PRELIMINARY DETERMINATION
ON PERMIT APPLICATION

Date of Mailing: June 5, 2018

Name of Applicant: Tintina Montana Inc.

Source: Underground Copper Mine and Mill Site – Black Butte Copper Project

Proposed Action: The Department of Environmental Quality (Department) proposes to issue a permit, with conditions, to the above-named applicant. The application was assigned Permit Application Number 5200-00.

Proposed Conditions: See attached.

Public Comment: Any member of the public desiring to comment must submit such comments in writing to the Air Quality Bureau (Bureau) of the Department at the address in the footer below. Comments may address the Department's analysis and determination, or the information submitted in the application. In order to be considered, comments on this Preliminary Determination are due by July 5, 2018. Copies of the application and the Department's analysis may be inspected at the Bureau's office in Helena. For more information, you may contact the Department. For this permit, electronic comments may also be sent to AEMDAQBPublicComment@mt.gov.

Departmental Action: The Department intends to make a decision on the application *within 30-days after the final Environmental Impact Statement is issued.* A copy of the decision may be obtained at the address in the footer below. The permit shall become final on the date stated in the Department's Decision on this permit, unless an appeal is filed with the Board of Environmental Review (Board).

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

For the Department,

Julie A. Merkel
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 AIR QUALITY PERMIT

Issued to: Tintina Montana Inc.
P.O. Box 431
White Sulphur Springs, MT 59645

MAQP: #5200-00
Application Complete: 05/11/2018
Preliminary Determination Issued: 06/5/2018
Department's Decision Issued:
Permit Final:

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

Tintina is proposing to develop and operate a new underground copper mine and mill identified as the Black Butte Copper Project (BBCP). The BBCP proposes to produce and ship copper concentrate mined from both the upper and lower zones of the Johnny Lee copper deposit. The area of the planned permit boundary encompasses 1,888 acres of privately owned ranch land under lease to Tintina. Mine life is estimated at approximately 19 years including two years of construction/pre-production, 13 years of active production mining, followed by four years of reclamation and closure. A complete list of permitted equipment is contained in Section I.A of the permit analysis.

B. Plant Location

Tintina proposes to develop the BBCP approximately 15 miles north of White Sulphur Springs in Meagher County, Montana. Total surface disturbance required for construction and operation of all mine-related facilities and access roads comprises approximately 295 acres. The proposed mine permit area resides in Sections 24, 25, and 36 in Township 12N, Range 6E, and Sections 19, 29, 30, 31, and 32 in Township 12N, Range 7E, Meagher County, Montana

Section II: Conditions and Limitations

A. Emission Limitations

1. Tintina shall be limited to a maximum of 3,700 tons of copper-enriched rock (ore) per day as measured by the material processed by the Portal Crusher (P1) during any 24-hour rolling period (ARM 17.8.749).

2. Tintina shall be limited to a maximum of 1.35 million tons of ore as measured by the material processed by the Portal Crusher during any rolling 12-month period (ARM 17.8.749).

3. Tintina shall be limited to a maximum usage of 1,552 tons of ammonium nitrate fuel oil (ANFO) during any rolling 12-month period (ARM 17.8.749).

4. Tintina shall be limited to a maximum total usage of 4,180,000 gallons of propane for the Upper Copper Zone Propane Heater (P10A) and the Lower Copper Zone Heater (P10B) during any rolling 12-month period (ARM 17.8.749).

5. Tintina shall be limited to diesel-fired generator sets for surface mine equipment including P1, P2, P4, P5, P6, P17, P18 and F26 of a maximum rated design capacity of the generator engine(s) not exceeding 4,124 brake-horsepower (bhp). This condition does not include the ratings from the four emergency diesel generators P7A, P7B, P8 and P9 (ARM 17.8.749).

6. Tintina shall be limited to a maximum total usage of 471,558 gallons of diesel fuel for underground mobile equipment during any rolling 12-month period (ARM 17.8.749).

7. Tintina shall be limited to a maximum total usage of 806,384 gallons of diesel fuel for mobile equipment, stationary and portable equipment for both surface and underground operations during any rolling 12-month period (ARM 17.8.749).

8. Tintina shall not cause or authorize to be discharged into the atmosphere any fugitive emissions from process equipment not covered under 40 CFR 60, Subpart LL that exhibit 20% opacity or greater averaged over 6 consecutive minutes (ARM 17.8.308).

9. Tintina shall limit process fugitive emissions for any affected facility as identified in 40 CFR 60, Subpart LL, from the date of the performance test (as required by Section II.C.1) forward, to a maximum opacity of 10%. Stack emissions from any affected facility are limited to a maximum of 7% opacity unless using a wet scrubber (40 CFR Part 60, Subpart LL, ARM 17.8.308 and ARM 17.8.340).

10. Tintina shall formalize a Fugitive Dust Control Plan from the elements approved in the BACT analysis to control fugitive dust and comply with ARM 17.8.308 - Airborne Particulate Matter (Reasonable Precautions). This plan shall include all mine areas including roads utilized within the mine permit boundary as defined by the Montana DEQ Hardrock Operating Permit. The plan should include four elements common with best management practices. 1) Staff titles responsible for carrying out the Fugitive Dust Control Plan. 2) Identification of dust control problems. 3) Recommended strategy or strategies for resolution. 4) Documentation of corrective action. Prior to the commencement of operation, Tintina shall submit the Fugitive Dust Control Plan to the Department for review and input. Tintina may develop separate plans based on the current phase of the mine; development, production and reclamation (ARM 17.8.749 and ARM 17.8.752).

11. Tintina 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).

12. Tintina 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).

13. Tintina shall treat all unpaved portions of the haul roads, access roads, parking lots, or general plant area with water and/or chemical dust suppressant as necessary to maintain compliance with the reasonable precautions limitation in Section II.A.10 (ARM 17.8.749 and ARM 17.8.752).

14. Tintina shall comply with all applicable standards and limitations, and the reporting, recordkeeping and notification requirements contained in 40 CFR 60, Subpart A and 40 CFR 60, Subpart LL (ARM 17.8.340, 40 CFR 60 Subpart A and 40 CFR 60 Subpart LL).

15. Emissions from the baghouses controlling emitting points P12, P13A, P13B, P14 and P15 (Jaw Crusher Building, Mill Building Areas, Surge Bin Discharge, and Water Treatment Area) and shall be limited to a maximum of 0.01 grains per dry standard cubic foot (gr/dscf) (ARM 17.8.340, 40 CFR Part 60, Subpart LL and ARM 17.8.752).

16. Tintina shall comply with all applicable standards and limitations, and the reporting, recordkeeping and notification requirements contained in 40 CFR 60 Subpart IIII for the four units identified as emergency generators. These are identified as P7A, P7B, P8 and P9 (ARM 17.8.340 and 40 CFR 60 Subpart IIII).

17. Tintina shall comply with all applicable standards and limitations, and the reporting, recordkeeping and notification requirements contained in 40 CFR 63 Subpart ZZZZ for the four units identified as emergency generators. These are identified as P7A, P7B, P8 and P9 (ARM 17.8.342 and 40 CFR 63 Subpart ZZZZ).

18. The four emergency generators shall be used for emergency or back-up operations only and shall each be limited to 500 hours of operation during any rolling 12-month time period. Preventative maintenance activities shall be included in the 500 hours of operation during any rolling 12-month time period (ARM 17.8.749).

19. Tintina shall use diesel engine/generators which satisfy 40 CFR Part 89 and/or 1039 for non-road engines (ARM 17.8.752, ARM 17.8.340 and 40 CFR 60 Subpart IIII).

20. Diesel-fired engines P2, P4, P5, P6, P7, P8, P9, P17, P18, and F26 shall be a minimum of EPA Tier 3-rated engines (ARM 17.8.749).

B. Emission Control Practice and Requirements

1. Underground Blasting – Industry Best Operating Practices (BOPs) shall be used for minimizing blasting emissions, including hole size optimization, placement optimization, optimizing the quantity of explosive, and mine planning to prevent overshooting (ARM 17.8.752).

2. Ore transferred from the jaw crusher to the mill building shall be done in an enclosed conveyor (ARM 17.8.752).

3. Portable Screens (P1 and P3) shall use reasonable precautions including water spray suppression for particulate control (ARM 17.8.752).

4. Diesel-fired engines P2, P4, P5, P6, P7, P8, P9, P17, P18, and F26 meet 40 CFR 60, Subpart IIII (ARM 17.8.340, 40 CFR 60, Subpart IIII and ARM 17.8.752).

5. Propane Heaters P10A and P10B shall be rated for a maximum of 75 MMBtu/hr total and shall utilize clean burning fuel (propane or equivalent) and utilize good combustion practices (ARM 17.8.752).

6. Temporary Diesel-fired Portal Heaters (P11-Up to 3 diesel-fired engines with a 1.2 MMBtu/hr total)) shall use diesel fuel or equivalent and utilize good combustion practices (ARM 17.8.752).

7. Temporary Portable Propane-fired Heaters (F28-Up to 9 units with a 37.8 MMBtu/hr total) shall use propane or equivalent and utilize good combustion practices (ARM 17.8.752).

8. Diesel-fired engines shall utilize low sulfur fuel having no greater than 0.0015% (15 parts per million) by weight (ARM 17.8.752).

9. Emitting Units P12, P13A, P13B, P14, and P15 (Jaw Crusher Building, Mill Building Lime and Lime Silo Areas, Surge Bin Discharge, and Water Treatment) shall use dust collectors for particulate control (ARM 17.8.752).

10. Backfill Plant Cement Operations including Fly Ash Hopper and Fly Ash Silo (P16A and P16B) shall use dust filters/collectors for particulate control (ARM 17.8.752).

