grandfathering of pending preconstruction permitting applications if the application was deemed complete by December 14, 2012. This grandfathering would apply to the Montanore Mine and the compliance demonstration would not need to demonstrate compliance with the new annual $PM_{2.5}$ standard.

For the 24-hour particulate concentrations, the high-second-high (H2H) concentrations were selected (Table 17). For comparison, the 24-hour PM_{10} and $PM_{2.5}$ background concentrations were 23.3% and 29.7%, respectively, of their corresponding NAAQS. The annual PM_{10} background concentration was 28.0% of the MAAQS and the annual $PM_{2.5}$ background concentration is 23.3% of the NAAQS.

Table 17. 2015 Daily and Annual Modeled Production Phase $PM_{2.5}$ and PM_{10} Results.

Pollutant	Averaging Period	Individual Source Group	Modeled Conc. ($\mu g/m^3$)[1]	Background Conc. ($\mu g/m^3$)	Total Conc. ($\mu g/m^3$)	NAAQS[3] ($\mu g/m^3$)	Percent of NAAQS (%)	MAAQS[4] ($\mu g/m^3$)	Percent of MAAQS (%)
PM_{10}	24-hour[2]	Montanore Mine Only	45.86	35[6]	80.87	150	53.9	150	53.9
		Inclusion of Rock Creek and Troy Mines	45.87		80.87		53.9		53.9
	Annual	Montanore Mine Only	11.57	14[6]	25.57	------		50	51.1
		Inclusion of Rock Creek and Troy Mines	11.58		25.58				51.2

$PM_{2.5}$	24-hour[2]	Montanore Mine Only	9.88	10.4[5]	20.28	35	57.9	------
		Inclusion of Rock Creek and Troy Mines	9.88		20.28		57.9	
	Annual	Montanore Mine Only	2.10	3.5[5]	5.60	15	37.3	------
		Inclusion of Rock Creek and Troy Mines	2.11		5.61		37.4	

[1] $\mu g/m^3$ = micrograms per cubic meter.
[2] Selected modeled concentrations are high second high (H2H) values.
[3] NAAQS = National Ambient Air National Standard.
[4] MAAQS = Montana Ambient Air National Standard.
[5] $PM_{2.5}$ data obtained from the Cabinet Mountains Wilderness Interagency Monitoring of Protected Visual Environments (IMPROVE) Site.
[6] PM_{10} 1988-1989 Montanore Mine monitoring data.

As shown, the addition of the two off-site mine particulate emissions with the Montanore Mine particulate emissions did not change the modeling results significantly. Furthermore, the 24-hour and annual NAAQS/MAAQS were not exceeded using the corresponding $PM_{2.5}$ and PM_{10} emission rates.

PSD Class I increment and impacts on the Libby PM_{10} nonattainment and $PM_{2.5}$ maintenance areas were not examined. The reason was that the Montanore Mine emissions alone were insignificant based on the various significant impact levels so further analyses were unwarranted.

2015 SUMMARY

The Montanore Mine NOx with the corresponding emissions from the Rock Creek and Troy Mines will not cause or contribute to a 1-hour NO_2 NAAQS. Furthermore, the daily and annual $PM_{2.5}$ and PM_{10} Montantore Mine Production Phase emissions with the corresponding particulate emissions from the Rock Creek and Troy Mines will not violate the corresponding NAAQS/MAAQS.

During the early period of the construction phase or better described as the "evaluation phase", three Tier II generators (two for continuous operation, and one for a spare) will be moved onto the site and provide temporary electrical generation prior to two Tier III engines moving onto the site or until the transmission line is in place. These engines were evaluated as Tier II engines and are not the same engines that MMI may use for later periods of the construction phase. The Tier II engines will not be used other than during this early part of the construction phase and are considered portable sources. These Tier II engines along with adit emissions were modeled to show compliance with the 1-hour NO_2 NAAQS. The summary is on file with the Department.

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? (ex.: 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 impact statement is being completed by the Department and the United States Forest Service for this project.

Permit Analysis prepared by: Jenny O'Mara
Date: June 1, 2011
Appended August 8, 2015 by Craig Henrikson