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MT DEQ/AIR QUALITY BUREAU

April 20, 2018

Craig Henrikson
Air Quality Bureau
Air, Energy & Mining Division
Department of Environmental Quality
P.O. Box 200901
Helena, MT 59620-0901

Dear Mr. Henrikson:

Re: Incompleteness Response for Montana Air Quality Permit (MAQP) #5200-00

Tintina Montana Inc. (Tintina) is submitting this response to the Montana Department of Environmental Quality (Department) incompleteness letter issued for the proposed Black Butte Copper Project MAQP application on March 21, 2018. To ease review, the entire application is being resubmitted with revisions as noted, including an updated certification of truth, accuracy, and completeness in Appendix A. Each of the Department's requests for information is itemized below with a response and reference, as applicable, to the relevant application section. In addition, several minor (non-substantive) editorial changes were made to the revised application, as needed.

1. *Modeling and Air Quality Analysis. After a review of the modeling and the air quality analysis, the Department determined Tintina must provide/revise the following information:*

   a. *Table 6-4 incorrectly uses "zero" for both the background concentration for particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10}) and carbon monoxide (CO). Neither value represents actual background concentrations for these two pollutants and appropriate background values will need to be substituted into the analysis. This will also require a correction to the background values in Table 6-6 and updated comparisons to the National Ambient Air Quality Standards and Montana Ambient Air Quality Standards (NAAQS and MAAQS, respectively).*

Response: The "zero" values selected as background concentrations for 24-Hour PM_{10} and 1-Hour CO NAAQS analyses were incorrectly interpreted from the 2017 State of Montana Air Quality Monitoring Network Plan (2017 Network Plan). The plan provides National Ambient Air Quality Standards (NAAQS) Design Values for air dispersion modeling analyses; however, the values for 24-Hour PM_{10} and 1-Hour CO in the 2017 Network Plan represented the number of exceedances of the standard at each monitoring station rather than an NAAQS Design Value. As a result, the background concentrations for 24-Hour PM_{10} and 1-Hour CO have been revised and are based on the EPA Monitor Values Report (MVR) database.[1] The MVR database displays air pollution measurements recorded by monitoring sites throughout the United States and details yearly summaries of the measurements at individual monitors and descriptive information about the sites. Data was extracted from the MVR database to represent the respective NAAQS Design Values. Consequently, the concentrations represent an average of the three most recent years of monitoring data (2015 – 2017) and exclude exceptional events data. The 2nd max values were extracted for both 24-hour PM_{10} and 1-hour CO for comparison to the NAAQS.

Background concentrations for PM_{10} were selected from the Fergus County (Lewistown) monitoring station as originally listed in Table 6-4 of the initial application submittal. The MVR database provided background data to replace the initial incorrect "zero" value for the station. PM_{10} background concentration data are not available for the Lewis and Clark County (Sieben Flatts NCORE) station which is utilized in the original analysis for $PM_{2.5}$, SO_2, and CO background concentrations.

Background concentrations for CO were selected from the Lewis and Clark County (Sieben Flatts NCORE) monitoring station as originally listed in Table 6-4 of the initial application submittal. The MVR database provided background data to replace the initial incorrect "zero" value for the station. CO background concentration data are not available for the Fergus County (Lewistown) station which is utilized in the original analysis for PM_{10} and NO_2 background concentrations.

The revised background concentrations are detailed in Section 6.3.6 of the application and are summarized as follows:

Pollutant	Averaging Period	Revised Background Concentration ($\mu g/m^3$)	Monitoring Station
PM_{10}	24-hour	30.3	Lewistown (Fergus County)
CO	1-hour	0.9	Sieben Flatts NCORE (Lewis & Clark County)

The revision to the PM_{10} background concentration resulted in a revision to the modeling approach of the volume sources associated with the main access road. In the initial submittal, the significant 24-hour PM_{10} NAAQS impact occurred near the intersection of the main access road with the property boundary because of the proximity of the modeled sources to the ambient air boundary and receptors. Tintina continues to propose water and chemical dust suppression to control haul and access roads within the property boundary. A conservatively small control efficiency (50%) was originally used to calculate

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[1] EPA Monitor Values Report https://www.epa.gov/outdoor-air-quality-data/monitor-values-report

controlled emissions for all fugitive road dust emissions. However, other mine sources (such as Otter Creek Coal, preliminary determination of MAQP #5106-00) have been permitted in Montana utilizing a control efficiency of 80% to control fugitive road dust with either water or chemical dust suppressant. Tintina continues to propose the utilization of the conservatively lower 50% control for all of the haul roads and most of the access roads. Tintina proposes to apply 80% control to the initial 200-meters of the access road which comprises emissions partitioned to the volume sources ACC_0001 – ACC_0026. The Otter Creek permit provides precedent that the larger control efficiency provides suitable control of fugitive dust using water or chemical suppression under ARM 17.8.308 – Reasonable Precautions. Tintina proposes the smaller control efficiency in other areas of the facility to simulate a conservative overestimation of impacts and elects the larger control efficiency along the main access road near the boundary. The change in access road emissions is detailed in the "F30 Road Dust Fugitive Emissions" page of the Emissions Inventory included in Appendix C. A summary of the difference in emissions per volume source is included as follows:

Emission Source	**Model Sources**	**No. of Volume Sources**	**PM_{10} Per Volume Source**		**$PM_{2.5}$ Per Volume Source**	
			lb/hr	**tpy**	**lb/hr**	**tpy**
Main Access Road (50% Control)	ACC_0027 - ACC_0298	272	0.01996	0.087	0.002003	0.0088
Main Access Road (80% Control)	ACC_0001 - ACC_0026	26	0.007984	0.035	0.000801	0.0035

b. *Table 6-7 doesn't show the 24-hr particulate matter with an aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$) significant impact level (SIL) being exceeded as indicated, but the resulting 1-hr nitrogen dioxide (NO_2) concentration is above the SIL and is not presented in the text and analysis as being above the SIL. Once Table 6-7 is corrected, Table 6.8 will also need to be updated.*

Response: Section 6.4.3, Table 6-7, and Table 6-8 of the revised application have been corrected to convey the correct SIL and NAAQS modeling results for the Tintina "Emergency Operations" simulation. The modeling analysis did not show an exceedance of the $PM_{2.5}$ 24-hour SIL standard as originally reported in Table 6-7. Conversely, the 1-hour NO_2 SIL threshold was exceeded and consequently assessed for NAAQS compliance. Table 6-8 has been corrected to report the results of modeling emergency operations in comparison to the 1-hour NO_2 NAAQS.

c. *Please provide additional detail on the QA procedures and representativeness of the on-site met data used for the analysis as required by 40 Part 51 Code of Federal Regulations (CFR) Appendix W.*

Response: Quality Assurance (QA) procedures and a description of the representativeness of the on-site met data used for the analysis is included in Section 6.3.5 and Appendix E.4 of the application. Appendix E.4 provides an in-depth description of the instrumentation and procedures used to collect the on-site meteorological data. Bison used Prevention of Significant Deterioration (PSD)-compliant instrumentation and procedures in accordance with EPA and State of Montana guidance as also described in Appendix E.4. In addition, Tintina has provided quarterly reports for that meteorological station to the Department since the operation of the station commenced in April of 2012.

d. *AERMINUTE wasn't used for the National Weather Service data. Please provide an explanation for the combination of data used for the analysis.*

Response: A general explanation of the AERMINUTE preprocessor and data supplementation methods is described in Section 6.1.3 of the revised application. An explanation of the exclusion of AERMINUTE in processing of the Tintina meteorological dataset is included in Section 6.3.5. A summary of the additions to the revised application is as follows:

An optional form of meteorological data supplementation can be utilized by the preprocessor, AERMINUTE, to reduce the number of meteorological hours with "calm" conditions in an NWS surface dataset. If an hourly wind speed measurement is below a threshold value, AERMOD does not calculate projected concentrations for that hour. To address instances where hourly observational data include a significant number of calm hours, thereby reducing the completeness of the modeling results, EPA developed an AERMET preprocessor called AERMINUTE that accepts one-minute ASOS data and generates hourly averaged wind speeds and wind directions that can supplement the standard hourly ASOS observations.

AERMINUTE was not required in the processing of the Tintina meteorological dataset and it was not used in the modeling analysis. As previously stated, AERMINUTE supplements NWS surface data and the Tintina meteorological dataset utilizes five years of on-site collected surface data as the primary surface dataset. NWS surface data is used secondarily to supplement "missing" hours in the primary on-site dataset. The on-site surface data cannot utilize AERMINUTE supplementation because AERMINUTE requires ASOS minutely data from an associated ASOS monitoring site. Regardless, the on-site station is designed to measure wind speed and direction more accurately at low wind speeds than NWS stations. This resulted in only 1.6% of surface data hours to be classified as "calm" hours and 4.36% to be classified as "missing" hours. A total of 5.97%, or 2619 hours out of the 43,848 hours processed, is classified as "calm" or "missing" hours. Therefore, the Tintina meteorological dataset has less than 10% "calm" hours and is an appropriate, representative meteorological dataset without the utilization of AERMINUTE.

e. *For the F6, F8, F10, F13, and F16 calculations – Please explain why the emissions in lb/hr are reported by multiplying by 2 transfers (load plus dump) but the modeling input then divides by 2 transfers.*

Response: Emission rates calculated by multiplying the transfer emission factor by two transfers account for the total transfer emission rate for an "activity" at the mine. For example, F10 represents the activity of material being transferred from the Cemented Tailings Facility (CTF) to the South Reclaim Stockpile (SPILE). The Department is correct that this corresponds to both the loading and dumping transfers. So, the total transfer emissions (Truck Load + Truck Dump) in the emissions inventory multiply the "transfer" emission factor by "two transfers" in order to calculate the total emissions associated with transferring material from the CTF to the SPILE (load and dump). However, in the model the loading transfer and dumping transfer occur at different locations. Loading occurs at the CTF and dumping at the SPILE yet the total emission rate accounts for both transfers. So, the total transfer emission rates (load and dump) for the activity (F10) are divided by two transfers so the model input emissions account for each individual transfer and can be placed at the correct location within the model. The loading emission rate is then located at the CTF and the dumping rate is located at the SPILE.

It should be noted that this methodology also occurs for the F24 calculations.

F20 and F22 also calculate transfer emissions but they only account for one transfer each. F20 calculates the transfer of ore from a truck to the copper-enriched ore stockpile. F22 calculates the transfer of waste rock from a truck to the waste-rock stockpile. Ore and waste rock are transferred to the trucks underground within the mine.

f. The storage pile emission inventory (EI) all have disturbance per day numbers that are not used. All the piles have a disturbance area that is the same regardless of the disturbances per day. Please explain how the emissions from each pile are the same even if the number of disturbances per day are different?

Response: Revisions to emissions calculations are included in the revised application Section 3.1.11 and the emissions inventory in Appendix C. The deficiency items have been addressed individually as follows:

Deficiency: The storage pile emission inventory (EI) all have disturbance per day numbers that are not used.

This oversight has been corrected and the number of disturbances per day is now used to calculate an estimated emission rate for each storage pile. Please see the updated emissions inventory for calculations. The "disturbance per day" values are updated and correspond to the number of haul truck round trips per day to each pile.

Deficiency: All the piles have a disturbance area that is the same regardless of the disturbances per day.

An assumption was made regarding the size of each individual disturbance area: each "event" disturbs an area equal to 6 meters by 6 meters, which equals 36 square meters of disturbed area. This is an overestimated assumption that equates to the area disturbed by a haul truck dumping material, a front-end loader bucket scooping material, or other pile disturbance activities.

The emission estimate calculations have been corrected to account for the estimated area disturbed during days with above-threshold wind events for the "worst case year." (The "worst case year" was created by taking the highest estimated fastest mile of wind for each calendar day during 2013 and 2016, as described in the emissions inventory narrative.)

Using the Excess Pile South (fugitive emission source F11) as an example: based on truck trips to the pile, the maximum number of disturbance events per day is 12.7 (which occurs in year 0 to 1). The friction velocity exceeded the threshold friction velocity on three days during the "worst case year." These are the days that at least one wind event was strong enough to cause fugitive dust emissions from the piles. Conservatively, it was assumed that all disturbances during such a day would result in fugitive dust emissions. The total annual area of disturbance was estimated to be equal to the number of disturbance events per day times the number of days with emissions per year times the individual disturbance area: 12.7 disturbances/day * 3 days/year * 36 $m^2 \approx$ 1370 m^2 of disturbance per year. This area, which depends on the number of disturbances per day and the number of days per year during which the threshold friction velocity is exceeded, is then used to calculate the particulate matter emissions, P_{annual}, for that material storage pile.

Deficiency: Please explain how the emissions from each pile are the same even if the number of disturbances per day are different?

Those calculations were in error and have been corrected, as described above.

g. F23 uses 24 hr/day to calculate the wind erosion emissions. All other storage piles use 12 hr/day. Please provide an explanation of how storage pile hours may differ.

Response: During early efforts to calculate fugitive dust emissions from material storage piles, it was assumed that construction and reclamation materials would be moved and stockpiled primarily during daylight hours, so a 12-hour day was assumed. Mine waste rock and ore were assumed to be generated on a continuous basis, so a 24-hour day was assumed. Daily operating hours were to be the basis for estimating the number of disturbance events per day, with an initial disturbance rate set to one event per hour. However, the number of daily truck trips to each stockpile provides a more accurate estimate of daily disturbance events. The stockpile emission estimate worksheets were corrected by removing the estimates of daily operating hours and disturbance events per hour and using the number of daily truck trips to estimate emissions. Details of the spreadsheet corrections are given below:

Spreadsheet corrections:

For each material pile worksheet (F7, F11, F14, F17, F18, F21, F23):

1. Changed the calculation in Table 3, "Daily emissions, g/m^2 = P * # of daily disturbance events" from:

"Worst case daily erosion potential, P_Daily, from years 2013 and 2016, g/m^2/event" * 12 [or 24] hr/day * 1 disturbance[2]/hr

To:

"Worst case daily erosion potential, P_Daily, from years 2013 and 2016, g/m^2/event" * [max number of daily truck trips] disturbances/day.

2. Deleted the hr/day under Operations (was either 12 or 24 hours).

3. Deleted the material pile disturbances/hr under Operations (was set to 1).

4. Changed the calculation for "N," number of disturbances per year, to be based on the maximum number of truck trips per day times the number of days during the "worst case year" during which emissions were generated.

5. Corrected the disturbance area, "A," from the assumed area of a single disturbance to the assumed area of a single disturbance times the number of annual disturbances, "N."

6. Corrected the calculation for "P_annual" to reflect the change in calculation.

Revisions to the emission calculations are included in the revised application Section 3.1.11 and the emissions inventory in Appendix C. A summary of the revised emissions is listed in the following table:

Emission Inventory Worksheet	**Previous Operations Hr/day**	**Max # of truck trips per day**	**# of days/year friction velocity exceeds threshold**	**PM tpy**	**PM$_{10}$ tpy**	**PM$_{2.5}$ tpy**
F7 Temp Pile	12	27	3	0.36	0.18	0.03
F11 Excess Pile S	12	13	3	0.08	0.04	0.01
F14 Excess Pile N	12	18	3	0.17	0.08	0.01
F17 Topsoil Pile	12	12	3	0.08	0.04	0.01
F18 Subsoil Pile	12	29	3	0.44	0.22	0.03
F21 Cu-Rock Pile	24	4	1	6.35E-04	3.18E-04	4.76E-05
F23 WRS Pile	24	24	1	0.019	0.0096	0.0014

h. The emission rate for PJO F3 – Year 3, uses the emissions from Year 2 (cell G81), instead of year 3 (cell G82). This changes the emissions for a number of road segments that will impact the modeling results.

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[2] A disturbance = an event.

Response: Emission rates for haul truck traffic transporting material from the portal to the copper-enriched ore stockpile (Activity ID: PJO) were intended to be calculated using the total round-trip miles per day (VMT/day) for Year 3 rather than Year 2. Activity PJO requires more VMT/day in Year 3 than Year 2 which results in larger potential emissions and potentially larger modeled impacts. The emission rates for PJO have been corrected to be based on the VMT/day for Year 3.

This correction results in the following changes to emissions:

PJO Emissions per Volume Source

VMT/Day Input	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**
Previous (Year 2)	0.00102	0.0001
Updated (Year 3)	0.00569	0.00057
Difference (Increase)	0.00467	0.00047

Emissions calculations are updated for Year 3 VMT/day in the emission inventory (Appendix C).

Modeled road segments associated with Activity PJO include:

- Rd5: Portal to West End of Portal Pad;
- Rd19: North Mill Road: Cu-enriched stockpile connector to Portal Pad;
- Rd24: North Mill Road connector to Cu-enriched stockpile.

The emissions per volume source for each road segment have been updated in the revised application Appendix E.2 "Haul Road Appendix Items." The model inputs are corrected as follows:

PJO Associated Road Segment Emissions per Volume Source

VMT/Day Input	**Rd5**		**Rd19**		**Rd24**	
	PM_{10} (tpy)	**$PM_{2.5}$ (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**	**PM_{10} (tpy)**	**$PM_{2.5}$ (tpy)**
Previous (Year 2)	0.06514	0.00652	0.00102	0.00010	0.00714	0.00071
Updated (Year 3)	0.06981	0.006992	0.00569	0.00057	0.01180	0.001182
Difference (Increase)	0.00467	0.00047	0.00467	0.00047	0.00467	0.00047

i. The Department believes a clear explanation of the emission inventory versus how the emission inventory numbers were actually input into the model would be helpful

> *to further determine the appropriateness of modeling assumptions. Since the project is not being modeled by "phase", having a "cross-walk" to clearly call out the basis of the modeling inputs is needed.*

Response: The revised application Section 6.2.2 has been expanded to more clearly explain the methodology in partitioning or combining emission rates from the emissions inventory to the model source inputs. Modeled point sources are straightforward and correspond to singular emission calculations in the emissions inventory. However, fugitive emissions exist at various locations throughout the property and require the partitioning or combining of emissions into various model volume sources. The following supplemental documents will also aid in connecting the emissions inventory with the modeled inputs:

- Emissions Inventory – Appendix C
    - Model Emission Inputs sheet
        - Direct emission inputs for modeled sources
    - Emissions by Activity sheet
        - Emissions for individual activities – feeds the "Model Emission Inputs" sheet as these emissions are combined for model inputs
    - "Modeling Emissions" tables at bottom of source sheets
        - Individual source sheets F1 – F30, P1 – P18
        - Modeling Emissions tables at bottom of sheets feed the "Emissions by Activity" sheet
- Additional Model Source Documents – Appendix E
    - E.1 Non-Road Fugitive Source Key
        - Key indicates the emissions inventory sources associated with modeled volume sources
    - E.2 Haul Road Modeling Methodology
        - Methodology used in apportioning haul road emissions

Tintina appreciates the opportunity to respond to the Department's March 21, 2018, request for additional information. Please contact John Shanahan at (406) 547-3466 or me at (406) 442-5768 with any questions on this revised application.

Sincerely,
BISON ENGINEERING, INC.

Debbie Skibicki
Consulting Team Leader

Enclosure

MONTANA AIR QUALITY PERMIT APPLICATION

TINTINA MONTANA INC.
BLACK BUTTE
COPPER PROJECT

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April 2018 Revision

TABLE OF CONTENTS

LIST OF TABLES

APPENDICES

ACRONYMS AND ABBREVIATIONS

acfm	Actual cubic feet per minute
ARM	Administrative Rules of Montana
BACT	Best Available Control Technology
BBCP	Black Butte Copper Project
CAA	Clean Air Act
cfm	Cubic feet per minute
CFR	Code of Federal Regulations
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_{2e}	Carbon dioxide equivalent
CTF	Cemented Tailings Facility
dcfm	Dry cubic feet per minute
DEM	Digital elevation model
dscfm	Dry standard cubic feet per minute
EF	Emission factor
EPA	U.S. Environmental Protection Agency
F	Fahrenheit
FCAA	Federal Clean Air Act
fps	Feet per second
ft	Feet
GEP	Good engineering practice
gr	Grains
H_2O	Water
HAP	Hazardous air pollutant
HDPE	High-density polyethylene
hr/yr	Hours per year
K	Kelvin
km	Kilometer
lb/MMBtu	Pounds per million British thermal units
lbs	Pounds
lb/hr	Pounds per hour
LRT	Long range transport
m	Meter
MACT	Maximum Achievable Control Technology

MAAQS	Montana Ambient Air Quality Standards
MAQP	Montana Air Quality Permit
MCAA	Montana Clean Air Act
MCA	Montana Code Annotated
MDEQ	Montana Department of Environmental Quality
MMBtu/hr	Million British Thermal Units per hour
$\mu g/m^3$	Micrograms per cubic meter
MOY	Mine operating year
N	Nitrogen
NAAQS	National Ambient Air Quality Standards
NED	National Elevation Dataset
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOx	Nitrogen oxides
NO_2	Nitrogen dioxide
NSPS	New Source Performance Standards
NSR	New Source Review
NWS	National Weather Service
O_3	Ozone
OAQPS	Office of Air Quality Planning and Standards
PM	Particulate matter
PM_{10}	Particulate matter with an aerodynamic diameter of 10 micrometers or less
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of 2.5 micrometers or less
PSD	Prevention of Significant Deterioration
PTE	Potential to emit
PWP	Process Water Pond
RBLC	EPA RACT/BACT/LAER Clearinghouse
RICE	Reciprocating Internal Combustion Engine
S	Sulfur
SAG	Semi-autogenous Grinding
SDTS	Spatial Data Transfer Standard
SER	Significant Emissions Rate
SIL	Significant Impact Level
SO_2	Sulfur dioxide
TPH	Tons per hour
tpy	Tons per year
VMT	Vehicle miles traveled
VOC	Volatile organic compound
USGS	U.S. Geological Survey
WRS	Waste Rock Storage

1.0 INTRODUCTION

Tintina Montana Inc. (Tintina) a wholly owned subsidiary of Sandfire Resources America Inc., proposes to develop and operate a new underground copper mine and mill at its Black Butte Copper Project (BBCP) site located 15 miles north of White Sulphur Springs in Meagher County, Montana (Figure 1). Tintina is filing this application with the Montana Department of Environmental Quality (MDEQ) for a Montana Air Quality Permit (MAQP) to construct and operate the BBCP.