11. All road sections and all stockpiles (ore, waste rock, excavated bedrock, topsoil, subsoil and temporary construction material etc.) shall utilize reasonable precautions for particulate control. For stockpiles, this may include wind-fencing and/or treatment with water or chemical dust suppressant (ARM 17.8.752).

12. Soil and subsoil stockpiles saved for mine reclamation will be revegetated in place within two growing seasons following their completion (ARM 17.8.752).

13. If water and/or chemical dust suppressant are not effective for controlling fugitive dust, Tintina shall also require vehicle restrictions including the use of vehicle speed limits to further reduce fugitive dust (ARM 17.8.752).

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.9 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 startup of the affected equipment (ARM 17.8.105, ARM 17.8.340, 40 CFR 60.8 and 40 CFR 60, Subpart LL).

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

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

D. Operational Reporting Requirements

1. Tintina 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). Tintina 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 produced as measured by the material processed by the Portal Crusher.

   b. Gallons of diesel fuel used by underground equipment.

   c. Gallons of diesel fuel used by above ground equipment.

   d. Gallons of propane used by P10A and P10B.

   e. Tons of ANFO explosive used.

   f. Hours of operation of each of the four emergency diesel-fired generators.

   g. An estimate of company vehicle miles traveled on the main mine roads.

   h. Amount of disturbed acreage by stockpile and material type.

2. Tintina 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).

4. All records compiled in accordance with this permit must be maintained by Tintina 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. These records may be stored at a location other than the plant site upon approval by the Department (ARM 17.8.749).

5. Tintina shall document, by day, the ore production levels as measured by the material processed by the Portal Crusher. Tintina 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. Tintina shall document, by month, the ore production levels as measured by the material processed by the Portal Crusher. By the 25th day of each month, Tintina shall document the total tons of ore processed 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 twelve months shall be submitted along with the annual emission inventory (ARM 17.8.749).

7. Tintina shall document, by month, the tons of ANFO explosive used at the site. By the 25th day of each month, Tintina shall document the total tons of ANFO 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.3. The information for each of the previous twelve months shall be submitted along with the annual emission inventory (ARM 17.8.749).

8. Tintina shall document, by month, the gallons of propane used by P10A and P10B. By the 25th day of each month, Tintina shall document the total gallons of propane used 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 twelve months shall be submitted along with the annual emission inventory (ARM 17.8.749).

9. Tintina shall document, by month, the diesel fuel consumption of all the underground equipment. By the 25th day of each month, Tintina shall calculate the total diesel fuel consumption for diesel-fired 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 twelve months shall be submitted along with the annual emission inventory (ARM 17.8.749).

10. Tintina shall document, by month, the diesel fuel consumption of all the underground equipment. By the 25th day of each month, Tintina shall calculate the total diesel fuel consumption for all mobile equipment, stationary and portable equipment for both surface and underground operations 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 twelve months shall be submitted along with the annual emission inventory (ARM 17.8.749).

11. Tintina shall document, by month, the hours of operation of each emergency diesel-fired generator (P7A, P7B, P8 and P9). By the 25th day of each month, Tintina shall document the total hours of operation of the diesel engine/generator for the previous month. The information for each of the previous twelve months shall be submitted along with the annual emission inventory (ARM 17.8.749).

12. Tintina shall provide documentation that the equipment installed at the site which relied on specific dispersion characteristics for ambient air quality modeling, is consistent with the modeled assumptions. These parameters are primarily exhaust flow, engine size (bhp), stack height and stack diameter. Alternatively, Tintina shall provide a demonstration that any significant differences in dispersion characteristics from those used in the modeling demonstration, do not result in increases in modeled concentrations and risk the determination that the project does not cause or contribute to a violation of an ambient air quality standard. Tintina shall provide this information within 90 days following start-up of the milling and flotation operation (ARM 17.8.749).

E. Notification

1. Tintina shall supply the Department the following notifications (ARM 17.8.749 and 40 CFR 60, Subpart A and 40 CFR 63, Subpart A):

   a. Date when Aboveground Ore Processing commences construction, postmarked no later than 30 days after such date.

   b. Date when Aboveground Ore Processing including milling and flotation begins operation, postmarked no later than 15 days after such date.

2. Tintina shall provide notification and any documentation, as necessary, from Section II.D.12 within 90 days of start-up of the milling and flotation operation (ARM 17.8.749).

SECTION III: General Conditions

A. Inspection – Tintina 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 such as Continuous Emission Monitoring Systems (CEMS) or Continuous Emission Rate Monitoring Systems (CERMS), or observing any monitoring or testing, and otherwise conducting all necessary functions related to this permit.

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

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

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

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

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

G. Permit Fee – Pursuant to Section 75-2-220, MCA, failure to pay the annual operation fee by Tintina 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).

Montana Air Quality Permit Analysis
Tintina Montana Inc.
MAQP #5200-00

I. Introduction/Process Description

Tintina Montana Inc. (Tintina) proposes to develop and operate an underground copper mine and mill facility. The facility is located approximately 15 miles north of White Sulphur Springs, in Meagher County. The facility is known as the Black Butte Copper Project (BBCP).

A. Permitted Equipment

Point Source Identification at Tintina

Point #	Emitting Unit Name
P1	250 ton per hour (TPH) Portable Conical Crusher
P2	325-horsepower (hp) Portable Diesel Engine/generator
P3	2 Portable Screens (400 TPH each)
P4	131-hp Portable Diesel Engine/generator
P5	545-kilowatt (kW) /914-hp Diesel Engine/generator
P6	320-kW /536-hp Diesel Engine/generator
P7A & P7B	1000-kW /1675-hp Diesel Engine/generators (2) - Emergency
P8	100-hp Diesel Engine/generator - Emergency evac hoists
P9	50-hp Diesel Fire Pump - Emergency
P10A	23 million British thermal unit per hour (MMBtu/hr) Propane-fired heater @ Intake Vent for Upper Copper Zone
P10B	52 MMBtu/hr Propane-fired heater @ Intake Vent for Lower Copper Zone
P11	3 Temporary diesel heaters at Portal - (1.2 MMBtu/hr total)
P12	Jaw Crusher (3640 TPD), Building/Dust Collector
P13A	Mill Building (mill, lime storage, etc.) Dust Collector
P13B	Mill Building (lime area/slurry mix tank) Dust Collector
P14	Surge Bin Discharge Dust Collector
P15	Water Treatment Plant Lime Area Dust Collector
P16A	Backfill Plant Cement/Fly Ash Hopper Dust Filter/Collector
P16B	Backfill Plant Cement/Fly Ash Silo Dust Filter/Collector
P17	Portable diesel engine/generators (total of 400 hp, 4 units)
P18	Air Compressor - Diesel Engine (275 hp)
F26	Diesel-powered Light plants - 11 - 14 hp each, 154 hp total
F27	Gasoline storage tank (double-walled 500 gallon (gal))
F28	9 Temporary portable propane heaters (37.8 MMBtu/hr total)
UG	ANFO

The Point Source table identifies each point source for which an emission inventory was developed and used within the air modeling analysis. Tintina identified the highest emitting rates which occur at each of the emitting units (point sources) over the course of the proposed mine life, and modeled those as if they were occurring at the same time. This approach over-estimated the actual emissions for nearly any given period but also ensures the highest possible rate was used in the modeling demonstration.

It was also necessary to model certain fugitive emissions such as those from haul roads. And while mobile sources are not regulated, underground emissions from blasting and engine emissions are modeled as point sources from the three planned exhaust portals. Fugitive emission sources are shown in the table below.

Fugitive Sources

F1	Road Dust, Mine Operating Year (MOY) 0 to 1
F2	Road Dust, MOY 1 to 2
F3	Road Dust, MOY 2 to 15, Annual Average
F4	Road Dust, MOY 16 and 17, Annual Average
F5	Road Dust, MOY 18
F6	Material Transfer to Temporary Stockpile, MOY 0 to 1.5
F7	Temporary Construction Stockpile
F8	Embankment Construction, MOY 0 to 1.5
F9	Backfill, (NCWR) Embankment Material to Facility CTF MOY 16 to 18
F10	Material Transfer to South Stockpile, MOY 0 to 1
F11	Excess Reclamation Stockpile (South)
F12	Material Transfer from South Stockpile, MOY 16 to 17
F13	Material Transfer to North Stockpile, MOY 0 to 1
F14	Excess Reclamation Stockpile (North)
F15	Material Transfer from North Stockpile, MOY 16 to 18
F16	Soil Removal and Stockpiling, MOY 0 to 1
F17	Topsoil Pile
F18	Subsoil Pile
F19	Soil Return, MOY 16 to 18
F20	Copper-enriched Rock Drop to Stockpile, MOY 2 to 3
F21	Copper-enriched Rock Stockpile (Mill Feed)
F22	Waste Rock Drop at WRS Pad, MOY 0 to 1.5, at CTF, MOY 1.5 to 4 and 8
F23	Temporary WRS
F24	Waste Rock Transfer from WRS to CTF, MOY 2 to 3
F25	Waste Rock Storage Pad Reclamation, MOY 3
F26	11 - 14-hp Portable Diesel-powered Light Plants (only 4 units will be used in Production Phase)
F27	500-gal Gasoline Storage Tank (double-walled)
F28	9 -Temporary Portable Propane-fired Heaters (37.8 MMBtu/hr total) (only 3 will be used in Production Phase)
F29	Road Dust, Construction Access Road, Year 0-2 Avg.
F30	Road Dust, Main Access Road, Year 2-15 Avg.
IEU1	Diesel Storage Tanks (250-gal, 500-gal, 10,000- gal)

B. Source Description

The proposed BBCP will mine approximately 15.3 million tons of copper-enriched rock (CER) and waste rock. This includes 14.5 million tons of CER with an average grade of 3.04% copper and 0.8 million tons of waste rock. Mining will occur at a rate of approximately 1.3 million tons/year or roughly 3,562 tons of CER per day. Ore production permit limits were set to match the highest predicted production level occurring in Year 11 of the mine life. The expected life of the mine is approximately 19 years including: a two-year development phase consisting of construction and pre-production mining, approximately 13 years of active mine production and milling, and four years of reclamation and closure.