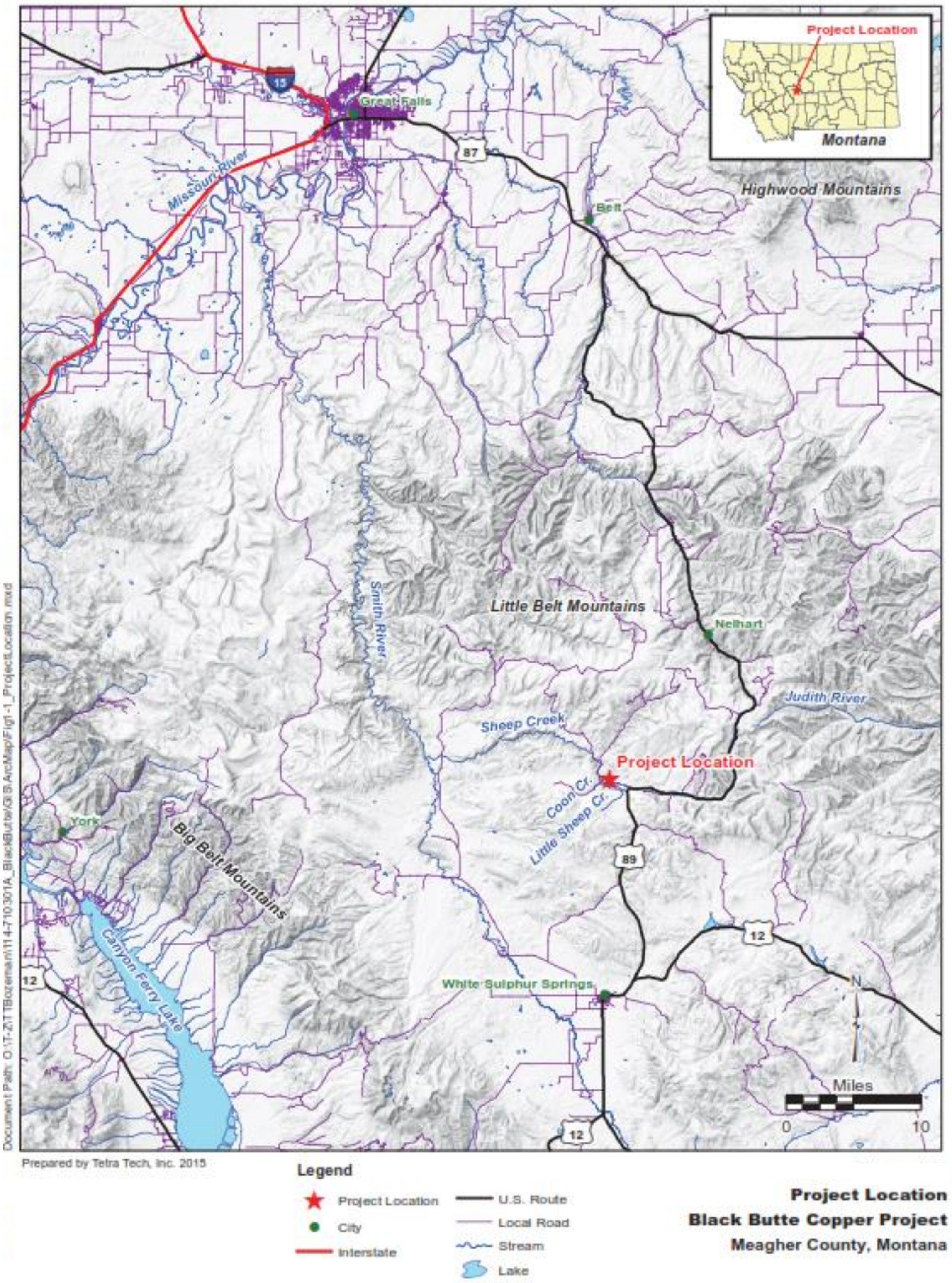
The BBCP proposes to produce and ship copper concentrate mined from both the upper and lower zones of the Johnny Lee copper deposit. All operations will occur within a Mine Permit boundary (the Mine Operating Permit Application is currently undergoing environmental review by MDEQ's Hard Rock Mining Bureau) encompassing 1,888 acres of privately owned ranch land under lease to Tintina. Total surface disturbance required for construction and operation of all mine-related facilities and access roads comprises 295.9 acres. The proposed operation will mine a total of approximately 15.3 million tons of combined copper-enriched rock and waste rock. This includes 14.5 million tons of copper-enriched rock 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 per year or 3,640 tons of copper-enriched rock per day, over a mine life of approximately 19 years (including two years of construction and pre-production mining, 13 years of active production mining, and four years of reclamation and closure). The mining company will directly employ approximately 240 workers, with an additional 24 contract miners working at the site during the first four years of mining. It will require a maximum of approximately 144 sub-contracted employees during the initial 30 to 36 months of support facility construction.

1.1 Background

Mineral exploration in the BBCP area began with limited small-scale underground development for copper mineralization in 1894 and has had some limited exploration presence in the area since that time. Tintina acquired the rights to mine the property in May of 2010 and has conducted surface exploration activities at the Project site since September 2010. Tintina has recently applied for a Mine Operating Permit, which is under consideration by the MDEQ Hard Rock Mining Bureau.

With respect to air quality permitting, Tintina currently holds MAQP #4978-00 for emissions sources associated with an exploration decline, which was never constructed. This application (for a new air quality permit) supersedes the previous permit and moves past the exploration stage to the development and operation of the BBCP in accordance with the requirements of the Montana Clean Air Act (MCAA), the Federal Clean Air Act (FCAA), and the rules adopted pursuant to these acts: Administrative Rules of Montana (ARM), Section 17.8.740, *et seq.* This application covers the emissions units, both point and fugitive, associated with the mine and mill development, production/ operation and closure stages.

Figure 1 – Project Location for the Black Butte Copper Project



Prepared by Tetra Tech, Inc. 2015

1.2 Current Action

The BBCP will be classified as a minor stationary source of air pollutant emissions for the purposes of the New Source Review - Prevention of Significant Deterioration (NSR-PSD) regulations. Tintina is submitting this application for a new minor source MAQP. This application is intended to satisfy the requirements of the Administrative Rules of Montana (ARM) 17.8, Subchapter 7 by providing the following information:

- A description of the proposed facility and planned operations (Section 2).
- An analysis of potential pollutant emission rates from fugitive and point sources (Section 3). Detailed emissions calculations are also provided in Appendix C.
- An analysis of state and federal air quality regulations that will potentially apply to the facility and its operations (Section 4).
- An evaluation and identification of best available control technologies (BACT) for applicable emissions sources and pollutants (Section 5).
- An analysis of potential impacts of the proposed facility and operations on local ambient air quality (Section 6).
- Completed MAQP application forms (Appendix A) including:
  - A certification of truth, accuracy, and completeness signed by a responsible official of the applicant company;
  - Proof of public notice as required by ARM 17.8.748(7).
- Facility site plan and mill diagram (Appendix B). See Section 2, Figure 2 for process flow diagram. For additional diagrams, see the Mine Operating Permit Application[1].
- An air quality permit application fee in the amount prescribed by ARM 17.8.504.

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[1] The Mine Operating Permit Application can be viewed at http://deq.mt.gov/Portals/112/Land/Hardrock/Documents/TintinaRevisionIII/BBC%20Mine%20Operating%20Permit%20Revision%203_07-14-17.pdf

2.0 PROJECT DESCRIPTION

2.1 Site Description

Tintina proposes to develop the BBCP approximately 15 miles north of White Sulphur Springs in Meagher County, Montana. A Mine Permit boundary will encompass all operations within 1,888 acres of privately owned ranch land under lease to Tintina. 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. The main area of the mine is located at UTM coordinates 506,725 meters East, 5,179,710 meters North (NAD 83, Zone 12).

The area is characterized by forested mountains and rolling hills of the Little Belt Mountains; grasslands and shrub lands; and creeks supplying the upper Sheep Creek drainage. Conifer Forest and Woodland habitat types are located within the surrounding area and include species of Douglas-fir, common juniper (less frequent), and Engelmann spruce (infrequent). Grassland and shrub land varies considerably among vegetation types in the area. Cropland is comprised of hay crops grown throughout the area and within the Sheep Creek floodplain.

The climatology of the immediate project area is boreal and is classified as a snowy climate with fully humid, warm summers. Adjacent rangeland is classified as a cold arid steppe.[2] Rainfall is approximately 13 inches per year for White Sulphur Springs, while 18.42 inches was the average precipitation measured at the onsite meteorological station from 2012-2016.

The air quality of this area is classified as either “better than national standards” or “unclassifiable/attainment” with respect to National Ambient Air Quality Standards (NAAQS) and Montana Ambient Air Quality Standards (MAAQS) for all criteria pollutants. There are no non-attainment areas near the site. The nearest Class I area, the Gates of the Mountains Wilderness Area, is approximately 38 miles northwest of the proposed mine boundary.

2.2 Process Description

The proposed Black Butte Copper Project 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 3,640 tons of CER per day. 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.

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[2] Per Koppen-Geiger climate map, available from http://koeppen-geiger.vu-wien.ac.at/

Tintina plans to mine copper-enriched rock from the upper and lower Johnny Lee mining zones. The mine permit boundary area is divided into three main property areas by the Sheep Creek Road and Butte Creek Road intersections (See Appendix B, Figure 1). 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. The Facilities Site Plan is included in Appendix B.

The mining process will use a drift and fill method where approximately 45% of the finely ground mill tailings will be mixed with cement and binder to form a paste and used to backfill production workings during the mining of successive drifts. This paste backfill method allows maximum extraction of copper-enriched rock without the need to leave pillars for structural support. The backfill also eliminates the risk of subsidence to surface and minimizes groundwater contact with mineralized rock both during operations and after closure. The use of paste backfilling and the drift and fill mining method minimizes the surface area of the underground mineral deposit exposed (to a few percent) to circulating air and moving groundwater at any given time during the mine life.

All mined rock will be brought to the surface through a single mine portal along a decline (tunnel) providing additional lower ramp access to the upper and lower Johnny Lee zones. The mined material will be crushed and sized in the enclosed Jaw Crusher building and travel in an enclosed conveyor for further processing (regrinding and flotation) in the milling building in order to liberate and concentrate copper for future smelting. All processing facilities (beyond temporary crushers and portable screens, which will use enclosures and water spray) utilize enclosed conveyors (or conveyors enclosed within buildings) and high efficiency dust collectors to minimize particulate emissions. The Process Flow Diagram of the mine is included in Appendix B. Referring to these diagrams will help contextualize the description of surface activities.

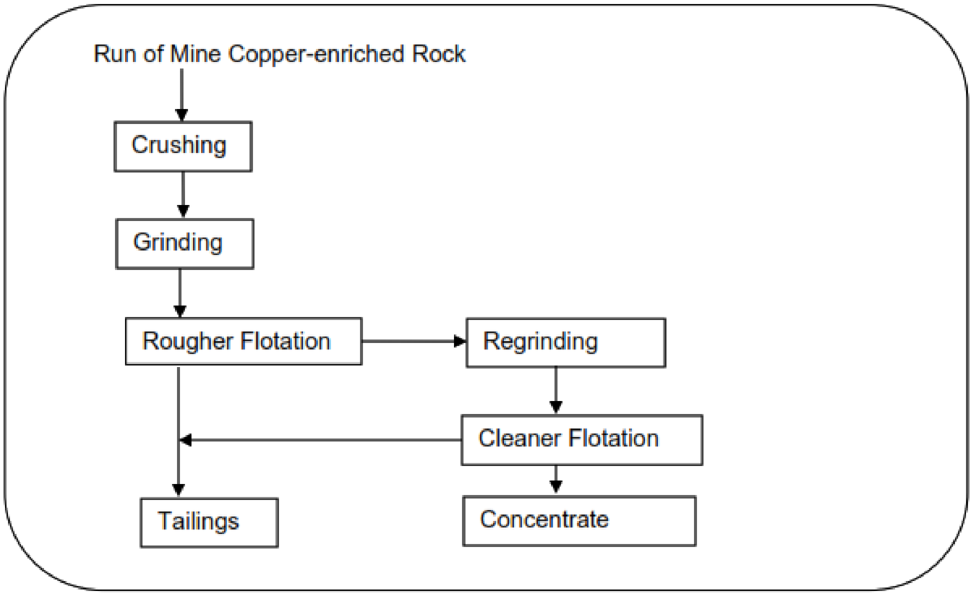
2.2.1 Milling and Flotation Processes

Resource material will be trucked from the underground mining operations to the portal pad and will be dumped directly onto stationary and vibrating grizzly screens. These screens either feed or bypass a jaw crusher. After screening or crushing, an enclosed conveyor will move the raw material to a surge bin on the mill pad in preparation for further size reduction in the grinding mills. A dust collector will control fugitive dust emissions from the enclosed crushing operation. Alternatively, rock can also be placed onto the 82,600-ton copper-enriched stockpile for later crushing and milling.

Crushed material will be conveyed (enclosed conveyor) from the surge bin to the grinding circuit within the mill building. The surge bin is controlled with a dust collector, as is the mill building (dust collection system). Further size reduction occurs in wet grinding mills as the crushing and grinding stages of the milling process liberate copper minerals to allow for their effective separation during the flotation process and the formation of copper concentrates. Effective liberation of copper minerals from the host rock requires grinding to the point where 80% of material measures smaller than 30 microns in diameter (<0.001 inches). The grinding plant will employ three stages of grinding, which crush and grind copper-enriched rock sequentially to complete the grinding process. The first stage of grinding is semi-autogenous grinding (SAG), followed by ball mill grinding, and finally stirred milling in a tower mill. Each of the mills will operate with a cyclone classification circuit to manage particle sizes of the ground material between mills, and ultimately to control the particle size sent to the flotation process.

A dust collection system will capture fugitive dust from various areas inside the mill building, but generally, the treatment system is a wet process and requires little dust collection. The mill building and mill area will contain areas for the following processes: grinding, flotation, regrinding, concentrate dewatering and handling, reagent handling, paste backfill (separate building to east of mill building), and tailings thickening (adjacent to the paste plant and mill building). Figure 2 provides a general process flow for the sizing and flotation processes at the BBCP.

Figure 2: Surface Processes Overview



After the grinding stage, a flotation process will liberate fine-grained copper minerals from the bulk of the mined rock to form copper concentrate. The water-based flotation processes rely upon the chemical interaction between fine-grained mineral particles and hydrocarbon-based reagents to separate specific minerals into concentrates. Copper minerals adhere to bubbles formed during agitation of the slurry of water and finely ground rock in a flotation cell. The bubbles then carry the copper minerals to the fluid surface and form a copper mineral-rich surface froth. Skimming the froth effectively separates the copper minerals from the slurry, and the skimmed froth routes to a thickening and filtering circuit to remove the water. The copper minerals concentrate in the froth formed on the fluid surface of the flotation cell. This separation forms the basis of the flotation process. This fine-grained high-grade concentrate is suitable for sale in the world market. The flotation milling facility is designed to process up to 3,640 tons of copper-enriched rock per day throughout two 12-hour shifts. It will operate 365 days per year.

The milling process will produce approximately 440 tons of copper-rich concentrate per day. That concentrate will travel via conveyor to the concentrate load-out building. The concentrate will contain approximately 10% moisture at this time and will produce negligible emissions from handling due to the moisture content. The concentrate will be sealed in enclosed containers for shipping. The concentrate containers will be shipped by truck to a regional railhead facility in Montana and from there either directly to a smelter or to a port where it will be loaded onto ships for transport to an overseas smelter. The use of shipping containers eliminates the need for surface stockpiles and multiple handling stages during transport which mitigates fugitive air pollution emissions.

The two emergency backup RICE gensets will be located near the mill building and be available in the event of a power outage during the production phase (emissions calculated at 500 hours per year). Other, portable smaller RICE will be used at various locations across the site during the construction and development phase (emissions calculated at 8760 hours per year).

2.2.2 Cemented Tailings Facility (CTF) and Process Water Pond (PWP)

All future waste rock will be placed into the CTF along with the mill tailings. However, a temporary waste rock storage (WRS) facility, lined with high-density polyethylene (HDPE) geomembrane, will be constructed between the portal and the mill. The WRS pad will receive all waste rock generated until construction of the cemented tailings facility (CTF) is completed. The temporary WRS pad will be completely reclaimed in year three.

No mined waste rock will be left exposed on the surface after closure of the CTF. The CTF will be dewatered (if any is present), sealed with a cover of HDPE geotextile, and reclaimed in closure. A separate stockpile on a smaller lined pad will be constructed off the northwest corner of the portal pad near the end of the construction period to contain a reserve of copper-enriched rock for mill feed should underground mining production be temporarily limited.

A process water pond (PWP), double lined with HDPE, with an underlying foundation drain and pond, will store water needed for milling. Water will be recycled between the process water pond and the mill during operations. A paste plant in the mill complex will mix fine-grained tailings from the milling process with a binder (the binder is a combination of cement and fly ash) for deposition both underground and in the cemented tailings facility. The plant will mix approximately 45% of the tailings with approximately 4% cement and other binders to be used as paste backfill in the underground mine workings.

The other 55% of the tailings will be mixed with 0.5 to 2% cement and other binders, which will be pumped to the cemented tailings facility where it will set up to form a non-flowable mass. The use of cemented tailings inhibits dust formation and provides added strength. The small amount of free water that collects in the CTF sump from cemented tailings seepage will be pumped to the PWP for reuse in the mill. Water not needed in the mill during mining operations will be pumped directly from the PWP to the reverse osmosis (RO) water treatment facility for treatment and then released to the underground infiltration galleries.

2.2.3 Material Stockpiles

Five main material stockpiles will be used for reclamation material (excavated bedrock, two stockpiles), topsoil, subsoil, and temporary construction material. Stockpiles will be wind-fenced and/or treated with water or chemical dust suppressants as necessary to maintain compliance with reasonable precautions requirements. Soil and subsoil stockpiles will be revegetated in place prior to their use in mine closure.

2.2.4 Underground Emissions

Four 16-feet diameter raises will be constructed from the mining zones to the surface to provide ventilation. These airways clear fumes from blasting and diesel equipment while also providing fresh air to the underground work areas. Both the upper and lower Johnny Lee zones will each utilize two ventilation raises, with one providing fresh air to the respective zone and the other providing a channel for exhaust from the mining area. Thus, the entire project will utilize two intake ventilation raises and two exhaust raises. The two exhaust raises, in addition to the portal, constitute sources of air pollution from underground activities and are accounted for in the model.

The underground vent raises include the two types of emissions listed above as well as emissions from the direct-fired propane-fueled heaters. The vent heaters provide seasonal heat to the intake vents and, as such, are limited in usage from October to April (212 days or 5088 hours of operation). The vent heaters and blasting emissions (ANFO) are included in both potential emissions estimates for permitting and regulatory applicability as well as their contributions to the modeled vent emissions. Underground mobile source diesel equipment is exempt from permitting but is included in the ambient air quality impacts analysis only as those emissions exit through the vents.

2.3 Emissions Units Description

The following table provides a general list of emissions units and what phase they may be operating in (and, in some cases, what hours for each phase). All of these units are being permitted regardless of the phase to allow flexibility during the transition between development and production phases. Underground mobile sources, while included in the ambient air quality demonstration, are not subject to permitting and are not included in the table. In addition, contracted equipment may be on site (including a temporary construction crusher and a temporary concrete batch plant, as seen in Appendix B – Figure 2), but any associated permitting be the responsibility of that particular contractor.

In general, the mine development phase will take place between mine operating years (MOY) zero and 2 or 2.5, with the production phase starting in MOY 2 or 2.5 through approximately MOY 15. Reclamation phase will follow in MOY 16-18. For simplicity, the reclamation phase activities are included in the production phase activity for the table below.

Table 2-1: BBCP Proposed Emitting Sources and Anticipated Use

EMITTING UNIT		Development Phase (hr/yr)	Production Phase (hr/yr)
ID	**Name**		
P1	250 TPH Portable Conical Crusher	8760	N/A
P2	325-hp Portable Diesel Eng/Gen	8760	N/A
P3	2 – Portable Screens (400 TPH each)	8760	N/A
P4	131-hp Portable Diesel Eng/Gen	8760	N/A
P5	545-kW/914-hp Portable Diesel Eng/Gen	8760	500
P6	320-kW/536-hp Portable Diesel Eng/Gen	8760	500
P7	2- 1000-kW/1675-hp Diesel Eng/Gen - Emergency backup	N/A	500
P8	100-hp Diesel Eng/Gen – Emergency evac hoists	N/A	500
P9	50-hp Diesel Fire Pump – Emergency	500	500
P10A	23 MMBtu/hr Propane-fired Heater – Intake Vent for Upper Copper Zone	N/A	5088
P10B	52 MMBtu/hr Propane-fired Heater – Intake Vent for Lower Copper Zone	N/A	5088
P11	3 Temporary diesel heaters at Portal - (1.2 MMBtu/hr total)	8760	N/A
P12	3640 TPD Jaw Crusher	N/A	8760
P13A	Mill Building (mill, lime storage, etc.)	N/A	8760
P13B	Mill Building (lime area/slurry mix tank)	N/A	8760
P14	Surge Bin Discharge	N/A	8760
P15	Water Treatment Plant Lime Area	N/A	8760
P16A	Backfill Plant Cement/Fly Ash Hopper	8760	8760
P16B	Backfill Plant Cement/Fly Ash Silo	8760	8760
P17	4- Portable Diesel Eng/Gen (400-hp total)	8760	8760

P18	Air Compressor - 275-hp Diesel Engine	8760	N/A
UG	ANFO	8760	8760
F1	Road Dust, Mine Operating Year (MOY) 0 to 1	8760	N/A
F2	Road Dust, MOY 1 to 2	8760	N/A
F3	Road Dust, MOY 2 to 15, Annual Average	N/A	8760
F4	Road Dust, MOY 16 and 17, Annual Average	N/A	8760
F5	Road Dust, MOY 18	N/A	8760
F6	Material Transfer to Temporary Stockpile, MOY 0 to 1.5	8760	N/A
F7	Temporary Construction Stockpile	8760	N/A
F8	Embankment Construction, MOY 0 to 1.5	8760	N/A
F9	Backfill, Non-contact Water Reservoir (NCWR) Embankment Material to Cemented Tailings Facility (CTF), MOY 16 to 18	N/A	8760
F10	Material Transfer to South Stockpile, MOY 0 to 1	8760	N/A
F11	Excess Reclamation Stockpile (South)	8760	8760
F12	Material Transfer from South Stockpile, MOY 16 to 17	N/A	8760
F13	Material Transfer to North Stockpile, MOY 0 to 1	8760	N/A
F14	Excess Reclamation Stockpile (North)	8760	8760
F15	Material Transfer from North Stockpile, MOY 16 to 18	N/A	8760
F16	Soil Removal and Stockpiling, MOY 0 to 1	8760	N/A
F17	Topsoil Pile	8760	8760
F18	Subsoil Pile	8760	8760
F19	Soil Return, MOY 16 to 18	N/A	8760
F20	Copper-enriched Rock Drop to Stockpile, MOY 2 to 3	8760	N/A
F21	Copper-enriched Rock Stockpile (Mill Feed)	N/A	8760

F22	Waste Rock Drop at Waste Rock Storage (WRS) Pad, MOY 0 to 1.5, at CTF, MOY 1.5 to 4 and 8	8760	8760
F23	Temporary WRS	8760	N/A
F24	Waste Rock Transfer from WRS to CTF, MOY 2 to 3	8760	N/A
F25	Waste Rock Storage Pad Reclamation, MOY 3	N/A	8760
F26	11 - 14-hp Portable Diesel-powered Light Plants (only 4 units will be used in Production Phase)	8760	8760
F27	500-gal Gasoline Storage Tank (double-walled)	8760	8760
F28	9 -Temporary Portable Propane-fired Heaters (37.8 MMBtu/hr total) (only 3 will be used in Production Phase)	8760	8760
F29	Road Dust, Construction Access Road, Year 0-2 Avg.	8760	N/A
F30	Road Dust, Main Access Road, Year 2-15 Avg.	8760	8760
IEU1	Diesel Storage Tanks (250-gal, 500-gal, 10,000-gal)	8760	8760

3.0 EMISSION INVENTORY

3.1 Criteria Pollutant Emission Inventory

The criteria air pollutants to be emitted from the BBCP mine include:

- Nitrogen oxides (NOx),
- Particulate matter with an aerodynamic diameter less than 10 microns (PM_{10}),
- Particulate matter with an aerodynamic diameter less than 2.5 microns ($PM_{2.5}$),
- Sulfur dioxide (SO_2),
- Volatile organic compounds (VOCs),
- Carbon monoxide (CO), and
- Greenhouse gases expressed as carbon dioxide equivalent (CO_2e).

Tintina has also included emission calculations for particulate matter (PM). Detailed air pollutant emissions calculations, including descriptions of related design parameters and assumptions, are presented in Appendix C. This section of the report provides a narrative overview and sample emissions calculations.

The general equation for emissions estimation is:

$$E = A \times EF \times (1-ER/100)$$

where:
E = emissions;
A = activity rate;
EF = emission factor; and
ER =overall emission reduction efficiency, %.

Each emission source is categorized as either a fugitive source or point source of emissions. In the ARM, fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening. All other sources are considered point sources of emissions. Because Tintina is not a listed source pursuant to ARM 17.8.801(22)(c) or ARM 17.8.1201(23)(b), fugitive emissions are not included in determining applicability with those programs. Table 3-1 lists the facility's air emissions point sources. Table 3-2 lists the facility's air emissions fugitive sources. Note: Emissions are expressed to the nearest one-hundredth (or one-thousandth, in limited cases) for presentation and calculation purposes. Multiple digit accuracy should not be assumed.

The emission factors used in this analysis were primarily obtained from three sources: 1) the EPA document, *Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources* (AP-42), Fifth Edition; 2) manufacturer's specifications for control equipment, and 3) regulatory requirements for emissions (for EPA Tier 3 stationary engines, for example). The full calculations are available in Appendix C. An example calculation is provided below for each general emission unit type.

Table 3-1: Summary of BBCP Proposed Emitting Sources – Point Sources (Controlled)

Point #	Emitting Unit	PM tons per year	PM_{10} tons per year	$PM_{2.5}$ tons per year	SO2 tons per year	NOx tons per year	CO tons per year	VOC tons per year
	POINT SOURCES							
P1	250 TPH Portable Conical Crusher	1.31	0.59	0.11	--	--	--	--
P2	325-hp Portable Diesel Engine/generator	0.47	0.47	0.47	0.17	9.36	8.19	3.52
P3	2 Portable Screens (400 TPH each)	7.71	2.59	0.18	--	--	--	--
P4	131-hp Portable Diesel Engine/generator	0.28	0.28	0.28	0.07	3.77	4.72	1.42
P5	545-kW /914-hp Diesel Engine/generator	1.32	1.32	1.32	0.49	42.10	23.02	9.88
P6	320-kW /536-hp Diesel Engine/generator	0.77	0.77	0.77	0.03	15.45	13.52	5.80
P7	1000-kW /1675-hp Diesel Engine/generators (2) - Emergency	0.28	0.28	0.28	0.10	8.81	4.82	2.07
P8	100-hp Diesel Engine/generator - Emergency evac hoists	0.02	0.02	0.02	0.00	0.19	0.21	0.06
P9	50-hp Diesel Fire Pump - Emergency	0.01	0.01	0.01	0.00	0.10	0.10	0.03
P10A	23 MMBtu/hr Propane-fired heater @ Intake Vent for Upper Copper Zone	0.45	0.45	0.45	0.03	8.33	4.80	0.64
P10B	52 MMBtu/hr Propane-fired heater @ Intake Vent for Lower Copper Zone	1.01	1.01	1.01	0.08	18.83	10.86	1.45
P11	3 Temporary diesel heaters at Portal - (1.2 MMBtu/hr total)	0.05	0.05	0.05	0.08	0.75	0.19	0.02
P12	Jaw Crusher (3640 TPD), Building/Dust Collector	3.19	3.19	3.19	--	--	--	--
P13A	Mill Building (mill, lime storage, etc.) Dust Collector	0.19	0.19	0.19	--	--	--	--
P13B	Mill Building (lime area/slurry mix tank) Dust Collector	1.24	1.24	1.24	--	--	--	--
P14	Surge Bin Discharge Dust Collector	1.88	1.88	1.88	--	--	--	--
P15	Water Trtmt Plant Lime Area Dust Collector	1.24	1.24	1.24	--	--	--	--
P16A	Backfill Plant Cement/Fly Ash Hopper Dust Filter/Collector	0.23	0.23	0.23	--	--	--	--
P16B	Backfill Plant Cement/Fly Ash Silo Dust Filter/Collector	0.45	0.45	0.45	--	--	--	--
P17	Portable diesel engine/generators (total of 400 hp, 4 units)	1.15	1.15	1.15	0.21	13.54	14.40	4.33
P18	Air Compressor - Diesel Engine (275 hp)	0.40	0.40	0.40	0.15	7.92	6.93	2.98
F26	Diesel-powered Light plants - 11 - 14 hp each	1.48	1.48	1.48	0.008	20.91	4.51	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	1.27	1.27	0.10	23.57	13.60	1.81
UG	ANFO	0.11	0.06	0.00	1.55	13.19	51.97	--
	TOTAL POINT SOURCES	**26.49**	**20.60**	**17.65**	**3.07**	**186.82**	**161.83**	**35.74**

Table 3-2: Summary of BBCP Proposed Emitting Sources – Fugitive Sources (Controlled)

		Controlled PTE		
		PM tons per year	PM_{10} tons per year	$PM_{2.5}$ tons per year
	FUGITIVE SOURCES (not included in Title V applicability)			
F1	Road Dust, Mine Operating Year 0 to 1	152.70	38.92	3.90
F2	Road Dust, Mine Operating Year 1 to 2	56.42	14.38	1.44
F3	Road Dust, Mine Operating Year 2 to 15, annual average	17.79	4.53	0.45
F4	Road Dust, Mine Operating Years 16 and 17, annual average	73.80	18.81	1.88
F5	Road Dust, Mine Operating Year 18	11.68	2.98	0.30
F6	Material transfer to Temporary Stockpile, MOY 0 to 1.5	3.13	0.91	0.30
F7	Temporary construction stockpile (Table 3-13, 3.4.1)	0.36	0.18	0.03
F8	Embankment Construction, Mine Operating Year 0 to 1.5	3.13	0.91	0.30
F9	Backfill, NWCR Embankment Material to CTF, MOY 16 to 18	1.78	0.52	0.17
F10	Material transfer to South Stockpile, MOY 0 to 1	1.49	0.43	0.14
F11	Excess reclamation stockpile (South) (Table 3-13, 3.4.1)	0.08	0.04	0.01
F12	Material transfer from South Stockpile, MOY 16 to 17	1.49	0.43	0.14
F13	Material transfer to North Stockpile, MOY 0 to 1	2.13	0.62	0.20
F14	Excess reclamation stockpile (North) (Table 3-13, 3.4.1)	0.17	0.08	0.01
F15	Material transfer from North Stockpile, MOY 16 to 18	0.82	0.24	0.08
F16	Soil Removal and Stockpiling, Mine Operating Year 0 to 1	4.99	1.45	0.47
F17	Topsoil pile (Table 3-13, 3.4.1, 3.6.10)	0.08	0.04	0.01
F18	Subsoil pile (Table 3-13, 3.4.1, 3.6.10)	0.44	0.22	0.03
F19	Soil Return, Mine Operating Year 16 to 18	4.17	1.21	0.39
F20	Copper-enriched rock drop to stockpile, MOY 2 to 3	0.16	0.06	0.06
F21	Copper-enriched rock stockpile (mill feed) (Tables 3-5 & 3-13, 3.4.1)	0.00	0.00	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	0.35	0.35
F23	Temporary waste rock storage (WRS) (Table 3-5, 3-13, 3.4.1)	0.019	0.010	0.001
F24	Waste Rock Transfer from WRS to CTF, MOY 2 to 3	1.39	0.56	0.56
F25	Waste Rock Storage Pad Reclamation, MOY 3	1.65	0.48	0.16
F29	Road Dust, Construction Access Road, Year 0 - 2 Avg.	0.90	0.23	0.02
F30	Road Dust, Main Access Road, Year 2 - 15 Avg.	102.19	26.05	2.61
	TOTAL (all rows)*	**340.77**	**88.38**	**11.38**
	*This total contains emissions that occur during different time periods			

3.1.1 Emission Point P1 - 250 tons per hour (TPH) Portable Conical Crusher

This category includes emissions produced by the conical crusher at a maximum capacity of 250 TPH. Piling factors are included in the fugitive section.

Emission Factors:

The source for each emission factor is summarized below.

Emission Factors for Crushing (controlled)		
PM	0.0012 lb/ton	AP-42 11.19.2-2 (08/04) Crushed Stone Processing and Pulverized Mineral Processing
PM_{10}	0.00054 lb/ton	AP-42 11.19.2-2 (08/04) Crushed Stone Processing and Pulverized Mineral Processing
$PM_{2.5}$	0.0001 lb/ton	AP-42 11.19.2-2 (08/04) Crushed Stone Processing and Pulverized Mineral Processing

Control Method

Emissions will be controlled by the use of reasonable precautions (water spray, etc.) to minimize emissions. Per MDEQ standard practice, the controlled factors were used to take reasonable precaution requirements into account.

Example Emission Calculation

PM Emissions
(0.0012 lb /ton) x (250 ton/hr)x (8,760 hr/yr)/(2,000 lb/ton) x = 1.31 ton

PM_{10} Emissions:
(0.00054 lb /ton) x (250 ton/hr)x (8,760 hr/yr)/(2,000 lb/ton) x = 0.59 ton

$PM_{2.5}$ Emissions:
(0.0001 lb /ton) x (250 ton/hr)x (8,760 hr/yr)/(2,000 lb/ton) x = 0.11 ton

3.1.2 Emission Point P2 – 325-Horsepower (hp) Portable Diesel Engine/Generator

This section summarizes emissions calculation methodology used for all of the diesel engines associated with generators used in this application. Emission Point P2 is used as an example. All engines will comply with their respective EPA NSPS requirements at the time of purchase/operation. In order to provide worst-case emissions, EPA Tier 3 factors are used. The calculations are also representative of Points P4, P5, P6, P7, P8, P9, P17, P18, and F26 with emission factors varying based on engine size (per 40 CFR 89.112, Table 1). For complete calculations, please see Appendix C.

Emission Factors:

The source for each emission factor is summarized below.

Emission Factors for Diesel Engines		
PM/ $PM_{10/}$ $PM_{2.5}$	3.29E-4 lb/hp-hr	Tier 3 engine - 40 CFR 89.112, Table 1; all PM assumed to be <1 um
SO_2	1.21E-4 lb/hp-hr	AP-42 Section 3.4, Table 3.4-1 (10/96) Large Stationary Diesel and All Stationary Dual-Fuel Engines*
NOx	6.58E-3 lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1
CO	5.75E-3 lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1
VOC	2.47E-3 lb/hp-hr	AP-42 Section 3.3, Table 3.3-1 (10/96) Gasoline and Diesel Industrial Engines

*Emission factor based on the use of EPA-required ultra-low sulfur diesel, sulfur content of 15 parts per million

Control Method

Emissions will be controlled by the use of good combustion and maintenance practices in accordance with the NSPS.

Example Emission Calculation

$PM/PM_{10}/PM_{2.5}$ Emissions
(3.29E-4 lb/hp-hr) x (325 hp) x (8,760 hr/yr)/(2,000 lb/ton) x = 0.47 ton

SO_2 Emissions
(1.21E-4 lb/hp-hr) x (325 hp) x (8,760 hr/yr)/(2,000 lb/ton) x = 0.17 ton

NOx Emissions
(6.58 E-3 lb/hp-hr) x (325 hp) x (8,760 hr/yr)/(2,000 lb/ton) x = 9.36 ton

CO Emissions
(5.73E-3 lb/hp-hr) x (325 hp) x (8,760 hr/yr)/(2,000 lb/ton) x = 8.19 ton

VOC Emissions
(2.47E-3 lb/hp-hr) x (325 hp) x (8,760 hr/yr)/(2,000 lb/ton) x = 3.52 ton

3.1.3 Emission Point P3 – Two 400 TPH Portable Screens

This category includes emissions produced by the two portable screens at a maximum capacity of 400 TPH each. Piling factors are included in the fugitive section.

Emission Factors:

The source for each emission factor is summarized below.

Emission Factors for Screening (controlled)		
PM	0.0022 lb/ton	AP-42 11.19.2-2 (08/04) Crushed Stone Processing and Pulverized Mineral Processing
PM_{10}	0.00074 lb/ton	AP-42 11.19.2-2 (08/04) Crushed Stone Processing and Pulverized Mineral Processing
$PM_{2.5}$	0.00005 lb/ton	AP-42 11.19.2-2 (08/04) Crushed Stone Processing and Pulverized Mineral Processing

Control Method

Emissions will be controlled by the use of reasonable precautions (water spray, etc.) to minimize emissions. Per MDEQ standard practice, the controlled factors were used to take reasonable precaution requirements into account.

Example Emission Calculation

PM Emissions
(0.0022 lb /ton) x (2) x (400 ton/hr) x (8,760 hr/yr)/(2,000 lb/ton) x = 7.71 ton

PM_{10} Emissions:
(0.00074 lb /ton) x (2) x (400 ton/hr) x (8,760 hr/yr)/(2,000 lb/ton) x = 2.59 ton

$PM_{2.5}$ Emissions:
(0.00005 lb /ton) x (2) x (400 ton/hr) x (8,760 hr/yr)/(2,000 lb/ton) x = 0.18 ton

3.1.4 Emission Point P10A – 23 million British thermal units per hour (MMBtu/hr) Direct-fired Propane-fueled Heater

This category includes emissions produced from stationary direct-fired propane-fueled heaters. The stationary propane-fueled heaters contribute to underground emissions from the portal and vents (the two direct-fired propane heaters, P10A and P10B are calculated at 5088 hours per year to reflect their seasonal operation). The emissions calculations are also representative of Points P10B and F28. For complete calculations, please see Appendix C.

Emission Factors:

The source for each emission factor is summarized below.

Emission Factors for Propane-fired Heaters		
PM/ PM_{10}/ $PM_{2.5}$	0.7 lb/10^3 gal	AP-42, Table 1.5-1 (07/08) Liquified Petroleum Gas Combustion
SO_2	0.054 lb/10^3 gal	AP-42, Table 1.5-1 (07/08) Liquified Petroleum Gas Combustion
NOx	13 lb/10^3 gal	AP-42, Table 1.5-1 (07/08) Liquified Petroleum Gas Combustion
CO	7.5 lb/10^3 gal	AP-42, Table 1.5-1 (07/08) Liquified Petroleum Gas Combustion
VOC	1 lb/10^3 gal	AP-42, Table 1.5-1 (07/08) Liquified Petroleum Gas Combustion

Control Method

Emissions will be controlled by the use of clean fuel (propane) and good combustion practices.

Example Emission Calculation

PM/PM_{10}/ $PM_{2.5}$ Emissions
(0.7 lb /10^3 gal) x (1281.33 10^3 gal/yr)/(2,000 lb/ton) x = 0.45 ton

SO_2 Emissions:
(0.054 lb /10^3 gal) x (1281.33 10^3 gal/yr)/(2,000 lb/ton) x = 0.03 ton

NOx Emissions:
(13 lb /10^3 gal) x (1281.33 10^3 gal/yr)/(2,000 lb/ton) x = 8.33 ton

CO Emissions:
(7.5 lb /10^3 gal) x (1281.33 10^3 gal/yr)/(2,000 lb/ton) x = 4.80 ton

VOC Emissions:
(1 lb /10^3 gal) x (1281.33 10^3 gal/yr)/(2,000 lb/ton) x = 0.64 ton

3.1.5 Emission Point P11 – 1.2 MMBtu/hr total Diesel-fired Heaters (three heaters 1.2 MMBtu/hr total - TEMPORARY)

This category includes emissions produced from portable diesel-fired heaters. For complete calculations, please see Appendix C.

Emission Factors:

The source for each emission factor is summarized below.

Emission Factors for Diesel-fired Heaters		
PM/ $PM_{10/}$ $PM_{2.5}$	1.3 lb/10^3 gal	AP-42, Table 1.5-1 (07/08) Liquified Petroleum Gas Combustion
SO_2	2.13 lb/10^3 gal	AP-42, Table 1.5-1 (07/08) Liquified Petroleum Gas Combustion
NOx	20 lb/10^3 gal	AP-42, Table 1.5-1 (07/08) Liquified Petroleum Gas Combustion
CO	5 lb/10^3 gal	AP-42, Table 1.5-1 (07/08) Liquified Petroleum Gas Combustion
VOC	0.556 lb/10^3 gal	AP-42, Table 1.5-1 (07/08) Liquified Petroleum Gas Combustion

Control Method

Emissions will be controlled by the use of clean fuel (diesel) and good combustion practices.

Example Emission Calculation

PM/PM_{10}/ $PM_{2.5}$ Emissions
(1.3 lb /10^3 gal) x (75.30 10^3 gal/yr)/(2,000 lb/ton) x = 0.05 ton

SO_2 Emissions:
(2.13 lb /10^3 gal) x (75.30 10^3 gal/yr)/(2,000 lb/ton) x = 0.08 ton

NOx Emissions:
(20 lb /10^3 gal) x (75.30 10^3 gal/yr)/(2,000 lb/ton) x = 0.75 ton

CO Emissions:
(5 lb /10^3 gal) x (75.30 10^3 gal/yr)/(2,000 lb/ton) x = 0.19 ton

VOC Emissions:
(0.556 lb /10^3 gal) x (75.30 10^3 gal/yr)/(2,000 lb/ton) x = 0.02 ton

3.1.6 Emission Point P12 – Jaw Crusher Building/Dust Collector

This category includes emissions enclosed and vented through dust collector/fabric filter baghouses. The calculations are also representative of Points P13A, P13B, P14, P15, P16A, and P16B. The dust collector/fabric filter baghouse flow rate varies based on the specific installation. These emissions represent filterable-only particulate emissions. For complete calculations, please see Appendix C.

Emission Factors:

The source for each emission factor is summarized below.

Emission Factors for Jaw Crusher Building/Dust Collector		
PM/ $PM_{10/}$ $PM_{2.5}$	0.01 gr/dscf	BACT Determination

Control Method

Emissions will be controlled by the use of the dust collector/fabric filter baghouse.

Example Emission Calculation

PM/PM_{10}/ $PM_{2.5}$ Emissions
(0.01 gr /dscf) x (8500 scfm)/(7000 gr/lb) x (60 min/hr) x (8,760 hr/yr) /(2,000 lb/ton) = 3.19 ton

3.1.7 Emission Point UG Explosives - ANFO

This category includes emissions produced by explosives used for the mining operation. At full production, Tintina plans to use 8.5 blasts per day, worst case, with 0.5 tons of ANFO per blast and a horizontal blast area of 289 ft^2.

Emission Factors:

The source for each emission factor is summarized below.

Emission Factors for Explosives		
PM	0.069 lb/blast	AP-42 11.9-1 Western Surface Coal Mining
PM_{10}	0.036 lb/blast	AP-42 11.9-1 (PM_{10}/PM scaling factor = 0.52)
$PM_{2.5}$	0.002 lb/blast	AP-42 11.9-1 ($PM_{2.5}$/PM scaling factor = 0.03)
NO_2	17 lb/ton ANFO	AP-42 13.3 Explosives Detonation, Table 13.3-1 (2/1980) for ANFO (ammonium nitrate with 5.8-8% fuel oil)
CO	67 lb/ton ANFO	AP-42 13.3 Explosives Detonation, Table 13.3-1 (2/1980) for ANFO (ammonium nitrate with 5.8-8% fuel oil)
SO_2	2 lb/ton ANFO	AP-42 13.3 Explosives Detonation, Table 13.3-1 (2/1980) for ANFO (ammonium nitrate with 5.8-8% fuel oil)

Control Method

Explosive use is a fugitive source of emissions. Emission controls will be the use of best operating practices to minimize emissions. To be conservative, no emissions control was assumed for emissions calculation.

Example Emission Calculation

PM Emissions
(0.069 lb/blast) x (8.5 blasts/day) x (365 days/yr)/(2,000 lb/ton) = 0.11 ton

PM_{10} Emissions
(0.036 lb/blast) x (8.5 blasts/day) x (365 days/yr)/(2,000 lb/ton) = 0.06 ton

$PM_{2.5}$ Emissions
(0.002 lb/blast) x (8.5 blasts/day) x (365 days/yr)/(2,000 lb/ton) = 0.00 ton

SO_2 Emissions
(2 lb /ton) x (8.5 blasts/day) x (0.5 ton ANFO/blast) x (365 days) /(2,000 lb/ton)
= 1.55 ton

NO_x Emissions
(17 lb /ton) x (8.5 blasts/day) x (0.5 ton ANFO/blast) x (365 days) /(2,000 lb/ton)
= 13.19 ton

CO Emissions
(67 lb /ton) x (8.5 blasts/day) x (0.5 ton ANFO/blast) x (365 days) /(2,000 lb/ton)
= 51.97 ton

3.1.8 Emission Point UG Mobile Sources (non-regulatory)

The emissions for mobile sources in underground use are calculated only for the purpose of quantifying emissions exiting from the portal and two exhaust vents, which are relevant for the ambient air quality demonstration. These emissions do not appear in the emissions summary tables in Section 3 because of their non-regulatory nature, but are detailed in Appendix C. While these emissions are not subject to permitting, they are included because they contribute to emissions exiting the mine vents and portal. Accordingly, the underground mobile source emissions, are calculated pursuant to EPA mobile source modeling guidelines. Fugitive emissions from the movement of mobile sources in the underground mine will be negligible due to the high moisture content of traveled surfaces underground, low wind speeds underground, and containment in the mine.

All mobile source emissions were calculated based on engine category data, manufacturer's Tier 3 certifications, MOBILE6 (an EPA mobile source emissions estimation tool), and engineering estimates where appropriate. Sulfur content in diesel fuel was based on the EPA requirements for 15 ppm (which became effective in 2007). Emissions were based on the estimated daily operating schedule of each piece of equipment. An average engine load factor representative of each piece of equipment was taken from background documentation from EPA's NONROAD2008a emissions inventory model (https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P10081RV.pdf). The NONROAD model was developed by EPA to calculate air emissions from nonroad sources including mobile construction equipment. Specifically, the file ACTIVITY.DAT, from which the NONROAD model pulls average load factor data by equipment type, was consulted. For each piece of diesel construction equipment proposed at the BBCP, an average engine load factor for an identical or representative source description in ACTIVITY.DAT was utilized. The selection of these load factors is presented in Appendix C, and equipment-specific load factors are also shown in the detailed emissions calculations. In addition, an equipment availability factor of 67.29% was developed by Tintina. The derivation of the availability factor, which accounts for equipment maintenance, downtime, and other factors, is described in the detailed emissions calculation sheets. The full calculations are available in Appendix C.

3.1.9 Fugitive Emissions F1-5: Haul Roads, 29 and 30: Access Roads

This category includes fugitive particulate emissions produced by vehicle travel on permanent unpaved access roads and provides example calculations for the general category.

Emission Factors:

Fugitive dust emissions were calculated using equations Eq. (1a) and Eq. (2) and factors provided in AP-42 Chapter 13.2.2 (11/06), Unpaved Roads.