Tintina plans to mine CER from the upper and lower Johnny Lee mining zones. The mine permit boundary area is divided into three main property areas near the Sheep Creek Road and Butte Creek Road intersections. The northwest sector contains the mine ventilation raises, while the northeast portion contains an access to a proposed public water supply water well utilized by Tintina. The southern property sector contains all mining operations including the mine portal, milling and material processing facilities, two emergency backup reciprocating internal combustion engine (RICE) gensets, a cemented paste tailings facility, material stockpiles, and various water containment ponds.

A drift and fill method will be used where finely ground mill tailings will be mixed with cement and binder to a form a paste used to backfill production workings. This will allow mining to proceed without the need to leave pillars for structural support. Mined rock will be brought to the surface via haul trucks and processed by vibrating screens and a Portal Crusher located within a crusher building. Material is then conveyed in an enclosed conveyor to the mill building for regrinding and flotation.

C. Response to Public Comments (only if there are comments received)

Person/Group Commenting	Permit Reference	Comment	Department Response

II. Applicable Rules and Regulations

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

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

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

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

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

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

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

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

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

1. ARM 17.8.204 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

Tintina must maintain compliance with the applicable ambient air quality standards.

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

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

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

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

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

5. ARM 17.8.322 Sulfur Oxide Emissions--Sulfur in Fuel. 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 17.8.324 Hydrocarbon Emissions--Petroleum Products. (3) No person shall load or permit the loading of gasoline into any stationary tank with a capacity of 250 gallons or more from any tank truck or trailer, except through a permanent submerged fill pipe, unless such tank is equipped with a vapor loss control device as described in (1) of this rule.

7. ARM 17.8.340 Standard of Performance for New Stationary Sources and Emission Guidelines for Existing Sources. This rule incorporates, by reference, 40 CFR Part 60, Standards of Performance for New Stationary Sources (NSPS). Tintina 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 LL – Standard of Performance for Metallic Mineral Processing Plants.

   c. 40 CFR 60, Subpart IIII – Standard of Performance for Stationary Compression Ignition Internal Combustion Engines. 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. Based on the information submitted by Tintina, the CI ICE equipment to be used under MAQP #5200-00 may be subject to this subpart because the proposed engines are manufactured after the applicable date.

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

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

    b. 40 CFR 63, Subpart ZZZZ – National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines. An owner or operator of a stationary reciprocating internal combustion engine (RICE) at a major or area source of HAP emissions is subject to this rule except if the stationary RICE is being tested at a stationary RICE test cell/stand. An area source of HAP emissions is a source that is not a major source. Based on the information submitted by Tintina, the RICE equipment to be used under MAQP #5200-00 may be subject to this subpart if Tintina remains in the same location for more than 12 months.

    c. 40 CFR 63, Subpart CCCCCC – National Emissions Standards for Hazardous Air Pollutants for Source Category: Gasoline Dispensing Facilities.

D. ARM 17.8, Subchapter 4 – Stack Height and Dispersion Techniques, including, but not limited to:

1. ARM 17.8.401 Definitions. This rule includes a list of definitions used in this chapter, unless indicated otherwise in a specific subchapter.

2. ARM 17.8.402 Requirements. Tintina must demonstrate compliance with the ambient air quality standards with a stack height that does not exceed Good Engineering Practices (GEP). The proposed height of all stacks for Tintina is below the allowable 65-meter GEP stack height.

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

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

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

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

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

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

2. ARM 17.8.743 Montana Air Quality Permits--When Required. This rule requires a person to obtain an air quality permit or permit modification to construct, modify, or use any air contaminant sources that have the potential to emit (PTE) greater than 25 tons per year of any pollutant. Tintina has a PTE greater than 25 tons per year of particulate matter (PM), particulate matter with an aerodynamic diameter less than or equal to ten microns (PM10), oxides of nitrogen (NOx), carbon monoxide (CO) and volatile organic compounds (VOCs), and therefore, an air quality permit is required.

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

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

5. ARM 17.8.748 New or Modified Emitting Units--Permit Application Requirements. (1) This rule requires that a permit application be submitted prior to installation, modification, or use of a source. Tintina 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. Tintina submitted an affidavit of publication of public notice for the February 20, 2018, issue of the *Bozeman Chronicle*, a newspaper of general circulation in the Town of Bozeman in Gallatin County, as proof of compliance with the public notice requirements. Tintina also submitted an affidavit of publication of public notice for the week of February 20, 2018, issues of the *Great Falls Tribune*, a newspaper of general circulation in the

Town of Great Falls in Cascade County, as proof of compliance with the public notice requirements. Tintina also submitted an affidavit of publication of public notice for the week of February 22, 2018, issues of the *Meagher County News*, a newspaper of general circulation in the Town of White Sulphur Springs in Meagher County, as proof of compliance with the public notice requirements.

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

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

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

9. ARM 17.8.756 Compliance with Other Requirements. This rule states that nothing in the permit shall be construed as relieving Tintina 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 1 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 rule states that an air quality permit may be transferred from one person to another if written notice of intent to transfer, including the names of the transferor and the transferee, is sent to the Department.

G. 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 because this facility is not a listed source and the facility's PTE is below 250 tons per year of any pollutant (excluding fugitive emissions).

H. 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 tons/year of any pollutant;

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

c. PTE > 70 tons/year of particulate matter with an aerodynamic diameter of 10 microns or less (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 #5200-00 for Tintina, the following conclusions were made:

a. The facility's PTE is greater 100 tons/year for CO and NO_x during the development phase when the use of temporary equipment would be needed.

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

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

d. This facility is subject to NSPS 40 CFR 60, Subpart LL and Subpart IIII.

e. This facility is subject to NESHAP 40 CFR 63, Subpart ZZZZ and Subpart CCCCCC.

f. This source is not a Title IV affected source, or a solid waste combustion unit.

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

Based on these facts, the Department determined that Tintina is subject to the Title V operating permit program. Tintina has indicated they will apply for a Title V operating permit as required unless they prepare an updated MAQP application during the development phase to reduce their emissions below Title V thresholds.

III. BACT Determination

A BACT determination is required for each new or modified source. Tintina 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 submitted by Tintina in permit application #5200-00, addressing available methods of controlling emissions from the proposed BBCP. The Department reviewed these methods, as well as previous BACT determinations. The following control options have been reviewed by the Department in order to make the following BACT determination.

BACT for Particulate Matter Emissions from Mineral Handling and Processing (jaw crusher, surge bin, mill building processes) and Auxiliary Processing and Handling (backfill plant, water treatment plant lime storage)

The mineral handling includes a jaw crusher, surge bin, and ore processing/milling. The auxiliary processing includes the backfill plant and the water treatment plant lime storage. These sources are individual emissions sources but are considered as a group with respect to particulate control technology evaluation.

Of the list of regulated criteria pollutants, these sources emit particulates (PM, PM_{10}, and $PM_{2.5}$). The analyses presented here are restricted to evaluation of BACT for the product processing and handling.
Note: Conveyors used in ore processing are enclosed and as a result do not require further analysis.

Step 1 - Identify All Control Options

The table below briefly describes available technologies for controlling particulate emissions from product processing and handling.

Available Particulate Control Technologies

Technology	Description
No Add-on Control	This is the base case for proposed new sources.
Enclosure	Enclosure technology employs structures, devices or underground placement to shelter material from wind entrainment. Enclosures can either fully or partially surround the source.
Wet Dust Suppression Including Retained or Inherent Moisture	Fogging water spray adds water, with or without surfactant, to material. Emissions are reduced through agglomerate formation by combining small dust particles with larger aggregate or with liquid droplets. Moisture retained from water sprays upstream in the process or moisture inherent in the material provides a similar emission reducing effect.
Electrostatic Precipitator (ESP)	An ESP uses electrical forces to move entrained particles onto a collection surface. To remove dust cake from the collection surface, the collection surface is periodically "rapped" by a variety of means to dislocate the particulate, which drops down into a hopper. Particulate-laden air must be able to be collected and ducted to the ESP.
Wet Particulate Scrubber	Wet scrubbers typically use water to impact, intercept, or diffuse a particulate in a waste gas stream. Particulate matter is accelerated and impacted onto a solid surface or into a liquid droplet through devices such as a venturi and spray chamber. Wet slurry material is typically stored in an on-site waste impoundment.
Fabric Filter Dust Collector/Bin Vent/Baghouse	Fabric filter dust collectors/bin vents/baghouses direct particulate- laden exhaust through tightly woven or felted fabric that traps particulate by sieving and other mechanisms. Collection efficiency and pressure drop simultaneously increase as a particulate layer collects on the filter. Filters are intermittently cleaned by shaking the bag, pulsing air through the bag, or temporarily reversing the airflow direction.

Step 2 - Eliminate Technically Infeasible Options

Wet Scrubber

Wet scrubbers can be very effective for particulate control; however, wet scrubbers would create a waste stream for disposal and are very seldom used on processes of this small size due to their complex operation, large footprint, and heavy use of water resources. For these reasons, a wet particulate scrubber as a control technology would be considered technically infeasible and not available to control particulate emissions from the mineral handling and processing.