Emission Factor = [(k)(s/12)^a(W/3)^b][(365-P)/365] + $EF_{\text{equipment wear}}$ lb/vehicle miles traveled (VMT)

k = particle size multiplier
= 4.9 for PM (<30 µm)
= 1.5 for PM_{10}
= 0.15 for $PM_{2.5}$
s = surface material silt content (%)
= 4.8%, AP-42 Table 13.2.2-1 sand & gravel plant road
a = empirical exponent
= 0.7 for PM (<30 µm),
= 0.9 for PM_{10} and $PM_{2.5}$
W = mean vehicle weight (tons)
= 57.5 tons, estimate based on 40-ton payload (77.5 loaded weight) and 34,000 kg (37.5-ton) empty trucks – this is the average weight
b = empirical exponent
= 0.45 for PM (<30 µm), PM_{10} and $PM_{2.5}$
P = number of days in year with at least 0.01 inches of precipitation
= 88 days, the minimum annual number of days with at least 0.01 inches of precipitation, based on site meteorological data from 2013 through 2017; the minimum number of days occurred in 2013
$EF_{\text{equipment wear}}$ = Emission factor for 1980s vehicle fleet exhaust, brake wear, and tire wear, AP-42 Table 13.2.2-4
= 0.00047 lb/VMT for PM (<30 µm)
= 0.00047 lb/VMT for PM_{10}
= 0.00036 lb/VMT for $PM_{2.5}$

Emission Factor for PM (<30 μm) = [(4.9)(4.8/12)$^{0.7}$(57.5/3)$^{0.45}$][(365-88)/365] + 0.00047 = 7.39 lb/VMT
Emission Factor for PM_{10} = [(1.5)(4.8/12)$^{0.9}$(57.5/3)$^{0.45}$][(365-88)/365] + 0.00047 = 1.89 lb/VMT
Emission Factor for $PM_{2.5}$ = [(0.15)(4.8/12)$^{0.9}$(57.5/3)$^{0.45}$][(365-88)/365] + 0.00036 = 0.19 lb/VMT

Emission Factors for Travel on Access Roads		
PM (<30 μm)	7.39 lb/VMT	AP-42 13.2.2 Unpaved Roads (11/06) Eq. (1a) and Eq. (2)
PM_{10}	1.89 lb/VMT	AP-42 13.2.2 Unpaved Roads (11/06) Eq. (1a) and Eq. (2)
$PM_{2.5}$	0.19 lb/VMT	AP-42 13.2.2 Unpaved Roads (11/06) Eq. (1a) and Eq. (2)

Activity Level:

An activity level in terms of vehicle miles traveled per year was calculated based on an estimated average number of vehicles per day and the estimated average distance traveled during different phases of the project. Years with similar activity level were grouped to estimate annual average fugitive emissions from road dust as shown below.

Year Range	**Number of Years**	**Annual Average VMT/day**
0-1	1	219.5
1-2	1	79.6
2-15, inclusive	14	29.6
16-17	2	108.9
18	1	17.3

Control Method

Water spray and/or chemical dust suppressants will be used to control fugitive dust emissions from unpaved roads. A 50% – 80% control factor for fugitive dust was used in the emission calculations based on a conservative estimate given the information regarding water and chemical dust suppressants in Section 13.2.2.3 of AP-42. Other mine sources (such as Otter Creek Coal, preliminary determination of MAQP #5106-00) have been permitted in Montana utilizing a control efficiency of 80% to control fugitive road dust with either water or chemical dust suppressant. Tintina proposes to utilize the conservatively lower 50% control for all the haul roads and most of the access roads. Tintina proposes to apply 80% control to the initial 200-meters of the access road which comprises of emissions apportioned to model volume sources ACC_0001 – ACC_0026.

Example Emission Calculation

PM Emissions for Inventory Years 0 - 1:
(7.39 lb PM/VMT) x (219.5 VMT/day) x (365 day/year) / (2,000 lb/ton) x (1- 0.5) =
148.6 ton/year

PM_{10} Emissions for Inventory Years 0 - 1:
(1.89 lb PM_{10}/VMT) x (219.5 VMT/day) x (365 day/year) / (2,000 lb/ton) x (1- 0.5) =
37.9 ton/year

$PM_{2.5}$ Emissions for Inventory Year 0 - 1:
(0.19 lb $PM_{2.5}$/VMT) x (219.5 VMT) x (365 day/year) / (2,000 lb/ton) x (1- 0.5) =
3.8 ton/year

3.1.10 Fugitive Emissions F6, F8-10, F12-13, F15-16, F19, and F25: Material Removal, Loading, and Dumping

This category estimates emissions produced during land clearing and removal of the topsoil, subsoil, and material beneath the soil layer for mine development, loading of this material into trucks, and deposition of material onto storage piles. This category also includes emissions generated during mine site reclamation. Materials are returned to disturbed sites by collecting material from the storage pile, loading the material into trucks, and depositing the material at the site of reclamation. These emissions occur during mine development (mine operating years 0 to 1.5; F6, F8, F10, F13, F16), WRS pad reclamation (year 3; F25), and during mine reclamation (years 16 through 18; F9, F12, F15, F19).

Emission Factors:

For each ton of topsoil, subsoil, and other earthen surface materials (assumed to have the same physical properties for purposes of fugitive dust emission estimates and thus collectively referred to as “soil”) moved, fugitive dust emissions are generated at each of the following steps: 1) as the soil is removed from an area by bulldozing/scraping, 2) as the soil is loaded into a truck for transport, 3) as the soil is dumped onto a storage pile. Emissions due to soil removal are estimated using the bulldozing overburden equation in Chapter 11.9 of AP-42, Western Surface Coal Mining (10/98), Table 11.9-1 (Table 11.9-3 lists acceptable parameter ranges for the equations in Table 11.9-1).

Emissions due to soil loading and unloading, also referred to as “drop operations,” are estimated using equation 1 from AP-42 Chapter 13.2.4, Aggregate Handling and Storage Piles (11/06), as directed by AP-42 Chapter 13.2.3, Heavy Construction Operations (1/95), Table 13.2.3-1, row II.5 Loading of excavated material into trucks and row II.6. Truck dumping of fill material, road base, or other materials.

Soil Removal Emission Factors (AP-42 Table 11.9-1, bulldozing overburden)

PM (Total Suspended Particulate, TSP) = $(5.7)(s)^{1.2} / (M)^{1.3}$
$PM_{10} = 0.75*(1.0)(s)^{1.5}/(M)^{1.4}$
$PM_{2.5} = 0.105* (5.7)(s)^{1.2} / (M)^{1.3}$

Where:
s = material silt content, %
= 6.9% per AP-42 Table 11.9-3
M = material moisture content, %
= 3.4% per AP-42 Table 13.2.4-1, western surface coal mining exposed ground mean moisture content – this is a reasonable approximation for the soil moisture content at the mine site.

Emission Factor for PM (TSP) = $(5.7)(6.9)^{1.2} / (3.4)^{1.3}$ = 11.792 lb/hr
Emission Factor for $PM_{10} = 0.75*(1.0)(6.9)^{1.5}/(3.4)^{1.4}$ = 2.451 lb/hr

Emission Factor for $PM_{2.5}$ = $0.105^* (5.7)(6.9)^{1.2} / (3.4)^{1.3}$ = 1.238 lb/hr

Emission Factors for Soil Removal Operations		
PM (TSP)	11.792 lb/hr	AP-42 11.9 Western Surface Coal Mining (10/98), Table 11.9-1, bulldozing overburden
PM_{10}	2.451 lb/hr	
$PM_{2.5}$	1.238 lb/hr	

Drop Operations Emission Factors (AP-42, Chapter 13.2.4 Equation 1)

Emission Factor = $(k)(0.0032)(U/5)^{1.3}/(M/2)^{1.4}$ lb/ton of material handled
Where:
k = particle size multiplier
= 0.74 for PM (<30 μm)
= 0.35 for PM_{10}
= 0.053 for $PM_{2.5}$
U = mean wind speed (miles per hour)
= 9.3 miles per hour, standard windspeed for MT per MDEQ
M = material moisture content, %
= 3.4% per equation maximum value (per AP-42 Table 13.2.4-1, western surface coal mining exposed ground mean moisture content – this is a reasonable approximation for the soil moisture content at the mine site)

Emission Factor for PM (<30 μm) = $(0.74)(0.0032)(9.3/5)^{1.3}/(3.4/2)^{1.4}$ = 0.00252 lb/ton
Emission Factor for PM_{10} = $(0.35)(0.0032)(9.3/5)^{1.3}/(3.4/2)^{1.4}$ = 0.00119 lb/ton
Emission Factor for $PM_{2.5}$ = $(0.053)(0.0032)(9.3/5)^{1.3}/(3.4/2)^{1.4}$ = 0.00018 lb/ton

Emission Factors for Soil Loading and Dumping		
PM (<30 μm)	0.00252 lb/ton soil	AP-42 13.2.4 Aggregate Handling and Storage Piles (11/06)
PM_{10}	0.00119 lb/ton soil	
$PM_{2.5}$	0.00018 lb/ton soil	

Total Emissions for Soil Removal Operations

The total emissions for soil removal operations are calculated as the emissions from soil removal, which are based on hours of operation, plus the emissions from the drop operations, which are based on the mass of soil loaded (1 drop) and the mass of soil dumped (1 drop).

Total soil removal emissions (ton/yr) = [$EF_{\text{soil removal}}$ (lb/hr) * operating hours (hr/yr) + 2 drops * $EF_{\text{drop operations}}$ (lb/ton) * mass of soil removed (ton/yr)] / 2,000 (lb/ton)

Activity Level:

The activity level in terms of tons of topsoil, subsoil, and other earthen surface materials removed and stockpiled was estimated based on the amount of material removed as part of mine construction at the portal pad, the CWP, the copper-enriched ore stockpile, the

WRS pad, the mill pad, the PWP, the CTF, the NWCR, the temporary powder storage area, and the foundation drain ponds. An example emission calculation is shown for topsoil removal and is based on a total of 622,332 tons of soil scraped, loaded and dropped in the first year of mine development.

For each fugitive emission source, the year in which emissions are highest (i.e., the year in which the most material is moved) is the year used to estimate emissions across the time period during which the emissions generating activity occurs. For example, emissions generated during topsoil return for mine reclamation were calculated based on a total annual process rate of 516,799 tons of soil collected, loaded and dropped during mine operating year 17. The rate of soil return during years 16 and 18 is much less; using year 17 to estimate soil return emissions for all three years conservatively estimates emissions.

Control Method:

Handling and transfer of soils and other earthen materials are a source of fugitive emissions. Emissions will be controlled using best operating practices to minimize emissions. Conservatively, no emissions control was assumed for the emissions calculation.

Example Emission Calculation:

Total soil removal emissions (ton/yr) = [$EF_{\text{soil removal}}$ (lb/hr) * operating hours (hr/yr) + 2 drops * $EF_{\text{drop operations}}$ (lb/ton) * mass of soil removed (ton/yr)] / 2,000 (lb/ton)

PM Emissions for Inventory Year 0-1:
[(11.792 lb PM/hr x 10 hr/day x 365 day/yr) + (0.00252 lb PM/ton x 622,332 ton/yr x 2 drops)] / [2,000 lb/ton] x (1- 0.00) = 27.39 ton/yr

PM_{10} Emissions for Inventory Year 0-1:
[(2.451 lb PM_{10}/hr x 10 hr/day x 365 day/yr) + (0.00119 lb PM_{10}/ton x 622,332 ton/yr x 2 drops)] / [2,000 lb/ton] x (1- 0.00) = 6.11 ton/yr

$PM_{2.5}$ Emissions for Inventory Year 0-1:
[(1.238 lb $PM_{2.5}$/hr x 10 hr/day x 365 day/yr) + (0.00018 lb $PM_{2.5}$/ton x 622,332 ton/yr x 2 drops)] / [2,000 lb/ton] x (1- 0.00) = 2.82 ton/yr

3.1.11 Fugitive Emissions F7, F11, F14, F17-18, F21, and F24: Storage Piles

This category includes emissions produced by wind erosion of material storage piles.

Emission Factors:

Emission factors for wind erosion are based on the calculations described in AP-42 Chapter 13.2.5 Industrial Wind Erosion.

The height to base ratio of each pile is less than 0.2, so each pile can be assumed to be flat. This allows the erosion potential to be calculated for a single geometry versus, for example, a conical pile, which has distinct subareas subject to different rates of erosion.

A daily erosion potential, P_{daily}, is calculated as follows using equation 3 from AP-42 Chapter 13.2.5:

$$P_{daily}\left(\frac{g}{m^2 \cdot event}\right) = \begin{Bmatrix} 58\,(u^* - u_t^*)^2 + 25(u^* - u_t^*) \\ 0\,for\,u^* \leq u_t^* \end{Bmatrix}$$

Where:

P_{daily} = daily erosion potential, grams per meter squared per material disturbance event

u* = friction velocity, m/s, estimated per the discussion below

u_t* = threshold friction velocity, m/s, from AP-42 Table 13.2.5-2

The daily erosion potential is multiplied by the number of daily disturbance events and summed over a year to calculate an annual erosion potential. The annual erosion potential is then used to estimate the annual rate of material erosion from stockpiles. The steps and assumptions involved in this estimation follow. The number of daily disturbance events correspond to the number of haul truck round trips per day to each pile.

A maximum daily 1-hour average windspeed, u, is used to calculate the friction velocity, u*. Windspeeds were measured and recorded at an onsite meteorological station, which has collected data from mid-2012 through 2017. Year 2013 daily windspeed data was chosen to estimate wind erosion because the highest hourly windspeed was recorded that year. Year 2016 data was also chosen for comparison because it is the most recent complete year of data available for the site. Two years of daily erosion potentials, P_{daily}, were developed from the windspeed data in order to create a complete, conservative set of annual daily erosion potentials. The calculated P_{daily} for each calendar day in 2013 was compared to P_{daily} for the corresponding calendar day in 2016, and the largest erosion potential was selected as the P_{daily} for that calendar day.

The equation to calculate the daily erosion potential, P_{daily}, contains the friction velocity, u* (m/s), and the threshold friction velocity, u_t* (m/s). Friction velocity, u*, is calculated as follows:

$u^* = 0.053 \times u^+_{10}$ (equation 4, AP-42 Ch. 13.2.5)

Where the fastest mile of wind at a reference anemometer height 10 meters, u^+_{10} (m/s), is calculated as follows:

$u^+_{10} = 1.35 * u$ (maximum 1-hour average windspeed)

The conversion factor of 1.35 is derived from the table “Wind Speed Conversions (Normative)” in Annex L of *TIA Standard Structural Standard for Antenna Supporting*

Structures and Antennas – Addendum 2, ANSI/TIA-222-G-2-2009, December 2009. This table lists the fastest mile windspeed in miles per hour and the hourly mean windspeed also in miles per hour. The ratio of each fastest mile windspeed and its associated hourly mean windspeed was calculated. The average ratio is 1.30, the minimum ratio 1.18, and the maximum ratio is 1.35. To be conservative, the maximum ratio was used to multiply the hourly average windspeed to obtain an estimate of the fastest mile windspeed.

The threshold friction velocity, u_t^* (m/s), for different materials is given in AP-42 Table 13.2.5-2. Materials stored at the Black Butte Copper Project were estimated to have properties similar to either western surface coal mine overburden ($u_t^* = 1.02$ m/s) or uncrusted coal pile ($u_t^* = 1.12$ m/s).

The friction velocity is often lower than the threshold velocity (i.e., $u^* \leq u_t^*$), thus there are many calendar days for which the erosion potential is equal to zero (see equation for P_{daily} above). For calendar days in which the friction velocity of wind exceeds the threshold velocity, a value for P_{daily} is generated and is used to calculate the annual erosion potential.

The annual erosion potential, P (g/m^2/year), is estimated by multiplying the number of stockpiled material disturbance events that occur in a day by the daily erosion potential calculated for a particular calendar day, P_{daily} (g/m^2/disturbance event), and then summing the estimated daily emissions over a calendar year:

$$P\left(\frac{g}{m^2 \cdot year}\right) = \sum_{P_{daily}=P_{daily}\ on\ day\ 1}^{P_{daily}=P_{daily}\ on\ day\ 365} P_{daily}\left(\frac{g}{m^2 \cdot event}\right) * [\max \#\ of\ truck\ trips]\ \frac{events}{day}$$

Using the Excess Material Stockpile South (F11) as an example: A threshold friction velocity of 1.02 m/s (AP-42, Table 13.2.5-2, overburden) is used, and the sum of daily erosion potentials equals 8.68 g/m^2/daily events[3] and P is as follows:

$$P\left(\frac{g}{m^2 \cdot year}\right) = 8.68\left(\frac{g}{m^2 \cdot event}\right) * 13\ \frac{event}{day} = 109.96\left(\frac{g}{m^2 \cdot year}\right) = 0.242\left(\frac{lb}{m^2 \cdot year}\right)$$
$$= 1.21E - 04\left(\frac{ton}{m^2 \cdot year}\right)$$

Using the Cu-rock Stockpile (F21) as an example: A threshold friction velocity of 1.12 m/s (AP-42, Table 13.2.5-2, uncrusted coal pile) is used, and the sum of daily erosion potentials equals 1.69 g/m2/daily events[4] and P is as follows:

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[3] Please refer to the Emission Inventory calculation spreadsheet, F11 Excess pile S worksheet, for the data table used to calculate this value.

[4] Please refer to the Emission Inventory calculation spreadsheet, Cu-rock pile worksheet, for the data table used to calculate this value.

$$P\left(\frac{g}{m^2 \cdot year}\right) = 1.69\left(\frac{g}{m^2 \cdot event}\right) * 4.4\ \frac{events}{day} = 7.35\left(\frac{g}{m^2 \cdot year}\right) = 0.016\left(\frac{lb}{m^2 \cdot year}\right)$$
$$= 8.11E - 06\left(\frac{ton}{m^2 \cdot year}\right)$$

The annual emission rate for particulate matter is then estimated as follows:

$$ER\ \left(\frac{ton}{yr}\right) = P\left(\frac{ton}{m^2 \cdot yr}\right) * A(m^2) * (1 - control\ effeciency) * k$$

Where:

ER = emission rate, ton/year

P = erosion potential converted to units of tons per meter squared per year – this varies based on the threshold friction velocity used
= 1.91E-04 ton/(m^2 year), based on a threshold friction velocity of 1.02 m/s for overburden (Table 13.2.5-2); used for topsoil, subsoil, and excess material storage piles N and S
= 3.72E-05 ton/(m^2 year), based on a threshold friction velocity of 1.12 m/s for uncrusted coal pile (Table 13.2.5-2); used for copper-enriched ore and waste rock storage piles

A = disturbance area in m^2 – conservatively assumed to be 36 m^2 per event[5] times the number of events per day times the number of days during the year which the threshold friction velocity is exceeded

Control efficiency is assumed to be 50%, as the material stockpiles will be watered as necessary and revegetated if possible

k = particle size multiplier, AP-42, page 13.2.5-3
= 1.0 for PM
= 0.5 for PM_{10}
= 0.075 for $PM_{2.5}$

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[5] An assumption was made regarding the size of each individual disturbance area: each “event” disturbs an area equal to 6 meters by 6 meters, which equals 36 square meters of disturbed area. This equates to the area disturbed by a haul truck dumping material, a front-end loader bucket scooping material, or other pile disturbance activities.

The estimated annual emission rate of fugitive dust from each stockpile is shown below.

Emission Rates for Storage Piles				
Material Stockpile	**Threshold Friction Velocity, u_t* (m/s)**	**PM (TSP) (ton/yr)**	**PM_{10} (ton/yr)**	**$PM_{2.5}$ (ton/yr)**
Temporary Construction Stockpile (F7)	1.02	0.364	0.182	0.027
Excess Reclamation Stockpile South (F11)	1.02	0.0829	0.0415	0.0062
Excess Reclamation Stockpile North (F14)	1.02	0.1681	0.0840	0.0126
Topsoil Stockpile (F17)	1.02	0.0807	0.0403	0.0060
Subsoil Stockpile (F18)	1.02	0.442	0.221	0.033
Copper-Enriched Rock Stockpile (F21)	1.12	6.35E-04	3.18E-04	4.76E-05
Waste Rock Storage Stockpile (F23)	1.12	0.0193	0.0096	0.0014

3.1.12 Fugitive Emissions F20, F22 and F24: Mined Material Drop Operations

This category estimates emissions produced during the deposition of mined material into piles (F20 and F22), and mined material dropped into the CTF for road construction (F24).

Emission Factors:

Emission factors for mined material drop operations are given in AP-42, Chapter 11.24 Metallic Mineral Processing (8/82), Table 11.24-2 High Moisture Ore – Material Handling & Transfer – All Materials Except Bauxite.

Emission Factors for Mined Material Drop Operations		
PM (TSP)	0.01 lb/ton	AP-42 11.24 Metallic Mineral Processing (8/82), Table 11.24-2
PM_{10}	0.004 lb/ton	
$PM_{2.5}$	0.004 lb/ton	

Activity Level:

The activity level in terms of tons of mined material dropped was estimated based on mine production estimates.

Control Method:

Handling and transfer of mined material is a source of fugitive emissions. Emissions are expected to be low due to the moisture content of the material and the low amount of fine particles in the material. No emissions control was assumed for the emissions calculation.

Example Emission Calculation:

Total mined material drop operation emissions (ton PM/yr) = $EF_{material\ drop}$ (lb PM/ton) * mass production rate (ton/yr) * 1 drop / 2,000 (lb PM/ton PM)

PM Emissions for Copper-Enriched Rock Drop to Stockpile, Year 3 (highest rate over years 2 to 3):
[0.01 (lb PM/ton) * (63,571 ton/yr) * 1 drop] / [2,000 lb/ton] x (1- 0.00) = 0.32 ton/yr

PM_{10} Emissions for Copper-Enriched Rock Drop to Stockpile, Year 3 (highest rate over years 2 to 3):
[0.004 (lb PM/ton) * (63,571 ton/yr) * 1 drop] / [2,000 lb/ton] x (1- 0.00) = 0.32 ton/yr

$PM_{2.5}$ Emissions for Copper-Enriched Rock Drop to Stockpile, Year 3 (highest rate over years 2 to 3):
[0.004 (lb PM/ton) * (63,571 ton/yr) * 1 drop] / [2,000 lb/ton] x (1- 0.00) = 0.32 ton/yr

3.1.13 Emission Point F27 – Gasoline Storage Tank (double-walled 500 gallon)

Emissions for this tank were calculated using the EPA TANKS4.09d program. See Appendix C for details.

3.2 Hazardous Pollutant Emission Inventory

Total hazardous air pollutant (HAPs) emissions for diesel fuel combustion for the mobile (mobile sources are not subject to permitting but are included to provide a highly conservative estimate), stationary, and portable equipment were estimated using data from AP-42 Chapter 3.4 and total diesel fuel combusted. Calculations were based on maximum diesel fuel required for both surface and underground operations, the maximum appears in years 4-13 of operation).

Emission factors for HAPs were obtained from AP-42, Chapter 3.3 for Gasoline and Diesel Industrial Engines.

Emission Factors for Diesel-fired Mobile/Portable/Stationary Equipment		
Total HAPs	3.87 E-03 lb/MMBtu	AP-42 3.3 Gasoline and Diesel Industrial Engines, Table 3.3-2 (10/1996)

Activity Level:

An activity level in terms of fuel used was provided by Tintina of 8,363 liters of diesel used per day. The amount of fuel used each year was converted from a gal/yr basis to an MMBtu/yr basis using a diesel heat content of 0.137 MMBtu/gal found in AP-42, Appendix A.

Fuel Usage Years 4 - 13 (MMBtu/yr) = 806,384 gal/yr x (0.137 MMBtu/gal) = 110,474 MMBtu

Control Method:

Emissions produced by diesel-fired mobile, portable and stationary equipment are considered fugitive sources of emissions. No additional control is assumed for this source.

Example Emission Calculation:

HAPs Emissions for Years 4-13 (per year, worst case fuel usage):
(0.00387 lb HAPs/MMBtu) x (110,474 MMBtu) / (2,000 lb/ton) x (1- 0.00) = 0.21 tons/year

In addition, trace metals are present in ore, tailings, and concentrate. During mining, handling, and processing of these materials, emissions of these metals, some of which are identified as HAPs, may occur as a fraction of the particulate emitted from these operations. The primary trace metals found in the BBCP soil[6] are arsenic, cadmium, copper, lead, and zinc (copper and zinc are not included on EPA's HAPs list under Section 112 of the Clean Air Act and are not discussed further). Using double MDEQ's Background Threshold Values (to provide a conservative estimate, several samples were higher, but the majority did not meet the Background Threshold Value on the mine site) for soils for arsenic, cadmium, and lead, the milligram/kilogram (mg/kg of soil) total would be 106 milligrams per kilogram of soil. The Background Threshold Values for arsenic, cadmium, and lead are 22.5, 0.7, and 29.8 mg/kg, respectively. Doubling their sum would be 106 mg/kg. Converting that to a lb/ton emission factor of the particulates emitted site-wide, would be 0.212 lb/ton. Multiplying that factor times the amount of particulate emitted site-wide would be 0.212 lb/ton x 320 tons of particulate emitted on an annual basis (both development/production and point/fugitive combined), with a result of 0.03 tons per year.

As a result, the total amount of HAPs emitted from the fuel and processing would be 0.24 tons per year, below the 25 tons/year for total HAPs, and 10 tons/year per individual HAP for major source thresholds. Tintina will be classified as an area source with respect to HAPs.

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[6] Tintina Mine Operating Permit Application, Revision 3, July 14, 2017, Appendix E – Baseline Soils Report

3.3 Greenhouse Gas Emissions Inventory

This category includes GHG emissions produced by diesel-fired mobile, portable and stationary equipment (calculations were based on maximum diesel fuel required for both surface and underground operations; the maximum appears in years 4-13 of operation).

Emission Factors:

Emission factor for CO_2 (other GHG emissions are anticipated to be negligible, AP-42 states this factor assumes 99% conversion to CO_2) was obtained from AP-42, Chapter 3.3 for Gasoline and Diesel Industrial Engines.

Emission Factors for Diesel-fired Mobile/Portable/Stationary Equipment		
CO_2	164 lb/MMBtu	AP-42 3.4 Gasoline and Diesel Industrial Engines, Table 3.3-1 (10/1996)

Activity Level:

An activity level in terms of fuel used was provided by Tintina of 8,363 liters of diesel used per day. The amount of fuel used each year was converted from a gal/yr basis to an MMBtu/yr basis using a diesel heat content of 0.137 MMBtu/gal found in AP-42, Appendix A.

Fuel Usage Years 4 - 13 (MMBtu/yr) = 806,384 gal/yr x (0.137 MMBtu/gal) = 110,474 MMBtu

Control Method:

Emissions produced by diesel-fired mobile, portable and stationary equipment are considered fugitive sources of emissions. No additional control is assumed for this source.

Example Emission Calculation:

GHG Emissions for Years 4-13 (per year, worst case fuel usage):
(164 lb CO_2/MMBtu) x (110,474 MMBtu) / (2,000 lb/ton) x (1- 0.00) = 9,058.92 ton/year

4.0 REGULATORY ANALYSIS

This section evaluates potentially applicable regulatory requirements for Tintina under both Montana and federal air quality regulations. Table 4-1 lists requirements that may apply to the proposed project. Analyses of each of the listed regulations follow.

Table 4-1: Potentially Applicable Rules

Rule Citation	Description	Report Section
ARM 17.8 Subchapter 1	General Provisions	4.1
ARM 17.8 Subchapter 2	Ambient Air Quality Standards	4.2
ARM 17.8.304	Emission Standards - Visible Air Contaminants	4.3
ARM 17.8.340	New Source Performance Standards (40 CFR 60, Stationary Sources)	4.4
ARM 17.8.342	Emission Standards for Hazardous Air Pollutants for Source Categories (MACT – 40 CFR 63)	4.5
ARM 17.8 Subchapter 5	Air Quality Permit Application, Operation, and Open Burning Fees	4.6
ARM 17.8 Subchapter 6	Outdoor Burning	4.7
ARM 17.8 Subchapter 7	Permit, Construction and Operation of Air Contaminant Sources	4.8
ARM 17.8.752	Best Available Control Technology (BACT)	4.9
ARM 17.8 Subchapter 8	Prevention of Significant Deterioration-New Source Review	4.10
ARM 17.8 Subchapter 12	Operating Permit Program	4.11
40 CFR Parts 51, 52, 70, *et al*.	Greenhouse Gas Tailoring Rule	4.12
40 CFR 98, Subpart C	Greenhouse Gas Mandatory Reporting Rule	4.13

4.1 General Provisions

ARM 17.8 Subchapter 1 contains general rules that apply to the air quality program including definitions, testing requirements, malfunction notification requirements, and prohibitions against dilution or the creation of a public nuisance. Tintina will comply with all of the requirements and general provisions in ARM 17.8 Subchapter 1. Tintina will not circumvent any air quality regulation.

4.2 Ambient Air Quality Standards

The air quality of the area is classified as "Better than National Standards" or unclassifiable/attainment of the National Ambient Air Quality Standards (NAAQS) for criteria pollutants (40 CFR 81.327).

Section 6 of this permit application presents the results of an air dispersion/modeling analysis of potential impacts of the proposed BBCP mine on local ambient air quality. This modeling used on-site meteorological monitoring data collected from April 2012 through June 2017. On-site meteorological data continues to be collected.

4.3 Emission Standards

4.3.1 Opacity

ARM 17.8 Sections 304 and 308 limit the opacity of source emissions to no more than 20% averaged over a six-minute period. Tintina will comply with the requirements of ARM 17.8.304 and ARM 17.8.308 by using control technologies discussed in more detail in Section 5 of this application.

4.3.2 Particulate Matter, Fuel Burning Equipment

ARM 17.8.309 states that no new fuel burning equipment shall emit PM in excess of the amount that results from the following equation:

$$E = 1.026 * H^{-0.233}$$

where: E = Particulate Emission Rate (lbs/MMBtu)
H = Heat Input Capacity (MMBtu/hr)

Tintina will ensure that all affected equipment complies with this limit.

4.3.3 Particulate Matter, Industrial Processes

ARM 17.8.310 limits PM emissions from industrial processes to the value calculated using the following formula.

$E = 4.10 * P^{0.67}$ (process rates up to and including 30 ton/hr)
$E = 55 * P^{0.11} - 40$ (process rates greater than 30 ton/hr)

where:

P = Process Rate (ton/hr)
E = Particulate matter emissions rate (pounds per hour)

Tintina will ensure that all affected equipment complies with this limit.

4.4 New Source Performance Standards (40 CFR 60, Stationary Sources)

ARM 17.8.340 incorporates by reference the New Source Performance Standards (NSPS) of 40 CFR 60. Tintina has identified two of these standards (not including the General Provisions) as potentially applying to its operations.

4.4.1 NSPS – Subpart A – General Provisions

This subpart applies to all equipment or facilities subject to a specific Part 60 subpart.

4.4.2 NSPS – Subpart LL – Standards of Performance for Metallic Mineral Processing Plants

Title 40 CFR 60, Subpart LL, Standards of Performance for Metallic Mineral Plants, applies to affected equipment that commenced construction or modification after August 24, 1982. Tintina has identified the following proposed stationary equipment as being subject to this regulation: the crushers (conical and jaw), portable screen, conveyor belt transfer points, surge bin, and enclosed storage area.

Water sprays and enclosures will control the crusher, screens, and conveyor belt transfer points within the required 7% opacity level. The remaining activities take place in buildings and/or are vented into dust collectors or fabric filter baghouses with a maximum grain loading limit more stringent than the required 0.05 grains per dry standard cubic foot for stack emissions.

4.4.3 NSPS – Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (CI ICE)

Title 40 CFR 60, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, applies to 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 stationary IC ICE that undergo modification or reconstruction after July 11, 2005. Tintina will have diesel-fired portable equipment that is subject to Subpart IIII. Tintina will comply with applicable requirements for this equipment.

4.5 Emission Standards for Hazardous Air Pollutants for Source Categories (NESHAP – 40 CFR 63)

ARM 17.8.342 incorporates by reference the National Emission Standards for Hazardous Air Pollutants (NESHAP) listed in 40 CFR Part 63 that apply to stationary sources. Tintina has identified two of these standards (not including the General Provisions) as potentially applying to its operations.

4.5.1 NESHAP – Subpart A – General Provisions

This subpart applies to all equipment or facilities subject to a specific Part 63 subpart.

4.5.2 NESHAP – Subpart ZZZZ – National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

Title 40 CFR 63, Subpart ZZZZ (National Emission Standards for Hazardous Air Pollutants from Stationary Reciprocating Internal Combustion Engines) applies to affected equipment at major and area sources of HAPs. The proposed BBCP will include gasoline- and/or diesel-fired portable/mobile equipment that is subject to Subpart ZZZZ. Based on the emissions estimates presented in Section 3 and Appendix C, the BBCP qualifies as an area source of emissions.

4.5.3 NESHAP – Subpart CCCCCC – National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Dispensing Facilities

Title 40 CFR 63, Subpart CCCCCC (National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Dispensing Facilities) applies to affected equipment at area sources of HAPs. The proposed BBCP will include a gasoline fuel tank in both the development and production phases of operation. Based on the emissions estimates presented in Section 3 and Appendix C, the BBCP qualifies as an area source of emissions.

4.6 Stack Heights and Dispersion Techniques

Rules governing stack heights do not physically limit the height of a given stack. Rather, the rules provide no incentive for building "tall" stacks since all analyses of BACT, modeling, etc., are based upon Good Engineering Practice (GEP) stack height or actual height, whichever is less. GEP can be determined by several different methods, but without special demonstrations, the minimum value of GEP stack height is 65 meters. All stacks at the BBCP were modeled using actual stack heights, and no stack heights proposed exceed 65 meters; therefore, the analysis complies with GEP.

4.7 Air Quality Permit Application, Operation, and Open Burning Fees

Tintina will submit the required permit application and operation fees per ARM 17.8 Subchapter 5. No outdoor burning is expected at the BBCP, so open burning fees will not apply.

4.8 Outdoor Burning

No outdoor burning is expected at the BBCP. If Tintina conducts any outdoor burning, all conditions in ARM 17.8, Subchapter 6 will be followed.

4.9 Permit, Construction and Operation of Air Contaminant Sources

According to ARM 17.8.743 and 744, the proposed project qualifies as a new stationary source for which an application for an air quality permit is required. This report, including completed permit application forms and other supporting information, constitutes Tintina’s application for an MAQP. Laboratory equipment is specifically exempted by the air quality requirements under ARM 17.8.744(1) and is not included in this analysis. Mobile sources are also specifically exempted under the same rule; however, the underground mobile source emissions are quantified for the ambient air quality demonstration because those emissions exit from the portal and exhaust vents.

One of the permit application requirements is that the applicant notify the public of its application by means of a newspaper of general circulation in the area affected by the facility modification (ARM 17.8.748). Such public notification will be served by advertisement in the weekly *Meagher County News* and the daily *Great Falls Tribune* and *Helena Independent Record* within ten days of filing the complete permit application. An affidavit of publication will be delivered to MDEQ upon receipt by Tintina.

4.10 Best Available Control Technology (BACT)

ARM 17.8.752 requires that any new or altered source requiring an air quality permit install the maximum air pollution control capability that is technically practical and economically feasible and that BACT must be utilized. Section 5 of this permit application analyzes available alternative control technologies and identifies BACT for each applicable emissions source and pollutant combination. To comply with this rule, Tintina proposes to utilize the control technologies determined through those analyses to qualify as BACT.

4.11 New Source Review (NSR) and Prevention of Significant Deterioration (PSD)

NSR/PSD regulations apply to new and modified major stationary sources. A major stationary source is one that:

- Is listed in ARM 17.8.801(22)(a)(i) and has the potential to emit more than 100 tons per year (tpy) of any pollutant subject to regulation under the Federal Clean Air Act for PSD review; or
- Is not listed but has the potential to emit (from a stationary, non-fugitive source) more than 250 tpy of any regulated pollutant.

The BBCP is a new source, is not a listed source, and does not have the potential to emit more than 250 tpy of a regulated pollutant from a stationary, non-fugitive source (see Section 3 of the application for a breakdown of fugitive and point source emissions). Therefore, the project is not a major stationary source and does not trigger the need for NSR/PSD permitting.

Because the proposed project is not subject to NSR/PSD permitting regulations, an analysis of project impacts on PSD increments is not required under ARM 17.8.820. However, a minor source, such as the BBCP, may also be required to conduct a PSD increment analysis in certain instances. Tintina has further investigated their responsibility for an analysis of increment as follows:

- The requirement to conduct an increment analysis as a minor emissions source hinges on the triggering of a “minor source baseline date” in a specific “baseline area.”
- ARM 17.8.801(21)(b) defines the minor source baseline date as “the earliest date after the trigger date on which a major stationary source or a major modification subject to 40 CFR 52.21 or to regulations approved pursuant to 40 CFR 51.166 submits a complete application under the relevant regulation.”
- ARM 17.8.801(3) defines baseline area as “any intrastate area (and every part thereof) designated as attainment or unclassifiable in 40 CFR 81.327 in which the major source or major modification establishing the minor source baseline date would construct or would have an air quality impact equal to or greater than one microgram per cubic meter (µg/m^3) (annual average) of the pollutant for which the minor source baseline date is established, except baseline areas for PM-2.5 are designated when a major source or major modification establishing the minor source baseline date would construct or would have an air quality impact equal to or greater than 0.3 µg/m^3 as an annual average for PM-2.5.” MDEQ, by policy, has used county boundaries to define baseline areas.
- Tintina is proposing to construct and operate a facility in Meagher County. No major stationary source applications have been submitted to MDEQ for Meagher County, nor has the “baseline area” of the county been triggered by any actions in the surrounding counties. The baseline areas have been triggered for Cascade and Broadwater Counties, but the facilities in those counties are geographically separated from the BBCP (by the Big Belt Mountains, etc.). Thus, we conclude the BBCP is not subject to a minor source baseline increment analysis.

4.12 Operating Permit Program (Title V)

Title V of the Federal Clean Air Act amendments of 1990 sets forth operating permit requirements that apply to major sources as defined within the statute. Montana administers the statute in accordance with rules codified at ARM 17.8 Subchapter 12. Several alternative criteria establish major source status, but the primary criteria that most often trigger applicability are:

- The facility’s potential to emit any pollutant from a stationary point source is greater than 100 tpy.
- The facility’s potential to emit any single listed hazardous air pollutant (HAP) is greater than 10 tpy, or its potential to emit all HAPs combined is greater than 25 tpy.

The critical BBCP phases for emissions are the development and production phases. Because of the use of engines and other temporary equipment in the development phase, the Title V thresholds for NOx and CO are triggered during that time. Consequently, Title V operating permit program rules would apply to the proposed project. However, the production phase would be below Title V thresholds and may require reevaluation of Title V applicability later in the project life.

Pursuant to ARM 17.8.1205(2)(b), “Persons required to obtain an air quality operating permit or permit revision who are also required to obtain a Montana air quality preconstruction permit under this chapter shall file a complete application for an air quality operating permit or permit revision within 12 months after commencing operation…” Given the current status, Tintina plans file a complete application for this project within 12 months after commencing operation. Tintina will comply with all regulations in ARM 17.8, Subchapter 12.

4.13 Greenhouse Gas Tailoring Rule

In general, the GHG Tailoring Rule triggers NSR/PSD applicability for stationary sources that emit greater than 100,000 tons CO_2 equivalent (CO_{2e}), or those that are already major sources and modify their facility with a resulting emissions increase greater than 75,000 tons CO_{2e} per year. A permitting threshold of 100,000 tons CO_{2e} from a stationary source triggers the need for a Title V Operating Permit. As shown in Section 3 – Greenhouse Gas Emissions, the BBCP’s potential GHG emissions from stationary sources will not exceed the applicable thresholds. To provide a conservative estimate, GHG emissions were calculated based on all the diesel fuel requirements (both mobile and stationary sources) for surface and underground operations. While a small amount of gasoline is used on-site, this amount would be dwarfed by the mobile source diesel requirements included in the GHG calculation (mobile sources would not be subject to these requirements). The GHG emissions calculated were far below the regulatory threshold for reporting, even including sources not subject to permitting.

4.14 Greenhouse Gas Mandatory Reporting Rule

Title 40 CFR Part 98, Subpart C requires reporting of greenhouse gas emissions from listed facilities and suppliers, as well as facilities with stationary sources that emit over 25,000 metric tons CO_2e in a calendar year. Metal mines (or, more specifically, copper mines) are not listed as mandatory sources for reporting purposes. If the proposed facility’s actual annual GHG emissions due to stationary source fuel combustion surpass the applicability threshold, it will be subject to this rule. As shown in Section 3 – Greenhouse Gas Emissions, BBCP will not be subject. To provide a conservative estimate, GHG emissions were calculated based on all the diesel fuel requirements (both mobile and stationary sources) for surface and underground operations. While a small amount of gasoline is used on-site, this amount would be dwarfed by the mobile source diesel requirements included in the GHG calculation (mobile sources would not be subject to these requirements). The GHG emissions calculated were far below the regulatory threshold for reporting.

5.0 BACT ANALYSES

ARM 17.8.752 requires the owner or operator of a new or altered source to implement the maximum degree of air pollution reduction that is technically and economically available and feasible. This level of emissions reduction is referred to as “best available control technology” (BACT) and is a case-by-case decision that considers energy, environment, and economic impacts.

BACT can constitute either add-on control equipment or modifications to production processes depending on the emissions source. It may be a process design, work practice, operational standard, or addition of control equipment if imposition of an emissions standard is infeasible.

There is no universally accepted method for determining BACT, particularly for non-major sources of emissions. Thus, various methods can be applied in determining control technology to be used as BACT. Point sources and fugitive sources that have available add-on control technology options were examined with a top-down, five-step BACT approach. That approach is described below.

Guideline procedures outlined in the document “New Source Review Workshop Manual, Office of Air Quality Planning and Standards, US EPA, Draft - October 1990” were followed for sources with potential add-on control technology. The methodology consists of the following five basic steps:

Step 1 - Identify all control options;
Step 2 - Eliminate technically infeasible options;
Step 3 - Rank remaining options by control effectiveness;
Step 4 - Evaluate the most effective controls and document results; and
Step 5 - Select BACT.

The New Source Review Workshop Manual is a draft guideline document although it provides a uniform and commonly used approach to BACT decision-making. Each step in the BACT analysis process is outlined below.

Step 1 - Identify All Control Options

In a top-down BACT analysis, the first step is to identify all available control options for the emissions unit in question. Available control options are defined as air pollution control technologies or techniques that have a practical and potential application to emissions units and pollutants being evaluated.

Step 2 - Eliminate Technically Infeasible Options

The second step of a top-down analysis accounts for source-specific factors by evaluating the technical feasibility of individual control options identified in Step 1. Determinations of technical infeasibility should clearly demonstrate how physical, chemical, and/or engineering principles would preclude the successful use of a control option on the emissions unit under review. Technically infeasible control options are eliminated from further consideration.

Step 3 - Rank Remaining Options by Control Effectiveness

Available control technology options deemed technically feasible from Step 2 are ranked in order of pollutant removal effectiveness. The control option that results in the highest pollutant removal value is considered the top control alternative.

Step 4 - Evaluate Most Effective Controls and Document Results

The fourth step considers direct energy, environmental, and economic impacts associated with the most effective control option defined in Step 3. Both beneficial and adverse impacts are discussed and quantified when possible.

Energy impact analyses estimate direct energy impacts of the control alternatives in units of energy consumption. Environmental impact analyses consider effects of unregulated air pollutants or non-air impacts such as liquid, solid, or hazardous waste disposal and whether they would justify selection of an alternative control option. Economic impact analyses assess costs associated with installation and operation of the various control options.

If energy, environmental, or economic impacts disqualify the top BACT candidate then the next most effective alternative becomes the best control option and is then similarly evaluated. This process continues until the top technology under consideration cannot be eliminated due to any source-specific energy, environmental, or economic impact(s).

Step 5 - Select BACT

The last step in evaluating BACT is to propose the most effective control option that remains after eliminating all non-viable options in Step 4. This step includes the proposal of a BACT-level emissions limit, or limits, if appropriate.

Generally, the following BBCP sources were evaluated under a “top-down,” emissions unit-specific approach.

- Mineral processing and handling (jaw crusher, surge bin, mill building processes);

- Auxiliary processing and handling (backfill plant, water treatment plant lime storage);

- Diesel engines/generators (both portable and stationary) including emergency generator, light plant, fire pump, and air compressor engines; and

- Propane and diesel heaters.

Because of the similarity in controls, the mineral and auxiliary processing are considered together. Other sources are evaluated through a review of operational standards, work practices, or the use of best operating practices (BOPs). Sources subjected to this type of BACT analysis would include:

- Small scale crushing and screening;
- Explosives detonation;
- Fugitive road dust;
- Material handling processes; and
- Wind erosion from material stockpiles/storage.

Insignificant units (diesel tanks and the gasoline tank) are not being analyzed due to their negligible emissions.

5.1 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)

As described in Section 2, 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 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 this processing are enclosed and are consequently excluded from further analysis.

5.1.1 Step 1 - Identify All Control Options

Table 5-1 lists and briefly describes available technologies for controlling particulate emissions from product processing and handling.

Table 5-1: 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.

5.1.2 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). Finally, Tintina 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.

5.1.3 Step 3 - Rank Remaining Options by Control Effectiveness

Table 5-4 ranks the remaining available alternatives according to their respective potential effectiveness values.

Table 5-2: Control Technology Effectiveness Estimates

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

5.1.4 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.

5.1.5 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[7] (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. A review of the EPA RBLC results in the Metallic Mineral/Ore Processing Type (90.021) shows the fabric filter dust collector technology to be consistent with the few major source metallic mineral/ore processing determinations. See Appendix D for a summary of the RBLC results collected. As previously mentioned, RBLC results are exclusively PSD actions, not requirements resulting from minor source BACT. Appendix D also includes three relevant Montana minor source BACT determinations for reference. The sources with lower emission rates capitalize on larger economies-of-scale as compared to relatively small dust collectors analyzed. Larger processes provide for

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[7] 0.01 gr/dscf as collected on the front half of a Method 5 train.

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[8] 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.

5.2 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.

5.3 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 will be broken down in two categories for add-on control: CO/VOC and NOx. Particulate matter emissions from propane combustion 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.

5.3.1 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.

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[8] Updated January 2013: https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/bact/bact_bulkmh.pdf

Table 5-3: Available CO/VOC Control Technologies

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, generally natural gas. 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.

5.3.2 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 practical installation of the add-on pollution control equipment addressed here technically infeasible. The remaining option is proper system design and operation.

5.3.3 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.

5.3.4 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.

5.3.5 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.

5.3.6 Step 1 - Identify All Control Options – NOx

NOx is formed during propane combustion in the heater. NOx comes from two sources in combustion, fuel NOx and thermal NOx. The fuel NOx 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 NOx control technologies for heaters.