Electrostatic Precipitators

Although ESP units are theoretically capable of controlling particulate emissions at levels similar to baghouses, they are generally not feasible for the application considered here. The EPA Air Pollution Cost Manual states that, "ESPs are not typically viewed as cost effective control devices for smaller sources" (U.S. EPA, 2002, pp. 4-15). Further, EPA states in another technical report that, "Electrostatic precipitators are usually not suited for use on processes which are highly variable, since frequent changes in operating conditions are likely to degrade ESP performance" (U.S. EPA, 1998). Tintina indicated it is unaware of any application of an ESP to control fugitive particulate emitted during mineral processing/handling or auxiliary processing/handling. For these reasons, ESP technology is considered to be technically infeasible and not available to control particulate emissions from the product processing and handling.

Step 3 - Rank Remaining Options by Control Effectiveness

The remaining available alternatives according to their respective potential effectiveness values.

Technology	**Control Efficiency**	**Ranking**
Fabric Filter Bin Vent/Dust Collector/Baghouse	95-99.9+%	1
Enclosure	Up to 90% (varies with degree of enclosure)	2
Wet Dust Suppression	50%	3
No Add-on Control	Base case	4

Step 4 - Evaluate Most Effective Controls and Document Results

Tintina proposes to install the top ranked control technology, fabric filter dust collector, to control particulate emissions from the mineral and auxiliary processing and handling points. Additional control will be provided by building enclosures for the jaw crusher, milling processes, backfill plant, and water treatment lime silo.

Step 5 - Select BACT

Based upon the preceding analysis, Tintina proposes that fabric filter dust collectors with a grain loading limit of 0.01 gr PM (with respect to filterable emissions, the manufacturer uses the conservative approach of equating PM_{10} and $PM_{2.5}$ emissions with PM) as BACT. The

grain loading value is consistent with recent MDEQ-permitted small dust collectors installed in Montana. Larger processes provide for smaller air-to-cloth ratio; i.e., more filtration available for a unit amount of exhaust flow. The Texas Commission on Environmental Quality publishes current guidelines for Bulk Material Handling which indicate that fabric filter baghouses with 0.01 gr/dscf grain loading specifications (approx. 99% reduction) constitute BACT for those types of sources.

BACT for Gaseous and Particulate Emissions from Diesel Engines/Generators

Tintina is proposing to use a variety of diesel engines/generators from light plants powered by 14-hp diesel engines to 1,000-kilowatt emergency backup generators. All of these are subject to EPA non-road engine standards, as described in 40 CFR Part 89 and/or 1039, as well as NSPS Subpart IIII for RICE. BACT for these engines is compliance with EPA nonroad standards and NSPS Subpart IIII. The proposed BACT conforms to previous BACT determinations made by MDEQ for similar-sized diesel engines. With respect to using the most recent (and lowest emitting) engines available, 40 CFR 60.4208 requires owners and operators to install recently manufactured engines that meet the NSPS standards.

BACT for Gaseous and Particulate Emissions from Propane Heaters (23 MMBtu/hr and 52 MMBtu/hr each)

Tintina is proposing to use two direct-fired propane heaters (one 23 MMBtu/hr and one 52 MMBtu/hr) at each intake vent to heat air entering the mine. Of the list of regulated criteria pollutants, these sources emit both gaseous and particulate emissions. The BACT analyses is broken down in two categories for add-on control: CO/VOC and NOx. Particulate matter emissions from cleaning burning fuels such as propane are quite small and would be best controlled by good combustion practices. SO_2 emissions are negligible and result solely from the sulfur content of propane.

Step 1 - Identify All Control Options – CO/VOC

CO and VOC are formed from the incomplete combustion of organic constituents in propane. Because CO and VOC are generated and controlled by the same mechanisms, they are addressed together. Two general and nonexclusive approaches were analyzed for controlling these emissions: improving combustion conditions to facilitate complete combustion in the heater burner and completing oxidation of the exhaust stream after it leaves the heater burner. Post-combustion CO/VOC control is accomplished via add-on equipment that creates an environment of high temperature and oxygen concentration to promote complete oxidation of the CO and VOC remaining in the exhaust. This can be facilitated at relatively low temperatures by the use of certain catalyst materials.

Technology	Description
Proper system design and operation	The base level of emissions for CO and VOC is proper design and operation of the proposed heater without additional add-on control. The CO and VOC emissions can be minimized by controlling the system temperatures through operation at maximum loads; increasing oxygen concentrations; maximizing combustion residence time; and improving mixing of the fuel, exhaust gases, and combustion air. Generally, a reduction in CO and VOC emissions will result in an increase in NOx emissions.

Thermal oxidation	Thermal oxidizers are essentially supplementary chambers that complete the fuel combustion of unburned organic constituents. They accomplish this by creating a high temperature environment with optimal oxygen concentration, mixing, and residence time. They require temperatures of approximately 1400 degrees Fahrenheit (°F) to 1500°F. This high temperature environment is produced by the combustion of supplemental fuel. Several design variations address different inlet concentrations, air flow rates, fuel efficiency requirements, and other operational variables. All of them function using the basic principles described above. One commonly used design is called a regenerative thermal oxidizer (RTO) which is evaluated for this BACT analysis. RTOs are capable of reducing CO and VOC emissions by 95 to 99 percent.
Catalytic oxidation	Catalytic oxidizers employ the same principles as thermal oxidizers, but they use catalysts to lower the temperature required to affect complete oxidation. One commonly used design is called a regenerative catalytic oxidizer (RCO) which is evaluated for this BACT analysis. The optimum temperature range for catalytic oxidizers is generally about 800°F. Catalytic oxidizers must be located downstream of a PM control device if the exhaust stream contains appreciable concentrations of PM because catalysts are prone to plugging and poisoning. For this application, the portal heater would be combusting a clean fuel (propane) and PM loading is not anticipated to be a problem. Like thermal oxidizers, catalytic oxidizer designs include many varieties to address specific operational conditions and requirements. They are generally capable of 90 to 99 percent destruction or removal efficiency at steady-state conditions.

Step 2 - Eliminate Technically Infeasible Options – CO/VOC

The proposed portal heaters are direct-fired burners where the combustion exhaust gases and the heated air are inseparable. This configuration makes the installation of the add-on pollution control equipment addressed here technically infeasible. The remaining option is proper system design and operation.

Step 3 - Rank Remaining Options by Control Effectiveness – CO/VOC

Proper design and operation was determined to be the only technically feasible control option for the portal heaters.

Step 4 - Evaluate Most Effective Controls and Document Results – CO/VOC

Proper design and operation was determined to be the only technically feasible control option for the portal heater.

Step 5 - Select BACT – CO/VOC

Tintina proposes that proper design and operation of the two propane-fired vent heaters are BACT for CO and VOC. The combustion of a clean fuel (propane) and following good combustion practices is proposed as BACT for the heaters associated with this project. The proposed BACT conforms to previous BACT determinations made by MDEQ.

BACT for NO_x for the Two Propane-Fired Heaters

Step 1 - Identify All Control Options – NO_x

NO_x is formed during propane combustion in the heater. NO_x comes from two sources in combustion, fuel NO_x and thermal NO_x. The fuel NO_x portion is relatively small and is based almost solely on the type of fuel combusted. The majority of NO_x formation is dominated by the process called thermal NO_x formation. Thermal NO_x results from the thermal fixation of atmospheric nitrogen and oxygen in the combustion air. The rate of formation is sensitive to local flame temperature and, to a lesser extent, local oxygen concentrations. Virtually all thermal NO_x is formed in the region of the flame at the highest temperature. Maximum thermal NO_x production occurs at a slightly lean fuel-to-air ratio due to the excess availability of oxygen for reaction with the nitrogen in the air and fuel. The following table contains NO_x control technologies for heaters.

Technology	Description
Proper system design and operation	The base level of emissions for NOx is proper design and operation of the proposed heater without additional add-on control.
Low NO_x Burners with Flue Gas Recirculation	Due to limited success of Low NO_x Burners (LNB) in lowering NO_x emissions as a stand-alone technology, it has been integrated with Flue Gas Recirculation (FGR). Together, LNB and FGR integrate staged combustion into the burner creating a fuel-rich primary combustion zone. Fuel NO_x formation is decreased by the reducing conditions in the primary combustion zone. Thermal NO_x is limited due to the lower flame temperature caused by the lower oxygen concentration. The secondary combustion zone is a fuel-lean zone where combustion is completed. The combined technology may result in increased CO and hydrocarbon emissions, decreased boiler efficiency and increased fuel costs.
Selective Non-Catalytic Reduction	Selective Non-Catalytic Reduction involves the noncatalytic decomposition of NO_x in the flue gas to nitrogen and water using a reducing agent (e.g., ammonia or urea). The reactions take place at much higher temperatures than in an SCR, typically between 1,650°F and 2100°F, because a catalyst is not used to drive the reaction. The efficiency of the conversion process diminishes quickly when operated outside the optimum temperature band and additional ammonia slip or excess NO_x emissions may result.
Selective Catalytic Reduction	Selective Catalytic Reduction (SCR) is a post-combustion gas treatment technique for reduction of NO and NO_2 in an exhaust stream to molecular nitrogen, water, and oxygen. Ammonia (NH_3) or urea is used as the reducing agent. Ammonia or urea is injected into the flue gas upstream of a catalyst bed, and NO_X and NH_3 combine at the catalyst surface, forming an ammonium salt intermediate, which subsequently decomposes to produce elemental nitrogen and water. The control technology works best for flue gas temperatures between 575°F and 750°F. Excess air is injected at the heater exhaust to reduce temperatures to the optimum range, or the SCR is located in a section of the heater exhaust ducting where the exhaust temperature has cooled to this temperature range.

Step 2 - Eliminate Technically Infeasible Options – NO_x

The proposed portal heaters are direct-fired burners where the combustion exhaust gases and the heated air are inseparable. This configuration makes the practical installation of the FGR as well as add-on pollution control equipment addressed here technically infeasible. The remaining option is proper system design and operation.

Step 3 - Rank Remaining Options by Control Effectiveness – NO_x

Proper design and operation was determined to be the only technically feasible control option for the portal heaters.

Step 4 - Evaluate Most Effective Controls and Document Results – NO_x
Proper design and operation was determined to be the only technically feasible control option for the portal heater.

Step 5 - Select BACT - NO_x

Tintina proposes that proper design and operation of the two propane-fired vent heaters are BACT for NO_x. The combustion of a clean fuel (propane) and following good combustion practices is proposed as BACT for the heaters associated with this project. The proposed BACT conforms to previous BACT determinations made by MDEQ.

BACT for Gaseous and Particulate Emissions from Small, Temporary, Portable Propane (nine heaters, 37.8 MMBtu/hr total) and Diesel Heaters (three heaters, 1.2 MMBtu/hr total)

Tintina proposes to use temporary heaters during the development phase for worker safety and to heat mine intake air, as necessary. The BACT analysis regarding the temporary diesel heaters in use at the portal and the temporary portable propane heaters that will be moved site-wide has been combined to assess BACT for small clean-burning heaters. Based on the small size of the heaters and the minimal emissions generated, particularly as temporary units, no add-on control technology would be economically feasible. Emissions of all criteria pollutants will be minimized through the combustion of propane and diesel and by following good combustion practices for these units.

Good combustion practices are proposed as BACT for the small, portable, temporary heaters associated with this project which burn both propane and diesel. The proposed BACT conforms to previous BACT determinations made by MDEQ for similar-sized propane and diesel heaters.

BACT for Particulate Emissions from Small Crushers and Screens (250 TPH crusher and two 400-TPH screens)

PM emissions are created by crushing and screening equipment. The potential uncontrolled emissions of particulate matter emissions from these operations can be significant. The moisture content of the material processed can have a substantial effect on emissions. Surface wetness causes fine particles to agglomerate on or to adhere to the faces of larger stones, with a resulting dust suppression effect. However, as new fine particles are created by crushing and attrition and as the moisture content is reduced by evaporation, this suppressive effect diminishes. Operators that use wet suppression systems (spray nozzles) to

maintain material moisture as needed can effectively control PM emissions throughout the process. Therefore, Tintina proposes wet suppression as BACT for the control of PM emissions on the small, portable crushing and screening units.

BACT for Gaseous and Particulate Emissions from Explosives Detonation/Blasting Ammonium Nitrate Fuel Oil (ANFO)

Explosives (primarily ANFO) will be used for underground mining and will result in the release of gaseous (NO_2, SO_2, and CO) and particulate (PM, PM_{10}, and $PM_{2.5}$) emissions. ANFO is a common bulk industrial explosive mixture that accounts for roughly 80% of explosives used annually in North America. The mixture provides a reliable explosive that is relatively easy to use, highly stable until detonation, and low cost. Gaseous emissions will result from the detonation of the chemical compounds with the explosives. Particulate emissions will result from the blasting and loosening of ore material. While blasting seemingly generates large amounts of dust, the operation occurs infrequently enough that it is not considered to be a significant contributor of PM_{10} [EPA 1991; Richards and Brozell 2001]. Nonetheless, various best operational practices (BOPs) and blasting techniques will be utilized for reducing gaseous and particulate emissions from blasting.

Tintina will use the following blasting BOPs:

- Optimize drill-hole size. Optimizing drill-hole size will result in effective blasting and reduce the number of blasts needed to achieve the desired effect.

- Optimize drill hole placement and utilization of sequential detonation. Optimizing drill hole placement will ensure that all material is successfully detonated, and additional explosives are not needed in order to achieve complete fragmentation.

- Optimize usage of explosive. Proper usage of explosive prevents the detonation of unnecessary, excess explosive and resulting excess emissions.

- Mine planning will result in blasting that is conducted in a manner that prevents overshooting and minimizes the area to be blasted.

Because the imposition of an emission standard is infeasible for blasting, Tintina proposes that BACT for reducing blasting emissions is a work practice condition to use proper blasting techniques, proper explosive selection, optimized application of explosives, and the utilization of best operating practices. These work practice conditions collectively reduce the amount of gaseous and particulate emissions resulting from explosives detonation.

BACT for Fugitive Particulate Emissions from Roads

Particulate emissions from fugitive road dust will result from vehicle and equipment travel on roadways within the BBCP mine site. BBCP roadway categories include permanent haul roads, temporary haul roads (used primarily during development phase), and mine access roads. Emissions were calculated for those roads based on vehicle type, activity, and frequency of trips. However, the overall control strategy for the roads will be discussed as a whole. The table below lists particulate control technologies available for reducing roadway fugitive emissions.

Technology	Description
No Add-on Control	This is the base case for proposed roadways.
Vehicle Restrictions	Restrict vehicle speed to reduce fugitive dust and increase distance between vehicles.
Surface Improvement	Improve roadway surfaces by paving with asphaltic concrete or other additives.
Surface Treatment	Wet suppression or surface treatment with chemical dust suppressants.

Initially, surface improvement using asphaltic concrete appears to be the most desirable road surface material and potential control technology. It offers a high coefficient of road adhesion and creates a surface that reduces dust problems. However, using this road composition has a seasonal disadvantage in climates with snow or freezing rain. The smooth surface of asphalt offers little resistance to the development of ice or snow causing the roadway to become extremely slick and remain so until a facility employs corrective measures. This could constitute a serious threat to operational safety in mining areas where rapid and frequent freeze conditions prevail. South-central Montana experiences many freeze/thaw periods throughout the year creating a potential safety hazard from the use of paved mine haul roadways.

The Design of Surface Haulage Roads Manual further states that "the high cost of asphaltic road surface severely restricts its feasibility on roads of short life. In most cases, a 4-inch layer of road surface may be accepted as the minimum requirement road depth due to the extreme weight of vehicles constantly traveling haul road surfaces. The cost of constructing a 4-inch thick layer ranges from $46 to $57 per square yard for labor, equipment, and material. Using the higher figure for a 5-mile road 30 feet wide would necessitate an expenditure of $440,000 for paving alone." Additionally, a sufficient sub- base and base course must be established prior to placing the asphalt. The necessary base course is an additional expense to be considered in total construction cost.

The Design of Surface Haulage Roads Manual continues to state that a great number of surface mining operations throughout the country are currently using gravel and crushed stone surface haulage roads. They provide a stable roadway that resists deformation and provides a relatively high coefficient of road adhesion with low rolling resistance. The Manual states that it would be impractical to use a permanent surface improvement control such as asphaltic concrete in areas where haul roads are subject to relocation or must accommodate heavy tracked vehicles.

A significant amount of traffic on BBCP roads will consist of haul trucks and other heavy machinery. Consequently, BBCP determined that surface improvement control techniques utilizing asphaltic concrete are both economically impractical and potentially hazardous.

The BBCP roads vary in both silt and moisture content and produce a varying degree of fugitive road dust emissions. A combination of surface treatments and vehicle restrictions are proposed to reduce fugitive road dust emissions

Tintina proposes the utilization of water as a surface treatment for all mine roads and along mine roads, with chemical dust suppressants considered as necessary (particularly on high traffic areas near private ranch buildings). Water sprays will be utilized to increase the moisture content of mine access roadway material in order to conglomerate particles and reduce the likelihood of fugitive particulate. The water sprays will be applied as necessary. Further vehicle restrictions will also be enforced as necessary in order to control fugitive emissions from mine access road travel. This includes the limitation of vehicle speed. These measures, as well as available reasonable precautions, will maintain compliance with ARM.17.8.304 and ARM 17.8.308.

BACT for Fugitive Particulate Emissions from Material Handling, Removal, and Stockpiles/Storage

Contemporaneous reclamation of disturbances will be a priority during the construction period. Maintaining reclaimed areas will be an ongoing BBCP focus. Surface disturbances related to cut and fill slopes associated with roads, ditches, embankment faces, and the disturbed perimeter of facility footprints will be reclaimed immediately where possible after final grades have been established. Reclamation includes: grading, slope stabilization, drainage control, topsoil and subsoil placement, and seeding. It is expected that these reclaimed areas will be fully revegetated within two to four years following construction. Temporary waste rock and life-of-mine copper-enriched rock storage areas will also be watered as necessary to minimize dust while loading or unloading material. Monitoring by site personnel during each shift will ensure watering is done to the level required to minimize the effects of dust at the site.

Construction-related disturbances that may generate dust and are not needed operationally will be recontoured, soil placed, and revegetated as quickly as possible following construction. This will include road cut-and-fill slopes, facility berms (Waste Rock storage and mill facility), embankments and berms of the Cemented Tailings Facility, Contact Water Pond, Process Water Pond, WRS and NCWR, buried pipelines, water diversion ditches, and soil/subsoil stockpiles. Dust control from the CTF is not expected to be problematic because the material will be moist (20%) and will be stabilized with cement additions to provide a non-flowable mass.

Other components of the dust control plan include (other specific emitting units are covered previously):

- Minimizing exposed soil areas to the extent possible by prompt revegetation of reclaimed areas,
- Establishing temporary vegetation on inactive soil and sub-soil stockpiles that will be in place for one year or more,
- Minimizing drop heights, etc. to minimize dust production from material transfer;
- Use of water and chemical dust suppression products to stabilize access and trucking road surfaces (with additional water application during dry periods), and
- Covering/enclosure of conveyor belts.

These measures, as well as available reasonable precautions, will maintain compliance with ARM.17.8.304 and ARM 17.8.308.

The control options selected have controls and control costs comparable to other recently permitted similar sources and are capable of achieving the appropriate emission standards.