Table 5-4: Available NOx Control Technologies

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 NOx Burners with Flue Gas Recirculation	Due to limited success of Low NOx Burners (LNB) in lowering NOx 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 NOx formation is decreased by the reducing conditions in the primary combustion zone. Thermal NOx 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.

5.3.7 Step 2 - Eliminate Technically Infeasible Options – NOx

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.

5.3.8 Step 3 - Rank Remaining Options by Control Effectiveness – NOx

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

5.3.9 Step 4 - Evaluate Most Effective Controls and Document Results – NOx

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

5.3.10 Step 5 - Select BACT - NOx

Tintina proposes that proper design and operation of the two propane-fired vent heaters are BACT for NOx. 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.

5.4 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.

The combustion of clean fuels (propane and diesel, respectively) and following good combustion practices is proposed as BACT for the small, portable, temporary heaters associated with this project. The proposed BACT conforms to previous BACT determinations made by MDEQ for similar-sized propane and diesel heaters.

5.5 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.

5.6 BACT for Gaseous and Particulate Emissions from Explosives Detonation/Blasting (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].[9] 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.

Section 3 estimates potential pollutant emission rates that will result from blasting and describes the basis for those estimations. The estimated values are sufficient for use in ambient impacts demonstrations and in regulatory applicability analyses. It would not be appropriate to assign these values as a permit limit due to uncontrollable variables inherent in the blasting process and the technical infeasibility of measuring the emission rates for compliance demonstration. Because the imposition of an emission standard is infeasible in this instance, 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.

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[9] DHHS CDC NIOSH Dust Control Handbook for Industrial Minerals Mining and Processing (page 101).

5.7 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. Table 5-5 lists particulate control technologies available for reducing roadway fugitive emissions.

Table 5-5: Available PM Control Technologies for 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.[10] 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

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[10] United States Department of Interior NIOSH: Design of Surface Haulage Roads – A Manual (Kaufman and Ault) (page 23).

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 be 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.

5.8 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 (WRS stockpile and mill facility), embankments and berms of the CTF, CWP, PWP, 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.

6.0 AMBIENT AIR QUALITY ANALYSIS

Montana's air quality rules require an applicant for a stationary source air quality permit to demonstrate compliance with ambient air quality standards designed to limit environmental impacts from air pollution emissions. This demonstration may be accomplished using professional judgment based on factors such as potential emission levels, emission source characteristics, existing air quality, regional meteorological conditions, surrounding terrain, and the proximity and scale of other nearby stationary emissions sources. MDEQ and EPA facilitate this type of analysis by providing guideline *de minimis* emission rates that in some cases may be used to indicate acceptable ambient impacts. In cases where *de minimis* emission levels are deemed inapplicable or where they would be exceeded, compliance with ambient standards is demonstrated using approved air dispersion modeling techniques.

The following air dispersion model analysis has been performed to demonstrate that the development and operation of the proposed BBCP will not cause or contribute to a violation of the NAAQS. The air dispersion analysis methodology has been designed in accordance with the State of Montana Modeling Guidance for Air Quality Permit Applications (November 2007 Draft) (*Modeling Guideline*) and Appendix W, 40 CFR Part 51, Revisions to the Guideline on Air Quality Models (Revised), January 17, 2017 (*Guideline Document*).

This section provides an explanation of the proposed facility and operating plan as it pertains to the ambient air quality modeling analyses and air dispersion modeling procedures. It discusses the modeling methodology used to assess ambient impacts such as model source parameters, emission rates, meteorological data processing and representative data selection, and selections of AERMOD technical options.

6.1 Ambient Concentration Modeling Methods

6.1.1 Modeling Applicability

Montana's air quality rules require an applicant for a stationary source MAQP to demonstrate compliance with ambient air quality standards designed to limit environmental impacts from air pollution emissions. Potential-to-Emit (PTE) emissions from the proposed BBCP were modeled for the pollutants and averaging periods listed in Table 6-1 in comparison to the Significant Impact Levels (SILs) and NAAQS modeling thresholds.

Table 6-1: SIL and NAAQS Pollutants and Averaging Periods

Pollutant	SIL/NAAQS Averaging Periods
PM_{10}	24-Hour
$PM_{2.5}$	24-Hour, Annual
NO_2	1-Hour, Annual
SO_2	1-Hour, 3-Hour, 24-Hour, Annual
CO	1-Hour, 8-Hour

6.1.2 Modeling Methodology

The modeling analysis was conducted in accordance with the methodology outlined in EPA's Draft New Source Review Workshop Manual, October 1990. This document, along with the *Modeling Guideline* and subsequent EPA guidance, outlines a four-phased approach for a modeling analysis.

Phase 1: Significant Impact Area Analysis - The first step is to define the area of influence of the proposed project. The impacted areas within the receptor grid are specific to each pollutant and averaging time due to source characteristics, emission rates, and influence from terrain and meteorological data. Pollutant and averaging period-specific impact areas are determined by modeling source emission rate impacts for individual pollutants on a receptor network and then assessing the impacts for each respective averaging period. An impacted area is therefore assessed for each pollutant/averaging period combination.

The receptor network utilized in this modeling analysis consists of a Cartesian grid that follows the grid spacing outlined in Section 6.3.1. The grid is designed to capture all potential impacts exceeding SILs and extends outward as far as necessary to adequately encompass all receptors with modeled concentrations equal to or exceeding the SILs listed in Table 6-2. The Phase 1 analysis ensures that all impacts exceeding the SILs are accounted for within the modeling area.

Table 6-2: Significance Levels for Air Quality Impacts

Pollutant	Averaging Period	Modeling Significance Level (µg/m^3)
CO	1-Hour	2,000
	8-Hour	500
NO_2	1-Hour	7.52
	Annual	1
SO_2	1-Hour	7.8
	3-Hour	25
	24-Hour	5
	Annual	1
$PM_{2.5}$	24-Hour	1.2
	Annual	0.3
PM_{10}	24-Hour	5

Modeling analysis for compliance with the NAAQS can proceed once the farthest significant receptor is established for each pollutant/averaging period combination and the extent of the designed receptor grid is verified to capture all exceedances of the SILs. The SILs are more stringent thresholds than the NAAQS so compliance with the SILs ensures compliance with the NAAQS. Consequently, NAAQS analyses generally proceed only for the receptors exceeding the SILs.

The SIL and NAAQS modeling analyses were modeled concurrently for this demonstration in the interest of shortening model runtimes due to the large number of volume sources. The NAAQS modeling methodology is captured in Phase 2.

Phase 2: PSD and Ambient Analyses - The next phase of the analysis is the modeling of all appropriate emission sources within the project's impact area described in Phase 1. Sources outside of the impact area are included if they are deemed to influence the project's area of impact. EPA guidance suggests that all minor and major stationary sources within the significant impact area should be considered. No surrounding sources were found within the area of influence for the BBCP. This is further described in Section 6.2.4.

A Class II PSD increment modeling analysis is not required since Tintina is not subject to PSD regulations or permitting requirements. However, a modeling analysis for comparison to the NAAQS was performed for each criteria pollutant and averaging period. The NAAQS analysis includes facility-wide emissions from Tintina as well as ambient background concentrations for comparison to the NAAQS. Selection of ambient background data is described in Section 6.3.6.

Phase 3: Hot Spot Analysis - Following Phase 2, the modeling grid is modified to include any unidentified "hot spot" receptors. This step involves identifying the peak receptor for each pollutant and averaging period assessed for NAAQS compliance. As necessary, additional receptors are centered on the peak receptor in a Cartesian grid with more refined receptor spacing than the original grid. Thus, a smaller grid is used to evaluate potentially higher impacts at a closer spaced receptor. The model is rerun with these added receptors to identify the receptor location that yields the highest predicted concentration value. If necessary, the hot spot receptor grid is expanded until the receptor with the highest predicted concentration is located inside the grid, not on its edge.

No hot spot analyses were required for this modeling demonstration as described in Section 6.4.2.

If the final time-average modeled concentrations are below the standards, no other analyses are required. If a modeled exceedance of a standard is noted, then the modeling proceeds to Phase 4.

The BBCP modeled concentrations are below the standards and no other analysis is required.

Phase 4: Cause and Contribute - If results of the Phase 2 and Phase 3 analyses would have indicated a modeled exceedance of a PSD or NAAQS standard, additional analyses would be performed to determine the facility's contribution to exceeded impacts. A Phase 4 analysis would identify the contributed impacts resulting from the proposed project's emissions at an exceedance in comparison to the contributed impact of surrounding source emissions. If the project's contribution to any modeled exceedance is less than a defined significance threshold, no further analysis would be required. If such is not the case, the modeling inputs (emission reductions, for example) would be modified to reduce concentration impacts and the impacts demonstration would be repeated.

A Phase 4 analysis was not required because no PSD or NAAQS standard was exceeded for the BBCP.

6.1.3 Model Selection

Model Selection Overview

Dispersion modeling uses mathematical formulations to characterize the atmospheric processes that disperse a pollutant emitted by a source. Based on emissions and meteorological inputs, a dispersion model can be used to predict concentrations at selected downwind receptor locations. These air quality models are used to determine compliance with the SILs, NAAQS, and other regulatory requirements such as New Source Review (NSR) and Prevention of Significant Deterioration (PSD) regulations (NSR and PSD are not applicable in this case).

Dispersion models are addressed in Appendix A of EPA's *Guideline Document* (also published as Appendix W of 40 CFR Part 51), which was originally published in April 1978 to provide consistency and equity in the use of modeling within the U.S. air quality management system. The *Guideline Document* is periodically revised to ensure that new model developments or expanded regulatory requirements are incorporated. Appendix W was last updated with a final rule published in the *Federal Register* on January 17, 2017.

The EPA preferred and recommended models for air quality dispersion modeling are as follows:

AERMOD Modeling System - AERMOD is a steady-state Gaussian plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. AERMOD has replaced Industrial Source Complex (ISC3) as the preferred Gaussian plume model for near-field dispersion (within 50 km).

CALPUFF Modeling System – CALPUFF is a non-steady-state puff dispersion model that simulates the effects of time- and space-varying meteorological conditions on pollution transport, transformation and removal. CALPUFF can be applied for long-range transport (LRT) and for complex terrain.

Other Models – Other recommended models are suited for specific circumstances as described below:

- BLP is designed to handle unique modeling problems associated with buoyant line sources.
- CTDMPLUS/CTSCREEN is used for predicting impacts in complex terrain under all stability conditions.
- CALINE3 is used for predicting air pollution levels near highways and arterial streets. CALINE3 is incorporated into the more refined CAL3QHC and CAL3QHCR models.
- OCD is used to assess impacts near shorelines from offshore sources.

Selected Model

The model selected for the BBCP air dispersion modeling analysis is AERMOD as recommended by the *Modeling Guideline*. AERMOD is also the EPA-recommended model for refined modeling applications in simple and complex terrain situations within a 50-km modeling domain.

AERMOD has features capable of handling multiple point, area, line, and volume sources, hourly meteorological data, building downwash effects, and simple and complex terrain. The following discussion further explains the features of AERMOD and its corresponding preprocessors, AERMET and AERMAP.

AERMOD is a steady-state plume dispersion model for the assessment of pollutant concentrations from a variety of sources. AERMOD simulates transport and dispersion from multiple sources based on an updated characterization of the atmospheric boundary layer. Sources may be located in rural or urban areas and receptors may be located in simple or complex terrain. AERMOD accounts for building wake effects and plume downwash. Sequential meteorological data is processed to estimate concentrations for averaging times from one hour to one year. AERMOD is appropriate for point, volume, and/or area sources; for surface, near-surface, and elevated releases; for rural or urban areas; for simple and complex terrain; for transport distances over which steady-state assumptions are appropriate (up to 50 km); and for continuous toxic air emissions. AERMOD's regulatory default option includes the use of terrain elevation data, stack-tip downwash, and sequential date checking.

AERMOD is designed to accept input data prepared by two specific pre-processor programs, AERMET and AERMAP. AERMET processes meteorological data available from several sources including on-site meteorological stations and the National Climatic Data Center (NCDC). AERMAP processes digital elevation data available from several different sources.

AERMET is designed to accept National Weather Service (NWS) 1-hour surface observations, NWS twice-daily upper air soundings, and data from on-site meteorological measurement systems. These data are processed in three steps. The first step extracts data from the archive data files and performs various quality assessment checks. The second step merges all available data (both NWS and on-site). These merged data are stored together in a single file. The third step reads the merged meteorological data and estimates the boundary layer parameters needed by AERMOD. AERMET writes two files for input to AERMOD: a file of hourly boundary layer parameter estimates and a file of multiple-level (when the data are available) observations of wind speed and direction, temperature, and standard deviation of the fluctuating components of the wind direction.

EPA created and released a supplemental preprocessor, AERMINUTE, to optionally supplement hourly average wind speed and direction data typically entered into AERMET. Hourly average surface data entered into AERMET are often generated by Automated Surface Observing Stations (ASOS) located at National Weather Service (NWS) stations. These data are typically processed such that wind speeds below three knots and certain variable wind direction conditions cannot be used in AERMOD. Consequently, hours during which these conditions occur are ignored in the modeling analysis and are indicated as “Calm” hours. AERMINUTE processes archived one-minute NWS data to fill in hourly observation data that are missing due to low wind speeds and variable wind directions.

AERMAP processes terrain elevation data available from the U.S. Geological Survey (USGS). The data are available in three distinct formats including Digital Elevation Model (DEM), Spatial Data Transfer Standard (SDTS), and National Elevation Dataset (NED). AERMAP first determines the base elevation at each receptor and source. For complex terrain situations, AERMOD captures the essential physics of dispersion in complex terrain and needs elevation data that convey the features of the surrounding terrain. In response to this need, AERMAP searches for the terrain height and location that has the greatest influence on dispersion for each individual receptor. This height is then referred to as the hill height scale. Both the base elevation and hill height scale data are produced by AERMAP as a file or files which can be directly accessed by AERMOD.

The most current EPA-accepted AERMOD and preprocessor versions will be used for the air quality impact analysis. For this application, the source code for the AERMOD modeling system is provided by BEE-Line Software Version. Versions of the modeling programs to be used are listed in Table 6-3.

Table 6-3: Air Dispersion Modeling Programs

Model/Program Name	Version
AERMOD	Version 16216r
AERMET	Version 16216
AERSURFACE	Version 13016
AERMAP	Version 11103
BPIPPRM	Version 04274
BEEST	Version 11.10
AERMINUTE[11]	Not Used

The complete model input and output files, including meteorological and terrain data files, are included on the DVD provided with the application. A summary of the model results is discussed in Section 6.4.

6.2 Model Setup and Inputs

Mine property will consist of three main parcels due to the boundary being intersected by Sheep Creek Road and Butte Creek Road. The northwest sector consists of the mine ventilation raises while the northeast portion provides access to a water well utilized by Tintina. The southern property sector contains all mining operations including the mine portal, milling and material processing facilities, two backup reciprocating internal combustion engine (RICE) gensets, a cement tailings facility, material stockpiles, and various water containments. (See Appendix B, Figure 1.)

Mining will occur at a rate of approximately 1.3 million tons/year or roughly 3,640 tons of Copper Enriched Rock per day. The expected life of the mine is approximately 19 years including a two-year development phase consisting of construction and pre-production mining and four years of reclamation and closure. This results in approximately 13 years of active production mining.

All mined rock will be brought to the surface through a single mine portal along a decline (tunnel) providing additional lower ramp access to the upper and lower Johnny Lee zones. The material will be processed through a series of sizing and flotation processes in order

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[11] AERMINUTE was not used in the modeling analyses. Its exclusion is explained in Section 6.3.5.

to liberate and concentrate copper for future smelting. See Section 2 for more detailed mine processes and activities.

The model conservatively overestimates facility-wide operations by simultaneously modeling the processes occurring in both the mine development and production phases. The development of the mine will be a dynamic process where mine sections will be developed subsequent to each other. Certain earthwork activities could occur throughout multiple areas of the mine. The model again overestimates operations by accounting for all construction processes within the development phase to occur simultaneously.

Due to the overestimated approach in the model setup, the models account for mine activities simultaneously occurring for the development phase including earthwork, excavation, pad prep, embankment construction, material transferring and hauling, and electrical generation by two generators as well as production phase sources accounting for milling and material processing sources controlled by baghouses, material transfers, and hauling. Road dust fugitive emissions have also been included for haul road and access road traffic in both development and production phases.

6.2.1 Facility Layout

Site Description

The Tintina mine permit boundary will encompass all operations within 1,888 acres of privately owned ranch land under lease to Tintina. The project area consists of all private land owned by the Bar Z Ranch and Short Ranch. The land is currently used predominately for agriculture, livestock grazing, and hay production. Outfitters also utilize the Sheep Creek drainage for hunting and fishing. All access to the mine area is closed to public access.

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. The main area of the mine is located at UTM coordinates 506,725 meters East, 5,179,710 meters North (NAD 83, Zone 12).

The area is characterized by forested mountains and rolling hills, grasslands and shrub lands, and creeks supplying the upper Sheep Creek drainage. Conifer Forest and Woodland habitat types are located within the surrounding area and include species of Douglas-fir, common juniper (less frequent), and Engelmann spruce (infrequent). Grassland and shrub land varies considerably among vegetation types in the area. Cropland is comprised of hay crops grown throughout the area and within the Sheep Creek floodplain.

The climatology of the immediate project area is boreal and is classified as a snowy climate with fully humid, warm summers. Adjacent rangeland is classified as a cold arid steppe.[12] Rainfall is approximately 13 inches per year.

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[12] Per Koppen-Geiger climate map, available from http://koeppen-geiger.vu-wien.ac.at/

The air quality classification for the area is “Better than National Standards” or unclassifiable/attainment for the National Ambient Air Quality Standards for criteria pollutants (40 CFR 81.315). There are no non-attainment areas near the site. The Gates of the Mountains Wilderness Area is approximately 38 miles northwest of the proposed mine boundary.

U.S. Highway 89 is located approximately 2.15 miles west of the mine portal and milling area. Meagher County roads, Butte Creek Road and Sheep Creek Road, run adjacent to the mine permit boundaries and traverse through the property creating the three property areas (Figure 1).

Ambient Air Boundary

As previously noted, all of the land within the Permit Boundary Area is privately owned ranch land under lease agreement to Tintina. Butte Creek Road and Sheep Creek Road will continue to provide public access to the surrounding area throughout mine development and production and are the only areas in which public access can occur through the Mine Permit Boundary area. These two roads are excluded from the Mine Permit Boundary Area as shown on Figure 1 and public access is precluded through the use of barbed wire fence on both sides of the road and locked gates for private ranch access. These fences extend eastward from the Mine Permit Boundary area to US Highway 89 which is also fenced. Therefore, there is no public access to either the privately-owned ranch land or to the Mine Permit Boundary area. Furthermore, there is additional internal fencing within the three Mine Permit Boundary area parcels including new fencing around the mine area (Appendix B, Figure 1, labeled “New Fence”) and new fencing surrounding the water-bearing lined containments and the mine intake and exhaust vents.

The modeled fenceline is created from the Mine Permit Boundary area illustrated in Appendix B, Figure 1. The figure was geo-rectified and input into BEEST to design the facility boundary.

General Layout, Buildings, and Structures

The general facility layout was designed in the model using geo-rectified versions of Appendix B, Figures 1 and 2. Figure 1 details the overall layout of the entire mine facility and was used to place the mill pad, portal pad, stockpiles, cemented tailings facility (CTF), roadway, mine vents, and water containments. Figure 2 provides a detailed view of the mill pad area and was used to place buildings, tanks, containments, silos, and other structures within the model. Building heights are input as their design heights to be constructed from construction pad level. The mill pad and portal pad will be constructed to an elevation of 1785 meters as discussed in Section 6.3.2. All buildings and structures were set to the construction grade elevation.

Two access roads provide entry to the mine facilities and are indicated in Appendix B, Figure 1. The Main Access Road extends from Sheep Creek Road to the east end of the mill pad. Most access will occur on this road for worker vehicles, material deliveries, waste removal, and concentrate trucks. A Construction Access Road will also be utilized during the early stages of the development phase while the Main Access Road is being constructed. The Construction Access Road already exists on site and will provide access for worker vehicles, material deliveries, and waste removal. Once the construction of the Main Access Road is complete, the Construction Access Road will be used less frequently.

Haul roads exist throughout the mine area and are illustrated in Appendix B, Figure 1. The main corridors within the Mine Operating Boundary area include the CTF Road which runs from the west end of the mill pad to the CTF and the North Mill Road which provides transport north of the mill pad to the west end of the portal pad. Additional haul roads designated as “service roads” provide haul truck access to the stockpiles and water reservoirs throughout the mine area. The service roads are smaller than the main haul roads and will experience less frequent haul truck traffic.

Additional figures depicting layouts of structures (water containments, CTF, etc.) throughout the facility are included in the Mine Operating Permit Application.[13]

Source Locations

Emission sources were placed in the model using Appendix B, Figures 1 and 2 and information provided in the Mine Operating Permit Application.

The 545-kW and 320-kW diesel engines will be located on the portal pad during mine development. They will provide electrical power during the development phase until line power is connected to the site. They will be removed once the production phase begins. The air compressor engine will also be located at facilities on the portal pad during the development phase and will be removed after development has been completed.

The mine portal location is depicted in Appendix B, Figure 1. The temporary diesel heaters to be placed at the portal were inserted near the opening within the model as described in the modeled source description. Figure 1 also illustrates the locations of road volume source placements and fugitive emissions from mine development and production. The road sources are placed along the roadways described in Section 6.2.2 in volume source configurations described in Section 6.2.3. The non-road fugitive emissions are placed in the area where they will occur as illustrated in Figure 1. For example, sources associated with excavation, wind erosion, pile disturbance, and material transfers to and from haul trucks at the Waste Rock Storage Pile are placed in the Waste Rock Storage Pile area as shown in Figure 1.

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[13] The Mine Operating Permit Application can be found at this link: http://deq.mt.gov/Portals/112/Land/Hardrock/Documents/TintinaRevisionIII/BBC%20Mine%20Operating%20Permit%20Revision%203_07-14-17.pdf

The jaw crusher enclosure is shown in Appendix B, Figure 1. The portable conical crusher and screening unit will be operated in years 0 through 3 only. It will principally be used in the Temporary Construction Stockpile area in years 0 to 2.0 and on the floor of the Cemented Tailings Facility in year 2 to 2.5. It has been placed near the Temporary Construction Stockpile in the model.

Mill pad sources are illustrated in Appendix B, Figure 2. This includes the milling process sources controlled by dust collector baghouses, the emergency generators to be used during the production phase, and the emergency fire pump engine.

Sources associated with the mine vent locations were placed using Appendix B, Figure 3. It displays the location of the Lower Exhaust Vent (EVL), Upper Exhaust Vent (EVU), and secondary escapeway where the emergency evacuation hoist powered by a 100-hp diesel engine is located.

Portable sources include the 325-hp generator, 131-hp generator, set of four 100-hp generators, nine temporary propane heaters (each requiring a 32-hp engine), and eleven diesel-powered light plants (each requiring a 14-hp engine). The generator sets will be used for various jobs throughout the facility, so they were placed around the facility in areas to overpredict impacts. The 325-hp generator is located at the west end of the mill pad and the 131-hp generator is located near the Process Water Pond, both near the western property boundary. The complete set of four 100-hp generators was placed on the fenceline side of the Non-Contact Water Reservoir. The propane heaters will be used to provide temporary heat in areas throughout the facility. They have been placed in sets of three throughout the facility in the model to mimic sources of heat for jobs occurring near the development phase workshop, the production phase truck shop, and the crushing and screening facility near the Temporary Construction Stockpile. The light plants will also be spread around the facility. They have been partitioned in the model with two sets of light plants at two different mine road intersections, three light plants at the Temporary Construction Stockpile, and four light plants at the portal pad.