IV. Emission Inventory

This project was modeled by finding the highest emissions for any activity during the proposed mine life, and assuming those activities all occur at the same time and in the same year. This provided a worst-case analysis to demonstrate there will be no violations of either NAAQS or MAAQS. The emitting units below include not only individual emitting units but also activities which generate emissions and were modeled. For example, underground blasting emissions are assigned as an emitting unit ID as are each of the various road sections for particulate matter emissions.

EMITTING UNIT ID	NAME
P1	250 TPH Portable Conical Crusher
P2	325-hp Portable Diesel Eng/Gen
P3	2 – Portable Screens (400 TPH each)
P4	131-hp Portable Diesel Eng/Gen
P5	545-kW/914-hp Portable Diesel Eng/Gen
P6	320-kW/1675-hp Portable Diesel Eng/Gen
P7A & P7B	2- 1000-kW/1675-hp Diesel Eng/Gen - Emergency backup
P8	100-hp Diesel Eng/Gen – Emergency evac hoists
P9	50-hp Diesel Fire Pump – Emergency
P10A	23 MMBtu/hr Propane-fired Heater – Intake Vent for Upper Copper Zone
P10B	52 MMBtu/hr Propane-fired Heater – Intake Vent for Lower Copper Zone
P11	3 Temporary diesel heaters at Portal - (1.2 MMBtu/hr total)
P12	3640 TPD Jaw Crusher
P13A	Mill Building (mill, lime storage, etc.)
P13B	Mill Building (lime area/slurry mix tank)
P14	Surge Bin Discharge
P15	Water Treatment Plant Lime Area
P16A	Backfill Plant Cement/Fly Ash Hopper
P16B	Backfill Plant Cement/Fly Ash Silo
P17	4- Portable Diesel Eng/Gen (400-hp total)
P18	Air Compressor - 275-hp Diesel Engine
UG	ANFO
F1	Road Dust, Mine Operating Year (MOY) 0 to 1
F2	Road Dust, MOY 1 to 2
F3	Road Dust, MOY 2 to 15, Annual Average
F4	Road Dust, MOY 16 and 17, Annual Average
F5	Road Dust, MOY 18
F6	Material Transfer to Temporary Stockpile, MOY 0 to 1.5
F7	Temporary Construction Stockpile

EMITTING UNIT ID	NAME
F8	Embankment Construction, MOY 0 to 1.5
F9	Backfill, NCWR Embankment Material to CTF, MOY 16 to 18
F10	Material Transfer to South Stockpile, MOY 0 to 1
F11	Excess Reclamation Stockpile (South)
F12	Material Transfer from South Stockpile, MOY 16 to 17
F13	Material Transfer to North Stockpile, MOY 0 to 1
F14	Excess Reclamation Stockpile (North)
F15	Material Transfer from North Stockpile, MOY 16 to 18
F16	Soil Removal and Stockpiling, MOY 0 to 1
F17	Topsoil Pile
F18	Subsoil Pile
F19	Soil Return, MOY 16 to 18
F20	Copper-enriched Rock Drop to Stockpile, MOY 2 to 3
F21	Copper-enriched Rock Stockpile (Mill Feed)
F22	Waste Rock Drop at WRS Pad, MOY 0 to 1.5, at CTF, MOY 1.5 to 4 and 8
F23	Temporary WRS
F24	Waste Rock Transfer from WRS to CTF, MOY 2 to 3
F25	Waste Rock Storage Pad Reclamation, MOY 3
F26	11 - 14-hp Portable Diesel-powered Light Plants (only 4 units will be used in Production Phase)
F27	500-gal Gasoline Storage Tank
F28	9 -Temporary Portable Propane-fired Heaters (37.8 MMBtu/hr total) (only 3 will be used in Production Phase)
F29	Road Dust, Construction Access Road, Year 0-2 Avg.
F30	Road Dust, Main Access Road, Year 2-15 Avg.
IEU1	Diesel Storage Tanks (250-gal, 500-gal, 10,000- gal)

The point source and fugitive emission inventory totals prepared for the modeling demonstration in the ambient air quality analysis against the MAAQS and NAAQS is summarized in the below table.

Source Cat.	**Model Type**	**Modeled Emissions (Tons/Year)**				
		PM_{10}	**$PM_{2.5}$**	**CO**	**NO_2**	**SO_2**
EVL	Point	1.020	1.000	28.090	19.460	0.630
EVU	Point	2.830	2.800	78.389	54.299	1.770
HEATER	Point	1.260	1.260	13.590	23.580	0.099
LIGHT	Point	1.480	1.480	4.510	20.900	0.008
P10A	Point	0.449	0.449	4.824	8.365	0.035
P10B	Point	1.021	1.021	10.908	18.912	0.079
P11	Point	0.050	0.050	0.190	0.750	0.080
P12	Point	3.190	3.190	n/a	n/a	n/a
P13A	Point	0.190	0.190	n/a	n/a	n/a

Source Cat.	Model Type	Modeled Emissions (Tons/Year)				
		PM_{10}	$PM_{2.5}$	CO	NO_2	SO_2
P13B	Point	1.240	1.240	n/a	n/a	n/a
P14	Point	1.880	1.880	n/a	n/a	n/a
P15	Point	1.240	1.240	n/a	n/a	n/a
P16A	Point	0.230	0.230	n/a	n/a	n/a
P16B	Point	0.450	0.450	n/a	n/a	n/a
P17	Point	1.150	1.150	14.400	13.540	0.210
P18	Point	0.400	0.400	6.930	7.920	0.150
P2	Point	0.470	0.470	8.190	9.360	0.170
P4	Point	0.280	0.280	4.720	3.770	0.070
P5	Point	1.320	1.320	23.020	42.101	0.490
P6	Point	0.770	0.770	13.520	15.450	0.030
PORTAL	Point	0.950	0.940	26.300	18.220	0.590
FUGITIVE	Volume	0.004	0.002	n/a	n/a	n/a
P1	Volume	0.591	0.109	n/a	n/a	n/a
P3A	Volume	1.296	0.088	n/a	n/a	n/a
P3B	Volume	1.296	0.088	n/a	n/a	n/a
ROAD	Volume	84.519	8.471	n/a	n/a	n/a
STOCKPILES	Volume	3.180	0.832	n/a	n/a	n/a
TRANSFERS	Volume	7.000	3.040	n/a	n/a	n/a
Total		**119.757**	**34.439**	**237.581**	**256.627**	**4.411**

Abbreviations:

EVL = Mine Ventilation Exhaust Lower Copper Zone
EVU = Mine Ventilation Exhaust Upper Copper Zone
Heater = Sum of Temporary Propane Heaters
Light = Sum of Diesel-fired Light Plants
Portal = Main Portal Exhaust
Road = Volume Sources for Roads
Stockpiles = Particulate Emissions from various stockpiles of material
Transfers = Particulate Emissions from material handling

PM_{10} = particulate matter with an aerodynamic diameter of 10 microns or less
$PM_{2.5}$ = particulate matter with an aerodynamic diameter of 2.5 microns or less
CO = carbon monoxide
NO_2 = oxides of nitrogen
SO_2 = sulfur dioxide

The emission inventory reflects maximum allowable emissions for all pollutants based on maximum production and year-round operation for most operations (8,760 hours) with the following exceptions. Emergency generators are limited to 500 hours of operation per year and P10A and P10B are used on a seasonal basis for heating the interior of the mine. Road fugitive totals were averaged across the emissions during each year in the production phase.

VOC and PM emissions were also totaled for sources and do not have ambient air quality standards to compare to, but are shown here for completeness.

Potential Emissions Summary - PM and VOC			
Point #	**Emitting Unit**	**PM tons per year**	**VOC tons per year**
	POINT SOURCES		
P1	250 TPH Portable Conical Crusher	1.31	--
P2	325-hp Portable Diesel Engine/generator	0.47	3.52
P3	2 Portable Screens (400 TPH each)	7.71	--
P4	131-hp Portable Diesel Engine/generator	0.28	1.42
P5	545-kW /914-hp Diesel Engine/generator	1.32	9.88
P6	320-kW /536-hp Diesel Engine/generator	0.77	5.80
P7	1000-kW /1675-hp Diesel Engine/generators (2) - Emergency	0.28	2.07
P8	100-hp Diesel Engine/generator - Emergency evac hoists	0.02	0.06
P9	50-hp Diesel Fire Pump - Emergency	0.01	0.03
P10A	23 MMBtu/hr Propane-fired heater @ Intake Vent for Upper Copper Zone	0.45	0.64
P10B	52 MMBtu/hr Propane-fired heater @ Intake Vent for Lower Copper Zone	1.01	1.45
P11	3 Temporary diesel heaters at Portal - (1.2 MMBtu/hr total)	0.05	0.02
P12	Jaw Crusher (3640 TPD), Building/Dust Collector	3.19	--
P13A	Mill Building (mill, lime storage, etc.) Dust Collector	0.19	--
P13B	Mill Building (lime area/slurry mix tank) Dust Collector	1.24	--
P14	Surge Bin Discharge Dust Collector	1.88	--
P15	Water Trtmt Plant Lime Area Dust Collector	1.24	--
P16A	Backfill Plant Cement/Fly Ash Hopper Dust Filter/Collector	0.23	--
P16B	Backfill Plant Cement/Fly Ash Silo Dust Filter/Collector	0.45	--
P17	Portable diesel engine/generators (total of 400 hp, 4 units)	1.15	4.33
P18	Air Compressor - Diesel Engine (275 hp)	0.40	2.98
F26	Diesel-powered Light plants - 11 - 14 hp each	1.48	1.67
F27	Gasoline storage tank (double-walled 500 gal)		0.07
F28	Temporary portable propane heaters (37.8 MMBtu/hr total) - 9	1.27	1.81
UG	ANFO	0.11	--
	TOTAL POINT SOURCES	**26.49**	**35.74**
UG - EVU	Mine Ventilation Exhaust Upper Copper Zone - EVU		17.36
UG - EVL	Mine Ventilation Exhaust Lower Copper Zone - EVL		6.22
UG - P	Mine Ventilation Exhaust - Mine Portal		5.82
	ANFO (included in UG sources)		