6.2.2 Emission Rates

Model source emissions are based on the calculations detailed in Section 3 and the Emission Inventory included in Appendix C. Additional documents in Appendix E help explain the partitioning or combining of emissions from the Emission Inventory to model source inputs.

The Emission Inventory details the complete emissions calculations for all proposed sources and processes for the BBCP including stack sources, road fugitive dust, wind erosion, dozing and excavating, underground emissions, and material transfer sources. Emission calculations are organized within the Emission Inventory by these source types. Modeled point sources are straight forward and correspond to singular emission calculations in the Emission Inventory. Conversely, sources of fugitive emissions exist at various locations throughout the property and require the partitioning or combining of emissions into model volume sources to appropriately distribute emissions throughout the facility. The following sections describe the apportionment of emissions from the Emission

Inventory to modeled sources. All sources are modeled to operate at full capacity (8760 hours per year) unless otherwise noted.

The following documents will additionally aid in connecting the emissions inventory with the modeled inputs and should be used in conjunction to this section.

- Emissions Inventory – Appendix C
    - "Model Emission Inputs" sheet
        - *Direct emission inputs for modeled sources*
    - "Emissions by Activity" sheet
        - *Emissions for individual activities – feeds the "Model Emission Inputs" sheet as these emissions are combined for model inputs*
    - "Modeling Emissions" tables at bottom of source sheets
        - *Individual source sheets F1 – F30*
        - *Modeling Emissions tables at bottom of sheets feed the "Emissions by Activity" sheet*
- Additional Model Source Documents – Appendix E
    - E.1 Non-Road Fugitive Source Key
        - *Key indicates the Emission Inventory sources associated with modeled volume sources*
    - E.2 Haul Road Modeling Methodology
        - *Methodology used in apportioning haul road emissions*

Point Sources

Modeled point source emissions are summarized in the "Model Emission Inputs" sheet for the Emission Inventory. Point sources are straight forward and correspond to a singular source at the BBCP. For example, the model point source "P2" represents the emissions for Emission Inventory source P2, the 325-hp portable diesel engine generator.

The only point sources that do not have a one-to-one relationship with the Emission Inventory are the temporary portable propane heaters (Model IDs ProA, ProB, ProC) and the diesel-powered light plants (Model IDs LightA, LightB, LightC, LightD). Both of these groups of sources will be distributed in groups throughout the facility. Therefore, the three-temporary portable propane heater point sources represent a group of three heaters each, totaling nine heaters on-site. The total emissions for the heaters is apportioned between the three groups. The light plant sources represent four groups of diesel-powered light plants. Two of the groups (LightA and LightB) represent two plants while LightC and LightD represent three and four plants, respectively. Emissions have also been apportioned between the four light plant point sources.

The other point sources represent engine stacks, baghouse stacks, or the mine ventilation adits and portal. The mine vent heaters (P10A and P10B) are located at the intake airway vents however, they are direct-fired heaters that exhaust emissions into the underground mine ventilation system. Consequently, the emissions from the heaters will exhaust at the mine exhaust vents so the corresponding point sources are located at the exhaust vents. The heaters will only operate during cold months to prevent freezing at the ventilation adits and to provide heat to the underground mining area. Point sources P10A and P10B are therefore modeled to only operate from October through April in the model by using the "Month" emission factor selection under the Factor tab in the Source Options. Thus, the pound per hour emission rate for the heaters was modeled to only operate from October through April.

Four emergency generators (Model IDs P7A, P7B, P8, and P9) will reside on the proposed Tintina mine site and will only operate at a maximum of 500 hours per year. They will only operate in the event of an emergency or when undergoing short, scheduled maintenance procedures to ensure they are operational. Since they will only operate in the event of an emergency or when undergoing short, infrequent maintenance procedures to ensure they are operational, the emergency generators were modeled separately from regularly occurring mine activities and equipment. Additionally, mine activities will cease in the event of an emergency so other sources of emissions will not occur during emergency procedures. Due to the unpredictable nature of emergency operations the generators were modeled to simulate operation for two consecutive but arbitrary hours per day. This scenario provides an overestimation of emergency operations since it totals 728 hours of operation a year – exceeding their operational limit of 500 hours per year by 228 hours. This scenario was modeled using the "Hour of Day 7" option in the Factors tab of the Source Options.

Note that the 545-kW and 320-kW generators are modeled at 8760 hours of operation per year. As stated in Section 6.2.1, these two generators will produce power on the portal pad during the development phase until line power is connected to the facility. The 545-kW generator will primarily be used to provide power while the 320-kW will be used as a backup. Regardless, both engines have been modeled at full capacity to provide an overrepresentation of mine operation and an overestimation of modeled impacts.

Non-Road Fugitive Sources

Fugitive sources of emissions from excavation, embankment construction, wind erosion, pile disturbance, and material transferring were calculated as independent processes as detailed in the "Emission by Activity" sheet and the individual process sheets[14] of the Emissions Inventory in Appendix C. The independent calculations are based on the amount of material to be processed for each activity and are grouped for input into the model by the location of each activity.

For example, the Emission Inventory sheet F16 calculates emissions associated with soil removal activities throughout the facility. This accounts for the topsoil and subsoil stripping (dozing and scraping activities) and the associated material transfers to stockpiles for the removal of earthen material to develop the Portal Pad, Contact Water Pond, Cu-Enriched Ore Stockpile, Waste Rock Storage Pad, Mill Pad, Process Water Pond, Cemented Tailings Facility, and Non-Contact Water Reservoir. The emissions calculations in F16 are associated with the same mine development activity however the

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[14] Emissions for individual activities are listed in individual process sheets: F6, F7, F8, F10, F11, F13, F14, F16, F17, F18, F20, F21, F22, F23, and F24.

emissions occur at different locations throughout the facility. The emissions need to be apportioned by location within the model. Therefore, non-road fugitive emissions calculations are grouped in the Emission Inventory by activity. The activities may occur at various locations throughout the facility. So, emissions are partitioned or grouped by location for input into the model so that emissions are distributed to the correct areas within the facility.

For example, all emissions calculated for the independent processes at the Process Water Pond (PWP) were summed into the four volume sources encompassing the entire area of the PWP. The modeled sources are as follows:

PWP Modeled Emission Source IDs: PWP_T_1, PWP_T_2, PWP_T_3, PWP_T_4

These modeled sources account for the emissions calculated in the emissions inventory as follows:

Associated Emission Inventory processes:
- F8: Dozing for Embankment Construction
- F16: Soil Removal
- F8_T_PWP: Material Transfer Haul Truck to PWP
- F16_PWP_T: Material Transfer from PWP to Haul Truck

The calculations for each process are included at the bottom of the material processing pages of the emissions inventory (F6 through F24). **The activities associated with each volume source are included in Appendix E.1 "Non-Road Fugitive Source Key". The key provides a list of each Emission Inventory calculation associated with the modeled fugitive volume sources.** The activities are listed by a process description and an Activity ID that can be linked to the individual emission calculation detailed in the emissions inventory (Appendix C).

Additionally, fugitive sources of emissions from excavation, embankment construction, and material transferring are calculated in the emissions inventory on a 12 hour per day operational basis. However, these operational constraints were not included in the model. The hourly emission rate was input for all the "12 hour per day" sources but were modeled at 8760 hours of operation per year. This effectively doubles the amount of emissions in the model than what is represented in the emissions inventory. The hourly rates in the emissions inventory are calculated from the annual rate and converting the annual rate by 4380 hours of yearly operation, or twice the hourly rate if converted by 8760 hours of yearly operation. The "doubled" hourly rate based on 4380 hours/year is then input into the model to simulate that rate occurring every hour for 8760 hours per year rather than applying the "Hour of Day 7" factors like the emergency engines to only model the emissions for 12 hours per day. This again provides an overestimation of all emissions resulting from excavation, embankment construction, and material transferring.

Access Road Sources

Access road emissions account for the two access roadways onto the mine property – the Construction Access Road and Main Access Road. Emissions for years 0 to 2 (Emissions Inventory F29) are input into modeled sources representing the Construction Access Road. This is an overestimation of mine vehicle traffic along the roadway because vehicle volume will be shared with the Main Access Road once constructed. The Construction Access Road already exists on the property but will not need to be used at the modeled capacity for all of years 0 – 2. Emissions for years 2 to 15 (Emissions Inventory F30) are input into volume sources representing the Main Access Road and account for the largest amount of non-haul road emissions. As discussed in Section 3.1.9 the initial 200-meters of Main Access Road utilizes a control efficiency of 80% (Model Source IDs ACC_0001 – ACC_0026). The remaining Main Access Road sources utilize a control efficiency of 50%.

Total fugitive emissions for each roadway are evenly distributed between corresponding model volume sources. Total emissions are calculated in Emission Inventory sheets F29 and F30. Emission rates per volume source are listed in the “Model Emission Inputs” sheet of the Emission Inventory and at the bottom of sheets F29 and F30.

Haul Road Sources

Haul road emission calculations are based on the Vehicle Miles Traveled (VMT) for various activities throughout the mine property. Like the non-road fugitive sources, the haul road source emission calculations have been grouped in the Emission Inventory by associated mine activity. The emissions account for all the activities that require material hauling during the development and production phases of the BBCP (Emission Inventory pages F1, F2, and F3). VMT for each activity is listed in the Emission Inventory page titled “Road Dust Design Values”. The amount of material hauled is also listed for each activity.

A Road Activity ID was created for each activity in the development and production phases to categorize the emissions associated with each mine activity. The Road Activity IDs are listed on the “Road Dust Design Values” page of the Emission Inventory and the “Haul Road Source Notations” page in Appendix E.2. An example of a Road Activity ID is “DB2” corresponding to hauling of material associated with the Embankment Construction of the Portal Pad.

- Mine Phase: D – Represents the Development Phase
- Mine Process: B – Represents the Embankment Construction Activity
- Mine Area: 2 – Represents the Portal Pad

A “Road Activity ID Key” and “Road Activity ID Catalog” are included on the “Haul Road Source Notations” page in Appendix E.2. The “Road Activity ID Catalog” can be matched to the activities listed on the “Road Dust Design Values” page of the Emission Inventory.

As previously stated, each Road Activity ID corresponds to a calculated amount of emissions produced from haul road traffic completing that activity. Each Road Activity ID also corresponds to a VMT to complete that activity.

The haul road emissions for each Road Activity ID must then be appropriately distributed throughout the facility like the non-road fugitive source emissions. Certain roadways will experience more traffic, so an even distribution of total haul road emissions among all haul road volume sources does not accurately represent the location of haul road traffic throughout the facility. Rather, an accurate model representation requires a weighted distribution based on the frequency and spatial distribution of individual Road Activity ID emissions. Thus, a methodology was created to apportion the emissions calculated by Road Activity ID to the appropriate locations within the model.

The haul roads are separated into "road segments" where each segment has a purpose of connecting one area of the mine to another. The road segments are thus associated with mine activities. For example, road segment "Rd24" connects the North Mill road to the Cu-Enriched stockpile. Rd24 is therefore associated with the activity of hauling material from the North Mill road intersection to the Cu-Enriched stockpile (Road Activity ID: PJO). The emissions for that activity (PJO) are then distributed among the Rd24 volume sources. The road segments thus create a framework for the distribution of haul road emissions calculated in the Emission Inventory.

Each road segment provides a known road length (VMT) and location within the model, thus creating the locations for haul road volume sources. Therefore, the road segments were input into the model and volume sources were created for each segment. However, certain Road Activity IDs use multiple road segments and road segments are used for multiple Road Activity IDs. So, the road segments associated with each Road Activity ID were cataloged in Appendix E.2 "Haul Road Volume Source Apportionment". The number of volume sources was then summed for each Road Activity ID by adding the number of volume sources for each road segment associated with each Road Activity ID.

Example: Road Activity DB2 (61 total volume sources)

Road Activity ID	**Associated Road Segments**	**Description**	**# of Vol Sources**	
			Per Road Segment	**Per Road Activity ID**
DB2	Rd5	*Portal to west end of Portal Pad:*	31	61
	Rd17	*North Mill Road: WRS connector to Portal Pad*	18	
	Rd23	*North Mill road connector to WRS Pad*	12	

The number of volume sources associated with each Road Activity ID was then used to calculate the emissions "per volume source". The emissions per volume source for each Road Activity ID were calculated in the Emission Inventory by dividing the total emissions for each Road Activity ID by the number of volume sources associated with that Road

Activity ID. These calculations are located at the bottom of the Emission Inventory pages for F1 Road Dust Year 0-1, F2 Road Dust Year 1-2, and F3 Road Dust Year 2-15.

The emissions per volume source for each Road Activity ID can then be summed for each road segment knowing the number of Road Activity IDs associated with each road segment. This determines the appropriate distribution of emissions throughout the facility. Therefore, the Road Activity IDs associated with each road segment are cataloged in Appendix E.2 “Haul Road Emissions Apportionment by Volume Source”. The emissions per volume source are listed for each associated Road Activity ID and are summed for each road segment.

Example: Road Segment – Rd24

Road Segment ID	Road Description	Road Activity ID	Vol source per Road Activity ID		Vol source per Road Segment	
			PM10 (tpy)	PM2.5 (tpy)	PM10 (tpy)	PM2.5 (tpy)
Rd24	North Mill road connector to Cu-Enriched stockpile	DAO	0.00064	0.00006		
		DCO	0.00547	0.00055		
		PJO	0.00569	0.00057	**0.01180**	**0.00118**

This provides the total emissions per volume source for each road segment and can be inputted into the model to simulate the appropriate haul road emissions apportionment for each road segment.

The only location where the method for calculating haul road emissions was adjusted is at the southwest section of the Mine Operating Boundary area where the road segment Rd9 branches to access the Topsoil Stockpile. The main road segment Rd9 connects the CTF road to the topsoil, subsoil, and south reclaim stockpiles. At the division in the road, segment Rd9 continues onward to the Southeast towards the subsoil and south reclaim stockpiles. Segment R9B connects the road division to the topsoil stockpile in the Southwest direction. Emissions are divided between Rd9 and R9B after the road divide for volume sources Rd9_0102 – Rd9_0144 and R9B_0001 – R9B_0019. Emissions were adjusted to account for the material being hauled to the Topsoil Stockpile (R9B) rather than the Subsoil and South Reclamation Materials Stockpile (Rd9). Road Activity IDs DA2, DAC, DAO, DAW, DAM, DAP, DAT, and DHW account for material transferred to the Topsoil and Subsoil stockpiles. Emissions from those activities were halved to account for material going to both soil piles. Emissions from hauling material to the South Reclamation Materials Stockpile (Road Activity ID DDT) remained in the volume sources on the road to the South Reclamation Materials and Subsoil stockpiles (Rd9). The emissions apportionment is further detailed in Appendix E.2 “Haul Road Emissions Apportionment by Volume Source”.

6.2.3 Release Parameters

Emission source characteristics are further detailed in the Appendix E document titled Model Source Catalog.

Point Sources

At this time Tintina is unaware of the specific make and model of the engines that will be located at the facility. Source parameters are based on manufacturer specifications for similarly rated engine units. For instance, the parameters of stack height, diameter, temperature, and flow rate for the 914-hp diesel engine generator set are characteristic of a 914-hp engine that will be placed on-site. This accounts for all engines associated with generators, emergency fire pump, diesel heaters, propane heaters (32-hp engine each), air compressor (275-hp engine), and light plants (14-hp engine each). Stack heights are based on the height of the engine or generator containment dimensions. The 1000-kW emergency generators have an additional stack attached because they will be placed on the mill pad and be stationary for the duration of the production phase.

Sources utilizing baghouse dust collectors will emit from stacks on the mill pad or the west end of the portal pad (jaw crusher). Dust collector stack parameters and flowrates are technical values provided by Tintina and are based on the processes being controlled. All baghouse sources control enclosed spaces including the jaw crusher and associated screen. All stacks will emit at ambient temperature which was input as 0 Kelvin (-273.15° Celsius) in AERMOD because it directs the program to use the ambient temperature in the AERMET file for that time period.

The portal and exhaust vents are modeled as point sources because they will be structures constructed with the purpose of directing exhaust gas with a designed flowrate. The portal opening will be constructed into a hillside to allow for haul traffic to enter the underground mine. Consequently, it is input as a horizontal stack release to characterize appropriate emissions releases. The opening will be 17-feet in diameter and is modeled accordingly. The mine exhaust vents will be constructed vertically upwards from the EVU and EVL zones and are modeled as vertical stack releases. They will both be 16-feet in diameter. Ventilation flow is apportioned to the three exhaust locations and their flow rates are calculated in standard cubic feet per minute (scfm) and actual cubic feet per minute (acfm) in the Underground Sources section of the emissions inventory. The exhaust gas will be warmed by the underground mining processes and will be around 70°F. The emissions from the propane heaters at the intake vents will emit through the exhaust vents at the same stack characteristics. These sources were input into the model at the same location and parameters as the mine exhaust vent sources.

Volume Sources

All volume sources are calculated based on EPA guidance for determining release heights, initial vertical dimensions, and initial horizontal dimensions. Sources are either represented by single volume sources or a line of adjacent volume sources. They are also all surface-based sources.

Volume source characteristics for the portable screen and crushing units located at the Temporary Construction Stockpile are based on dimensions for similarly sized equipment – 250 ton per hour conical crusher and 400 ton per hour screens. Similar to the engine sources, Tintina is unaware of the specific make and model of these units at this time.

The non-road fugitive emission sources account for soil removal, excavation, embankment construction, wind erosion, pile disturbance, and transfers to and from haul trucks. Emissions are grouped into sources encompassing the areas of activity. For example, the Contact Water Pond (CWP) will be the location of soil removal (Emission Inventory, EI, ID F16), excavation of materials to be hauled to the North Reclamation Material Stockpile (EI ID F13), and transfers into haul trucks (EI IDs F13 and F16). The earthwork will occur over the entire area of the future CWP location. Three volume sources span the area of the CWP to account for the associated fugitive emissions since we cannot predict where emissions will occur at a particular time of the modeling period. The horizontal component of these volume sources is based on the length of the affected area divided by the number of volume sources accounting for that area. So, the CWP is approximately 230 meters in length and utilizes three volume sources. Each initial horizontal dimension in thus based on a horizontal length of 76.67 meters (230 / 3 = 76.67). Each of these volume sources was calculated with characteristics based on single, surface-based volume sources rather than line sources represented by several adjacent sources because each source will occur individually over mine development. These calculations are detailed in the Model Source Catalog.

The vertical components for the non-road fugitive sources are dependent on whether it is necessary to account for pile height. Sources that account for soil removal, excavation, and transfers to haul trucks are based on the vertical dimension of a dozer utilized in soil removal and excavation. Transfers to haul trucks will likely be accomplished with front-end loaders; however, using dozer vertical dimensions provides a conservative overestimate of impacts by creating a shorter release height. The release height and initial vertical dimension components for these sources are based on bulldozer height dimensions and are indicated in the Model Source Catalog. Sources that account for stockpile height, such as wind erosion, pile disturbance, and transfer to piles utilize the height of the pile as the vertical component in order to interpret the action of these activities at varying vertical locations of the stockpiles. The release heights and initial vertical dimensions for these sources are based on the height of associated stockpile and are indicated in the Model Source Catalog.

Road volume sources for fugitive dust emissions are based on the width of each roadway and the type of vehicle used to represent vehicle travel on the road. All road sources are represented by lines of adjacent, surface-based volume sources and are separated by the length of the vehicle.

Haul roads are based on the dimensions for a 42 to 44-ton target payload haul truck. The release height and initial vertical dimensions are based on the height of the truck and the sources are separated by the length of the trucks. Initial horizontal dimensions are calculated differently for the CTF road and service roads. The CTF road runs from the portal pad along the northern edge of the mill pad and then southeast to the CTF (Figure 1). There will also be short branches off the CTF road to access the Waste Rock Storage (WRS) and copper-enriched rock (Cu Pile) stockpile pads. The CTF road will be two lanes so the initial horizontal dimension for the associated volume sources is based on the road width of 10 meters or approximately 32.8 feet. Service haul roads provide access to the Process Water Pond, Non-Contact Water Reservoir, Contact Water Ponds, and Topsoil and Subsoil storage areas. They will have a roadbed with a 16-foot width that allows for single lane traffic. Consequently, volume sources for the service haul roads have an initial horizontal dimension based on the width of the haul truck per EPA guidance. Road segments representing the CTF Roads and service roads are indicated in the Model Source Catalog.

Access roads are based on the dimensions for a Class 6 Heavy Truck – such as an International Durastar – because it represents the mean vehicle weight for traffic along both roadways. The release height and initial vertical dimension inputs are based on the vehicle dimensions and the sources are spaced by the vehicle length. The Main Access Road will be two lanes, each 12 feet wide, with a minimum 1-foot shoulder; therefore, the initial horizontal dimension for the volume sources is based on a road width of 26 feet. The temporary Construction Access Road is based on the existing roadway entering the facility from Butte Creek Road. It is a single lane roadway so the initial horizontal dimensions for these sources are based on the width of a Class 6 Heavy Truck. All road sources are additionally explained in the Model Source Catalog.

6.2.4 Surrounding Sources

Cumulative impacts modeling for comparison to the PSD Increments (again, not applicable in this case) and NAAQS require the modeling of significant surrounding sources to evaluate cumulative air quality standards impacts. This could include minor or major sources within Tintina's significant impact area (SIA). No significant sources were located within the area surrounding the SIAs for each pollutant. The spatial limits of AERMOD were taken into consideration while screening for surrounding sources due to the model being capable of estimating impacts up to 50 kilometers of the edge of the SIAs.

6.3 AERMOD Technical Options

Regulatory default selections were used for the technical options in all modeling runs. Options selected within the regulatory default framework relate to output options, formatting, and NO_2 / NO_X conversion parameters. Output formats will provide MDEQ with a model output grid for each pollutant and averaging period.

6.3.1 Receptor Grid

A Cartesian receptor grid was used for combined SIL and NAAQS modeling analyses. The analyses were assessed concurrently in order to reduce computer processing time. The receptor grids extent and spacing are defined as follows and are reported as nominal values. The BEEST graphical user interface program was used to automatically create rectangular receptor grids around the property boundary based on these input parameters:

Fenceline (Ambient Air Boundary): 50-meter spacing
Fenceline to 1,000 meters: 100-meter spacing
1,000 to 3,000 meters: 250-meter spacing
3,000 to 10,000 meters: 500-meter spacing
10,000 to 20,000 meters: 1,000-meter spacing

NOTE: The outermost grid was reduced from 20,000 meters to an extent of 15,000 meters in order to reduce model runtime for the model runs assessing particulate matter (PM_{10} and $PM_{2.5}$) impacts. The particulate matter model runs include a large number of volume sources which increase processing time. The reduction in the outer extent only reduced the grid by approximately 960 receptors. The reduced grid adequately captured the extent of PM_{10} and $PM_{2.5}$ impacts with the farthest 24-hour $PM_{2.5}$ SIL exceedance occurring approximately 7,600 meters from the fenceline and the 24-hour $PM_{2.5}$ NAAQS impact occurring at the facility fenceline. The fenceline impact does not exceed the 24-hour $PM_{2.5}$ NAAQS.