	Fugitive Source PM Totals	PM tons per year
F1	Road Dust, Mine Operating Year 0 to 1	152.70
F2	Road Dust, Mine Operating Year 1 to 2	56.42
F3	Road Dust, Mine Operating Year 2 to 15, annual average	17.79
F4	Road Dust, Mine Operating Years 16 and 17, annual average	73.80
F5	Road Dust, Mine Operating Year 18	11.68
F6	Material transfer to Temporary Stockpile, MOY 0 to 1.5	3.13
F7	Temporary construction stockpile (Table 3-13, 3.4.1)	0.36
F8	Embankment Construction, Mine Operating Year 0 to 1.5	3.13
F9	Backfill, NWCR Embankment Material to CTF, MOY 16 to 18	1.78
F10	Material transfer to South Stockpile, MOY 0 to 1	1.49
F11	Excess reclamation stockpile (South) (Table 3-13, 3.4.1)	0.08
F12	Material transfer from South Stockpile, MOY 16 to 17	1.49
F13	Material transfer to North Stockpile, MOY 0 to 1	2.13
F14	Excess reclamation stockpile (North) (Table 3-13, 3.4.1)	0.17
F15	Material transfer from North Stockpile, MOY 16 to 18	0.82
F16	Soil Removal and Stockpiling, Mine Operating Year 0 to 1	4.99
F17	Topsoil pile (Table 3-13, 3.4.1, 3.6.10)	0.08
F18	Subsoil pile (Table 3-13, 3.4.1, 3.6.10)	0.44
F19	Soil Return, Mine Operating Year 16 to 18	4.17
F20	Copper-enriched rock drop to stockpile, MOY 2 to 3	0.16
F21	Copper-enriched rock stockpile (mill feed) (Tables 3-5 & 3-13, 3.4.1)	0.00
F22	Waste Rock Drop -at WRS Pad, MOY 0 to 1.5, at CTF, MOY 1.5 to 4 and 8	0.87
F23	Temporary waste rock storage (WRS) (Table 3-5, 3-13, 3.4.1)	0.019
F24	Waste Rock Transfer from WRS to CTF, MOY 2 to 3	1.39
F25	Waste Rock Storage Pad Reclamation, MOY 3	1.65
F29	Road Dust, Construction Access Road, Year 0 - 2 Avg.	0.90
F30	Road Dust, Main Access Road, Year 2 - 15 Avg.	102.19
	TOTAL FUGITIVE SOURCES	272.22
	TOTAL	**340.77**

V. Existing Air Quality

This permit is for an underground copper mine and surface mill buildings in Meagher County, Montana. Meagher County has been designated unclassified/attainment with all ambient air quality standards.

VI. Ambient Air Impact Analysis

The project is scheduled to occur in three phases; development, production and reclamation. For demonstration with NAAQS and MAAQS, highest emitting activities have been assumed to occur at the same time regardless of which phase they actually occur in. This

assumption shows that even with a conservative approach, the emitting units and sources of criteria pollutants will not violate ambient air quality standards. The project would be classified as a minor source for PSD-NSR and a major source under Title V regulations. Temporary engines utilized in the development phase of the mine, trigger the Title V major status. Tintina could later decide to revisit the Title V major status following the development phase but as currently presented, Tintina would need to apply for a Title V Operating permit within 12-months after commencing operation of the engines and temporary equipment presented for operation during the development phase.

Tintina conducted a screening analysis on CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$ for various long and short-term averaging periods. All emissions were held constant across all averaging periods. Tintina modeled 26 discrete point sources, and 1583 volume sources. The Heater and Light points represent multiple units distributed across the site and the four emergency generators are not included in the 26 point source total. The majority of volume sources were equally spaced road segments, modeled for fugitive dust emissions of PM_{10} and $PM_{2.5}$.

The table below reports the total emissions modeled for each pollutant.

Source Cat.	Model Type	Modeled Emissions (Tons/Year)				
		PM_{10}	**$PM_{2.5}$**	**CO**	**NO_2**	**SO_2**
EVL	Point	1.020	1.000	28.090	19.460	0.630
EVU	Point	2.830	2.800	78.389	54.299	1.770
HEATER	Point	1.260	1.260	13.590	23.580	0.099
LIGHT	Point	1.480	1.480	4.510	20.900	0.008
P10A	Point	0.449	0.449	4.824	8.365	0.035
P10B	Point	1.021	1.021	10.908	18.912	0.079
P11	Point	0.050	0.050	0.190	0.750	0.080
P12	Point	3.190	3.190	n/a	n/a	n/a
P13A	Point	0.190	0.190	n/a	n/a	n/a
P13B	Point	1.240	1.240	n/a	n/a	n/a
P14	Point	1.880	1.880	n/a	n/a	n/a
P15	Point	1.240	1.240	n/a	n/a	n/a
P16A	Point	0.230	0.230	n/a	n/a	n/a
P16B	Point	0.450	0.450	n/a	n/a	n/a
P17	Point	1.150	1.150	14.400	13.540	0.210
P18	Point	0.400	0.400	6.930	7.920	0.150
P2	Point	0.470	0.470	8.190	9.360	0.170
P4	Point	0.280	0.280	4.720	3.770	0.070
P5	Point	1.320	1.320	23.020	42.101	0.490
P6	Point	0.770	0.770	13.520	15.450	0.030
PORTAL	Point	0.950	0.940	26.300	18.220	0.590
FUGITIVE	Volume	0.004	0.002	n/a	n/a	n/a
P1	Volume	0.591	0.109	n/a	n/a	n/a
P3A	Volume	1.296	0.088	n/a	n/a	n/a
P3B	Volume	1.296	0.088	n/a	n/a	n/a
ROAD	Volume	84.519	8.471	n/a	n/a	n/a

Source Cat.	Model Type	Modeled Emissions (Tons/Year)				
		PM_{10}	$PM_{2.5}$	CO	NO_2	SO_2
STOCKPILES	Volume	3.180	0.832	n/a	n/a	n/a
TRANSFERS	Volume	7.000	3.040	n/a	n/a	n/a
Total		**119.757**	**34.439**	**237.581**	**256.627**	**4.411**

The application also included the use of four emergency generators for 728 hours per year (permit contains a limit for 500 but modeling was done at 728) for each. These emissions were modeled separately on the assumption that normal operations would cease if the emergency generators were activated. The table below shows the emissions for the emergency generators.

Source	Emissions (Tons/Year)				
	$PM_{2.5}$	PM_{10}	NO_2	CO	SO_2
P7A	2.409	2.409	77.176	42.216	0.889
P7B	2.409	2.409	77.176	42.216	0.889
P8	0.289	0.289	3.373	3.592	0.053
P9	0.144	0.145	1.691	1.800	0.027
Total	5.251	5.252	159.416	89.823	1.857

The SIL and MAAQS/NAAQS compliance demonstrations were conducted using the latest available version of AERMOD and associated preprocessors. Specifically:

- AERMOD version 16216r: Air dispersion model
- AERMET version 16216: processes on-site and NWS meteorological data for input to AERMOD
- AERSURFACE version 13016: processes 1992 National Land Cover Data surface characteristics for input to AERMET
- AERMAP version 11103: Processes National Elevation Data from the USGS to determine elevation of sources and receptors for input into AERMOD
- BPIPPRM version 04274: characterizes building downwash for input to AERMOD
- BEEST version 11.10: GUI used for easier processing of AERMOD inputs and outputs.

Regulatory default options were used for all model runs. Rural dispersion coefficients were applied because less than 50% of the site location is classified into a developed land use category. All of Montana currently meets this criterion. Metrological data was obtained from an on-site meteorological tower at the proposed facility location. Data was collected from May 2012, through April 2017, and used in the modeling analysis. National Weather Service data from the Helena Regional Airport (WBAN 24144) was used to supplement missing on-site data for the five-year period. The Great Falls Upper Air station (WBAN 04102) was used for upper air data.

Source parameters were provided by Tintina and remained constant across all pollutants and averaging times. The tables below outline the source parameters used for point and volume sources for the facility, followed by parameters for the emergency generators.

Point source parameters for the facility operations are listed below.

Source Cat.	Source	Stack Height (m)	Stack Temp(K)	Stack Vel. (m/s)	Stack Diam. (m)
EVL	EVL	0.91	294.25	7.28	4.88
EVU	EVU	0.91	294.25	20.32	4.88
Heater	PROA	1.83	755.35	8.79	0.1
	PROB	1.83	755.35	8.79	0.1
	PROC	1.83	755.35	8.79	0.1
Light	LIGHTA	0.91	866.45	9	0.08
	LIGHTB	0.91	866.45	9	0.08
	LIGHTC	0.91	866.45	9	0.08
	LIGHTD	0.91	866.45	9	0.08
P10A	P10A	0.91	294.25	20.32	4.88
P10B	P10B	0.91	294.25	7.28	4.88
P11	P11	1.22	810.95	18.1	0.1
P12	P12	10	ambient temp	17.78	0.61
P13A	P13A	25	ambient temp	13.71	0.15
P13B	P13B	25	ambient temp	20.14	0.36
P14	P14	15	ambient temp	18.7	0.46
P15	P15	10	ambient temp	20.14	0.36
P16A	P16A	15	ambient temp	19.74	0.15
P16B	P16B	15	ambient temp	17.54	0.23
P17	P17	1.22	838.75	36.96	0.1
P18	P18	1.68	737.15	43.54	0.15
P2	P2	1.68	737.15	50.11	0.15
P4	P4	1.83	755.37	32.83	0.1
P5	P5	2.13	791.35	52.63	0.23
P6	P6	2.44	743.15	25.46	0.23
PORTAL	PORTAL	0.3	294.25	6.04	5.18

Volume source parameters for the facility operations are listed below.

Source Cat.	Source	Release Height (m)	Init Sy (m)	Init Sz (m)
Fugitive	DRAIN_CTF	2	10.47	1.86
	DRAIN_PWP	2	7.44	1.86
	POWDER	2	10.23	1.86
P1	P1	2.16	3.09	2.01
P3A	P3A	2.45	2.77	2.28
P3B	P3B	2.45	2.77	2.28
Road	ACC	2.11	6.48	1.96
	CON	2.11	3.88	1.96
	CTF Road	3.5	7.44	3.25
	Service Road	3.5	4.51	3.25
Stockpiles	CUPILE	9	16.28	8.37
	NPILE	4.5	33.72	4.19
	SPILE	4.5	27.91	4.19
	SUBS	4.5	32.09	4.19
	TEMP	3.05	18.14	2.84
	TOPS	4.5	27.91	4.19
	WRS	7.5	53.49	6.98
Transfers	CTF_T	2	36.05	1.86
	CUPILE_T	2	16.28	1.86
	CWP_T	2	17.83	1.86
	MILL_T	2	20.93	1.86
	NCWR_T	2	29.07	1.86
	PORTAL_T	2	13.37	1.86
	PWP_T	2	22.67	1.86
	WRS_T	2	17.83	1.86

The emergency generators' source parameters are listed below.

Source	Source Parameters				
	Base Elev. (m)	Stack Height (m)	Stack Temp(K)	Stack Vel. (m/s)	Stack Diam. (m)
P7A	1785	6.1	746.55	49.05	0.3
P7B	1785	6.1	746.55	49.05	0.3
P8	1768.9	1.22	838.75	36.96	0.1
P9	1785	1.22	810.95	18.1	0.1

Tintina conducted a screening analysis in concurrence with the NAAQS/MAAQS analysis to determine whether the proposed project would result in predicted concentrations exceeding any of the significant impacts levels (SILs) for any of the criteria pollutants for the various averaging periods. The results of the screening analysis from the Tintina MAQP application are shown below.

Pollutant	Avg. Period	Modeled Conc. (µg/m3)	Class II SIL (µg/m3)	Significant (Y/N)
PM_{10}	24-hr	108.6	5	Y
$PM_{2.5}$	24-hr	16.6	1.2	Y
	Annual	4.2	0.3	Y
NO_2	1-hr	263	7.52	Y
	Annual	11.7	1	Y
SO_2	1-hr	13.8	7.8	Y
	3-hr	20.5	25	N
	24-hr	3.6	5	N
	Annual	0.19	1	N
CO	1-hr	2725	2,000	Y
	8-hr	459.2	500	N

SILs were exceeded for 24-hr PM_{10}, 24-hr and annual $PM_{2.5}$, 1-hr and annual NO_2, 1-hr SO_2 and 1-hr CO. Thresholds above the SILs requires that a compliance demonstration using existing nearby industrial sources in addition to background concentrations be conducted with the resulting concentrations compared to NAAQS and MAAQS. As the proposed project site is not in close proximity with other existing industrial facilities, no nearby sources were included in the NAAQS and MAAQS compliance demonstration. Therefore, the compliance demonstration was simplified to adding the modeled concentrations from the proposed project to approved background concentrations.

Tintina also conducted a screening analysis for emergency operations in concurrence with the NAAQS/MAAQS analysis to determine whether the emergency operations would result in predicted concentrations exceeding any of the significant impacts levels (SILs) for any of the criteria pollutants for the various averaging periods. The results of the screening analysis from the Tintina MAQP application are shown below.

Pollutant	Avg. Period	Modeled Conc.[(a)] ($\mu g/m^3$)	Class II SIL ($\mu g/m^3$)	Significant (Y/N)
PM_{10}	24-hr	1.4	5	N
$PM_{2.5}$	24-hr	0.97	1.2	N
	Annual	0.03	0.3	N
NO_2	1-hr	240	7.52[(b)]	Y
	Annual	0.79	1	N
	1-hr	5.6	7.8[(c)]	N

Pollutant	Avg. Period	Modeled Conc.[a] ($\mu g/m^3$)	Class II SIL ($\mu g/m^3$)	Significant (Y/N)
SO_2	3-hr	3.8	25	N
	24-hr	0.48	5	N
	Annual	0.013	1	N
CO	1-hr	398	2,000	N
	8-hr	70	500	N

Background concentrations prepared by Tintina were collected at the Sieben Flats NCore monitoring station (Lewis and Clark County) and the Lewistown monitoring station (Fergus County). The Sieben Flats station monitors background air quality data is part of the National Core (NCore) multi-pollutant monitoring network which addresses monitoring objectives including long-term health assessments contributing to ongoing reviews of the NAAQS and the support of scientific research in public health, atmospheric science, and ecological science. The monitoring station resides approximately 17.7 miles north-northeast of Helena, Montana, in an area of rural, agricultural land with characteristics similar to the region surrounding the BBCP. Monitoring data from the Sieben station was used for all pollutants collected at the station, which included all criteria pollutants except for NO_2 and PM_{10}. The Lewistown station provides another set of monitoring data characteristic to the BBCP location and was used for NO_2 and PM_{10} background concentration values.

Pollutant	Averaging Period	Background[a] Concentration ($\mu g/m^3$)	Monitoring Station
PM_{10}[b]	24-hour	30.3[c]	Lewistown
$PM_{2.5}$[b]	24-hour	10	Sieben Flatts NCORE
	Annual	2.5	Sieben Flatts NCORE
SO_2	1-hour	5.24[d]	Sieben Flatts NCORE
CO[b]	1-hour	1031[c]	Sieben Flatts NCORE
NO_2	1-hour	20.7[e]	Lewistown
	Annual	1[f]	Lewistown

(a) NAAQS design values provided in 2017 Network Plan produced by Montana DEQ unless noted otherwise.
(b) Values exclude EPA or DEQ defined exceptional events.
(c) NAAQS design values derived from EPA Monitoring Values Report data.
(d) Concentration represents 2 ppb.
(e) Concentration represents 11 ppb.
(f) Concentration represents 0.5 ppb. Value not a regulatory calculated. Internally calculated arithmetic mean provided in 2017 Network Plan. Used in lieu of no NO_2 Annual NAAQS Design Value

The compliance demonstration for the modeled inputs against the NAAQS and MAAQS is shown below.

Pollutant	Avg. Period	Modeled Conc. ($\mu g/m^3$)	Background Conc. ($\mu g/m^3$)	Ambient Conc. ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	% of NAAQS	MAAQS ($\mu g/m^3$)	% of MAAQS
PM_{10}	24-hr	89.7[a]	30.3	120	150	80%	150	80%
$PM_{2.5}$	24-hr	12.0[b]	10	22.0	35	63%	------	------
	Annual	4.25[c]	2.5	6.75	12	56%	------	------
NO_2	1-hr	131[d]	20.7	151.7	188	81%	564	36%[g]
	Annual	11.7[c]	1	12.7	100	13%	94	13%
SO_2	1-hr	5.8[e]	5.24	11.03	196	6%	1309	1%
CO	1-hr	1890[f]	1031	2921	40,000	7%	26,450	11%

(a) Modeled concentration is the high-6th-high modeled over a 5-year concatenated met period.
(b) Modeled concentration is the high-8th-high modeled over a 5-year concatenated met period.
(c) Modeled concentration is the highest annual average over the modeled five-year period.
(d) Modeled concentration is the high-8th-high modeled over a 5-year concatenated met period.
(e) Modeled concentration is the high-4th-high modeled over a 5-year concatenated met period.
(f) Modeled concentration is the high-2nd-high modeled over a 5-year concatenated met period.
(g) Modeled concentration is the high-2nd-high modeled impact over a 5-year concatenated met period. High-2nd-high concentration is 184 ug/m3 and was not included in the table. With the addition of the 20.7 ug/m3 background value the ambient impact is 36% of the MAAQS.

The compliance demonstration for the emergency operations for NO_2 1-hr are shown against the NAAQS and MAAQS below.

Pollutant	Avg. Period	Modeled Conc. ($\mu g/m^3$)	Background Conc. ($\mu g/m^3$)	Ambient Conc. ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	% of NAAQS	MAAQS ($\mu g/m^3$)	% of MAAQS
NO_2	1-hr	139.26[a]	20.7	159.96	188	85%	------	------

Modeled results of the full facility indicate the 1-hr NO_2 standard and 24-hr PM_{10} standard are at 81% and 80% of the NAAQS, respectively. Modeling results of the emergency operations indicate the 1-hr NO_2 standard is 85% of the NAAQS. These are the highest modeled concentrations with the next highest being the 24-hr $PM_{2.5}$ concentrations. Given the modeling approach of assuming the highest emitting activities occur at the same time, emission estimates are generally over-stated and since no pollutant is over either the NAAQS or MAAQS for any averaging period, the proposed project has demonstrated compliance with the NAAQS and MAAQS.

The Department determined, based on the modeling analysis, accompanying assumptions and conditions including BACT methods established in MAQP #5200-00 that the impacts from this permitting action will be minor. The Department believes it will not cause or contribute to a violation of any ambient air quality standard. The full modeling analysis submitted with the MAQP application, 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 EA is not being conducted as part of this preliminary determination, as the proposed underground mine and mill is being evaluated by the Department of Environmental Quality and a separate Environmental Impact Statement (EIS) is in the process of being developed. All project-related documents including the EIS related documents are being posted on the DEQ website at: http://deq.mt.gov/Land/hardrock/tintinamines.

Analysis Prepared By: Craig Henrikson
Date: May 15, 2018