Additional receptors were placed along Sheep Creek Road and Butte Creek Road. Both county roadways intersect the property boundary and run adjacent to the fenceline. Receptors were placed with 50-meter spacing along the portions of both roads where they are located next to the fenceline to ensure impacts along the roadway were captured.

An analysis of modeling results using this complete grid configuration indicated that the receptor spacing was adequate to identify all peak impacts. No hotspot analyses were required. Additionally, it was determined that no refined grids were required to separately assess impacts at locations with high occupation frequencies.

6.3.2 Elevation Data

Elevations of sources used in the modeling analyses were determined from preliminary general arrangement drawing elevations of the plant sites and AERMAP. Sources and structures located on the Mill Pad and Portal Pad were placed at the project construction grade of 1785 meters. All additional source elevations were calculated using AERMAP. Sources accounting for the fugitive emissions associated with the earthwork and construction of the Portal Pad and Mill Pad were set to AERMAP calculated values since those activities will occur at existing elevations to ultimately achieve the final construction grade of 1785 meters.

Receptor elevations and hill heights were determined using AERMAP. Elevation data was obtained from the USGS website in seamless NED files. NED files were downloaded spanning the modeling domain to calculate hill heights as determined by the BEEST domain calculation feature. The NED elevation file and AERMAP processor files are included on the modeling DVD submitted with this application package.

6.3.3 NOx to NO_2 Conversion

NO_2/NO_X conversion was accounted for using the Ambient Ratio Method Version 2 (ARM2). ARM2 is a regulatory default option within AERMOD. The regulatory default values were selected for the ratio inputs with 0.5 for the minimum ratio and 0.9 for the maximum ratio.

6.3.4 Building Downwash and GEP Stack Heights

Building influences on stacks were considered by incorporating the EPA Building Profile Input Program for PRIME (BPIPPRM). BPIPPRM is used in conjunction with AERMOD to characterize building downwash effects. According to program documentation, it is "designed to incorporate the two fundamental features associated with building downwash: enhanced plume dispersion coefficients due to the turbulent wake, and reduced plume rise caused by a combination of the descending streamlines in the lee of the building and the increased entrainment in the wake." Stack and building heights in the dispersion model are the proposed heights or Good Engineering Practice (GEP) stack heights.

6.3.5 Meteorological Data

AERMOD requires hourly meteorological data with a minimum set of parameters such as temperature, wind speed, and wind direction to calculate concentration impacts. EPA modeling policy suggests the use of either one complete year of meteorological data collected near the site of the proposed project or five current years of NWS data collected at a NWS station within the general vicinity of the project. The final meteorological data input into AERMOD must be processed through the AERMET module. AERMET requires, at a minimum, one set of hourly surface observation data and a complementary set of twice-daily upper air sounding data. If on-site data is provided, AERMET will optionally accept additional NWS surface data that it uses to substitute data missing from the on-site set.

Data describing surface characteristics surrounding the surface meteorological station are an additional required input to AERMET. Seasonally and directionally varying data are available in the form of land cover data files available from the Multi-Resolution Land Characteristics Consortium. Files from the 1992 National Land Cover Database (NLCD1992)[15] were obtained for input into AERSURFACE, which reads the data and produces an AERMET input file with the required surface characteristics.

All the above data types were used to produce AERMET meteorological files for the BBCP. A meteorological tower was constructed on mine property and has collected surface meteorological data since 2012. As a result, five years of on-site data[16] were input into AERMET to assess on-site surface conditions from May 1, 2012, through April 30,

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[15] Note that, although newer datasets are available, they are not currently supported by AERSURFACE.

[16] Five years of on-site data is used for surface data even though only one year of on-site surface data is required for modeling analyses.

2017. The meteorological station uses PSD-compliant instrumentation and procedures in accordance with EPA and State of Montana guidance to collect data for the modeling analyses. An in-depth description of the instrumentation and procedures used in collecting the on-site meteorological data is included in Appendix E. Quarterly audits and calibrations of the meteorological station have been conducted since the start of monitoring and reports are submitted to DEQ on a quarterly basis.

Surface data from the Helena, MT NWS station (WBAN 24144) was used as supplemental surface data to substitute for missing data from the on-site dataset. Upper air data was utilized from the Great Falls, MT Upper Air station (WBAN 04102).

Following are basic descriptions of the data included in the AERMET meteorological datasets used for this modeling analysis. Additional detail is provided in the model-generated electronic files included on the DVD attached to the submittal copy of this application. ".SFC" and ".PFL" files are included in both individual year and concatenated datasets.

Tintina Meteorological Dataset

- On-site surface data: Tintina On-Site, 2012 – 2017
- Supplemental NWS surface data: Helena Regional Airport (KHLN) Airport, 2012 – 2017
- Upper air NWS data: Great Falls International Airport (GTF), 2012 – 2017
- Surface characteristics data: Tintina On-Site Location, 1992 data

Another optional form of meteorological data supplementation can be utilized by the preprocessor, AERMINUTE, to reduce the number of meteorological hours with "calm" conditions in a NWS surface dataset. If an hourly wind speed measurement is below a threshold value, AERMOD does not calculate projected concentrations for that hour. To address instances where hourly observational data include a significant number of calm hours, thereby reducing the completeness of the modeling results, EPA developed an AERMET preprocessor called AERMINUTE that accepts one-minute ASOS data and generates hourly averaged wind speeds and wind directions that can supplement the standard hourly ASOS observations.

AERMINUTE was not required in the processing of the Tintina meteorological dataset and it was not used in the modeling analysis. As previously stated, AERMINUTE supplements NWS surface data and the Tintina meteorological dataset utilizes five years of on-site collected surface data as the primary surface dataset. NWS surface data is used secondarily to supplement "missing" hours in the primary on-site data. The on-site surface data cannot utilize AERMINUTE supplementation because AERMINUTE requires ASOS minutely data from an associated ASOS monitoring site. Regardless, the on-site station is designed to measure wind speed and direction more accurately at low wind speeds than NWS stations. This resulted in only 1.6% of surface data hours to be classified as "calm" hours and 4.36% to be classified as "missing" hours. A total of 5.97%

or 2619 hours out of the 43,848 hours processed are classified as “calm” or “missing” hours. Therefore, the Tintina meteorological dataset has less than 10% “calm” hours and is an appropriate, representative meteorological dataset without the utilization of AERMINUTE.

6.3.6 Background Concentrations

Background concentrations are used if a cumulative NAAQS air impact modeling analysis is required. Ambient background concentrations are added to modeled impacts to demonstrate compliance with applicable NAAQS thresholds. MDEQ guidance states that the most current representative background information should be used in the modeling analysis. If ambient monitoring does not exist on-site, ambient data should be utilized from a monitoring station in an area of similar characteristics of the modeling domain site.

Tintina utilized criteria pollutant background concentrations 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 as a 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 characteristic 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. 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.

Background values were obtained from the State of Montana 2017 Air Quality Network Plan (2017 Network Plan) produced by MDEQ or the EPA Monitoring Values Report (MVR) database. The 2017 Network Plan provides summaries of monitoring concentrations for the NAAQS design values to be used for modeling assessments in comparison to the NAAQS standards. The design values are averaged from 2014 – 2016 and particulate values are adjusted to exclude exceptional events such as forest fires. The 2017 Network Plan provides NAAQS design background concentration values for 24-hour and annual $PM_{2.5}$, 1-hour SO_2, and 1-hour and annual NO_2. Values for 24-hour PM_{10} and 1-hour CO are not included in the report and were obtained via the EPA MVR database. Data was extracted from MVR database to represent the respective NAAQS Design Values. Consequently, the concentrations represent an average of the three most recent years of monitoring data (2015 – 2017) and exclude exceptional events data. The 2nd max values were extracted for both 24-hour PM_{10} and 1-hour CO. The selected background concentrations are included in Table 6-4. Only concentrations are listed for pollutants and averaging periods that exceed the SILs as detailed in Section 6.4.1.

Table 6-4: NAAQS Background Concentrations

Pollutant	Averaging Period	Background[(a)] Concentration (μg/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	0.9(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.

6.4 Ambient Concentration Modeling Results

6.4.1 Significant Impacts

Significant impact modeling results establish the need for cumulative impacts analyses. If modeled impacts from proposed emissions exceed any respective SIL, additional analyses demonstrating cumulative ambient concentration impacts are typically required. SIL modeling results are compared to the applicable Class II SILs in Table 6-5. All concentrations are 1st-high values for comparison to the SILs.

Table 6-5: Tintina Significant Impact Modeling Results

Pollutant	Avg. Period	Modeled Conc. [(a)] (μg/m^3)	Class II SIL (μg/m^3)	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(b)	Y
	Annual	11.7	1	Y
SO_2	1-hr	13.8	7.8(c)	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

As indicated, Tintina's potential emissions of 8-Hour CO and 3-Hour, 24-Hour, and Annual SO_2 do not exceed the respective SIL standards. However, cumulative impacts modeling was performed for the other pollutants where peak impacts exceed the SILs.

6.4.2 Cumulative NAAQS and MAAQS Impacts

NAAQS and MAAQS compliance demonstrations require the inclusion of relevant nearby industrial sources as well as the background concentrations for each pollutant and averaging period for which the applicant source significantly impacts ambient concentrations. Applicable cumulative impacts modeling results are compared to the relevant MAAQS and NAAQS in Table 6-6. Modeled concentrations show the combined impacts from Tintina sources added to the appropriate background values as described in Section 6.3.6. No regional stationary sources exist in the surrounding impact area as described in Section 6.2.4. Ambient standards modeling for each pollutant/averaging-hour combination was conducted using the appropriate meteorological input dataset (individual year or concatenated data) and the appropriate modeling high-impact (High-1st-High, High-2nd-High, etc.).

Table 6-6: Tintina Class NAAQS/MAAQS Modeling Results

Pollu-tant	Avg. Period	Modeled Conc. (μg/m³)	Background Conc. (μg/m³)	Ambient Conc. (μg/m³)	NAAQS (μg/m³)	% of NAAQS	MAAQS (μg/m³)	% 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]	0.9	1891	40,000	5%	26,450	7%

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 μg/m³ and was not included in the table. With the addition of the 20.7 μg/m³ background value the ambient impact is 36% of the MAAQS.

As indicated, Tintina's potential emissions of CO, SO_2, NO_2, PM_{10}, and $PM_{2.5}$ do not cause or contribute to an exceedance of the relevant MAAQS and NAAQS.

The only impacts close to the NAAQS threshold to merit the consideration of a hot spot analysis are the 1-hour NO_2 and 24-hour PM_{10} results. Both impacts are located along the fenceline near Butte Creek Road and are considered adequately modeled considering that receptor density is high due to fenceline and road receptors creating spacing at 30 - 40 meters. As a result, no further hot spot analyses are required.

The impacts from 24-hour PM_{10} and 1-hour NO_2 generally approach the NAAQS standards; however, it is important to note the very conservative approach in modeling a scenario that is an over-estimation of realistic yearly mine activity. The development phase and production phase activities were modeled concurrently and the activities within each phase are modeled for the years with the highest throughput or associated impacts. Additionally, all construction activities in the development phase are modeled simultaneously rather than depicting the dynamic nature of the mine development both spatially and temporally. Instead, the model accounts for all activities to occur at the same time over the course of the entire modeling period. Furthermore, the 545-kW and 320-kW generators will only provide power on the portal pad prior to the substation coming online. Additionally, the 545-kW unit will be the primary source of power until line power is provided to the site. The 320-kW generator will provide emergency backup power for the underground pumps, vent fans, and shop in the event the main generator power supply is disrupted. Regardless, both generators are modeled at full capacity for the entire duration of the model providing another overestimation of impacts. In summary, an overestimation of all mine processes during the development and production phases of the BBCP do not cause or contribute to an exceedance of the relevant MAAQS and NAAQS.

6.4.3 Emergency Operations

The four emergency generators that will reside on the proposed Tintina mine site will only operate at a maximum of 500 hours per year. Since they will only operate in the event of an emergency or when undergoing short, infrequent maintenance procedures to ensure they are operational, the emergency generators were modeled separately from regularly occurring mine activities and equipment. Additionally, mine activities will cease in the event of an emergency so other sources of emissions will not occur during emergency procedures.

Due to the unpredictable nature of emergency operations the generators were modeled to simulate operation for two consecutive but arbitrary hours per day. This scenario provides an overestimation of emergency operations since it totals 728 hours of operation a year – exceeding their operational limit by 228 hours each year.

The SIL and NAAQS impacts are as follows:

Table 6-7: Tintina Emergency Operation Significant Impact Modeling Results

Pollutant	Avg. Period	Modeled Conc. [(a)] (μg/m^3)	Class II SIL (μg/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
SO_2	1-hr	5.6	7.8[(c)]	N
	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

The only exceedance is the 1-Hour NO_2 SIL which was assessed for comparison with the NAAQS.

Table 6-8: Tintina Emergency Operation NAAQS Modeling Results

Pollu-tant	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%	------	------

a. Modeled concentration is the high-8th-high modeled over a 5-year concatenated met period

As indicated, an overestimation of emergency operations at the mine does not exceed the 1-hour NO_2 NAAQS limit.

APPENDIX A: MDEQ AIR QUALITY PERMIT APPLICATION FORMS

Air Quality Bureau ● P.O. Box 200901 ● Helena MT 59620-0901 ● (406) 444-3490

AIR QUALITY PERMIT APPLICATION FOR STATIONARY SOURCES

Montana Department of Environmental Quality
Air Quality Bureau
Permitting Services Section Supervisor
1520 E. Sixth Avenue
P.O. Box 200901
Helena, MT 59620-0901
Phone: (406) 444-3490 FAX (406) 444-1499
Email: DEQ-ARMB-Admin@mt.gov

For State of Montana Use Only

Permit Application #: _________ AFS #: _________

Application Fee Paid with Application? ☐ Yes ☐ No
Amount Paid: __________ Check #: ____________

Three complete copies of this application, any associated fees, and the affidavit of publication of the attached public notice must be delivered to the address above. The application may be submitted electronically to the email address provided above; however, the application will not be considered complete until the appropriate permit application fee, affidavit of publication, and certification of truth, accuracy, and completeness are submitted to the Department. Any checks, affidavits, and certifications submitted separately from the application should be clearly identified. The applicant is encouraged to contact the Department with any questions related to this application form.

Note: This application form should ***not*** *be used for portable sources or oil and gas registrations. Permit application forms for portable sources and oil and gas registrations are available on the Department's website. Applications for Acid Rain permits must be made on nationally standardized forms available from the U.S. Environmental Protection Agency as well as through the Department's application for a Title V Operating Permit.*

§1.0 General Facility Information and Site Description

§1.1 FACILITY NAME AND ADDRESS (As registered with the Montana Secretary of State)

Company Name Tintina Montana Inc.

Facility Name Black Butte Copper Mine

Mailing Address	Physical Address (if different from mailing address)
17 West Main St.; P.O. Box 431 Address	_____ Address
White Sulphur Springs (City) MT (State) 59645 (Zip)	_____ (City) _____ (State) _____ (Zip)

§1.2 Contact Information

	Name	Title	Telephone	Email
Owner	Tintina Montana, Inc.		406-547-3466	
Facility Manager	John Shanahan	President and CEO	406-547-3466	jshanahan@sandfireamerica.com
Responsible Official	John Shanahan	President and CEO	406-547-3466	jshanahan@sandfireamerica.com
Alternate Responsible Official				
Contact Person	Jerry Zieg	Senior Vice President of Exploration	406-547-3466	jzieg@sandfireamerica.com
Alternate Contact Person				

[Note: If email address is provided, the Department will send all permit notices (i.e. Preliminary Determination, Department Decision, and Final Permit) electronically.

§1.3 PERMIT TYPE (Check all that apply)

☒ **Montana Air Quality Permit (MAQP)**

MAQP Permit Action: ☒ New Facility ☐ Modification to Existing Permit # _________ - _____

☐ Synthetic Minor (major source using federally enforceable permit conditions to avoid MACT, NSR, or Title V Operating Permit requirements)

☐ New Source Review

- ☐ Prevention of Significant Deterioration
- ☐ Nonattainment Area

☐ **Air Quality Operating Permit (Title V)**

Title V Permit Action: ☐ Initial Air Quality Operating Permit

☐ Renewal of Air Quality Operating Permit #OP_________ - _____

☐ Modification of Air Quality Operating Permit #OP_________ - _____

- ☐ Minor Modification
- ☐ Significant Modification

Note: The applicant must also send one copy of the Title V Operating Permit application to the EPA at the following address:

Office of Partnerships and Regulatory Assistance
Air and Radiation Program
US EPA Region VIII 8P-AR
1595 Wynkoop St.
Denver, Colorado 80202-1129

A statement certifying that a copy of the Title V Operating Permit application has been mailed to EPA must accompany the Title V Operating Permit application.

§1.4 Physical Location and Facility Information

Qtr/Qtr Section	_________	Sections	24, 25, and 36	Township	12 North	Range	6 East
			19, 29, 30, 31, and 32		12 North		7 East

Latitude (in decimal degrees) 46.77° Longitude (in decimal degrees) -110.92° County Meagher

Will the facility be operating in (or impacting) a nonattainment area? ☐ Yes ☒ No

(*Note: Maps of the state's nonattainment areas can be found at the following website:* http://deq.mt.gov/AirQuality/Planning/AirNonattainment.asp.)

If yes, which pollutant(s) is the area nonattainment for?
____

Total Property Area (acres) 1888 acres (mine permit boundary) Year Facility Began Operation at Site: New Facility

General Nature of Business: Copper Mining and Milling

Standard Industrial Classification (SIC) Codes(s): 1021

SIC Description(s): Metal Mining - Copper Ore

(*Note: SIC Codes can be found at the following website:* http://www.osha.gov/pls/imis/sicsearch.html.)

For MAQP only, **a drawing, sketch, or topographic map of appropriate scale must be submitted** (maximum scale 1"=500', measurement to the nearest 20'), showing at least the following:

a. The property boundaries on which the source is located;
b. The outlines and dimensions of all existing and proposed buildings and stacks;
c. The locations of existing and proposed emitting units, including lat/long coordinates (in NAD83) and elevation (in feet above mean sea level) for each emitting unit. The emissions units and points should be identified as existing or proposed;
d. Any nearby streets, highways, and waterbodies;
e. Any nearby sensitive areas, such as schools, hospitals, parks, residential areas, etc.;
f. A true north arrow; and
g. A graphically displayed scale.

See Appendix B

§1.5 Project Summary (*Not Required for Title V Operating Permit applications*)

Overview of project, including any new or modified equipment (*attach additional information as necessary*):

The development and operation of a new underground copper mine and mill at the Black Butte Copper Project site, located 15 miles north of White Sulphur Springs. The project will produce and ship copper concentrate mined from both the upper and lower zones of the Johnny Lee copper deposit.

Include a process flow diagram showing material balances.

Construction/Installation Schedule:

Expected Construction Start Date: October 2018 (construction of decline) Expected Operation Start Date: Mid 2021

Duration (if a temporary source): ____

Optional Information:

Estimate of Capital Expenditure for Proposed Project: $_______________

Estimate of Cost of Air Pollution Control Equipment: $_______________

§2.0 Emitting Unit Listing

List all existing and proposed emitting units.
For Title V Operating Permits only, note all insignificant emission units.

Note: An **insignificant emissions unit** includes any activity or emissions unit that has the potential to emit less than 5 tons per year of any regulated pollutant, less than 500 pounds per year of lead, less than 500 pounds per year of a hazardous air pollutant, and is not regulated by an applicable requirement, such as a New Source Performance Standard (NSPS) or Maximum Achievable Control Technology (MACT) standard.

EMITTING UNIT		**Pollution Control Device**	**New Source**	**Existing Source**	**Insignificant**	
ID	**Name**				**Yes**	**No**
P1	250 TPH Portable Conical Crusher	Water suppression	☒	☐	☐	☒
P2	325-hp Portable Diesel Eng/Gen	NSPS Subpart IIII	☒	☐	☐	☒
P3	2 – Portable Screens (400 TPH each)	Water suppression	☒	☐	☐	☒
P4	131-hp Portable Diesel Eng/Gen	NSPS Subpart IIII	☒	☐	☐	☒
P5	545-kW/914-hp Portable Diesel Eng/Gen	NSPS Subpart IIII	☒	☐	☐	☒
P6	320-kW/536-hp Portable Diesel Eng/Gen	NSPS Subpart IIII	☒	☐	☐	☒
P7	2- 1000-kW/1675-hp Diesel Eng/Gen - Emergency backup	NSPS Subpart IIII	☒	☐	☐	☒
P8	100-hp Diesel Eng/Gen – Emergency evac hoists	NSPS Subpart IIII	☒	☐	☐	☒
P9	50-hp Diesel Fire Pump – Emergency	NSPS Subpart IIII	☒	☐	☐	☒
P10A	23 MMBtu/hr Propane-fired Heater – Intake Vent for Upper Copper Zone	Good combustion practices	☒	☐	☐	☒
P10B	52 MMBtu/hr Propane-fired Heater – Intake Vent for Lower Copper Zone	Good combustion practices	☒	☐	☐	☒
P11	3 Temporary diesel heaters at Portal - (1.2 MMBtu/hr total)	Good combustion practices	☒	☐	☒	☐
P12	3640 TPD Jaw Crusher	Building/Dust Collector	☒	☐	☐	☒
P13A	Mill Building (mill, lime storage, etc.)	Building/Dust Collector	☒	☐	☐	☒
P13B	Mill Building (lime area/slurry mix tank)	Building/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	4- Portable Diesel Eng/Gen (400-hp total)	NSPS Subpart IIII	☒	☐	☐	☒
P18	Air Compressor - 275-hp Diesel Engine	NSPS Subpart IIII	☒	☐	☐	☒
UG	ANFO	Best operating practices	☒	☐	☐	☒
F1	Road Dust, Mine Operating Year (MOY) 0 to 1	Reasonable Precautions/Dust Suppression	☒	☐	☐	☒
F2	Road Dust, MOY 1 to 2	Reasonable Precautions/Dust Suppression	☒	☐	☐	☒
F3	Road Dust, MOY 2 to 15, Annual Average	Reasonable Precautions/Dust Suppression	☒	☐	☒	☐
F4	Road Dust, MOY 16 and 17, Annual Average	Reasonable Precautions/Dust Suppression	☒	☐	☐	☒
F5	Road Dust, MOY 18	Reasonable Precautions/Dust Suppression	☒	☐	☒	☐
F6	Material Transfer to Temporary Stockpile, MOY 0 to 1.5	Reasonable Precautions/Dust Suppression	☒	☐	☒	☐
F7	Temporary Construction Stockpile	Reasonable Precautions/Dust Suppression	☒	☐	☒	☐
F8	Embankment Construction, MOY 0 to 1.5	Reasonable Precautions/Dust Suppression	☒	☐	☒	☐
F9	Backfill, Non-contact Water Reservoir (NCWR) Embankment Material to Cemented Tailings Facility (CTF), MOY 16 to 18	Reasonable Precautions/Dust Suppression	☒	☐	☒	☐
F10	Material Transfer to South Stockpile, MOY 0 to 1	Reasonable Precautions/Dust Suppression	☒	☐	☒	☐
F11	Excess Reclamation Stockpile (South)	Reasonable Precautions/Dust Suppression	☒	☐	☒	☐
F12	Material Transfer from South Stockpile, MOY 16 to 17	Reasonable Precautions/Dust Suppression	☒	☐	☒	☐
F13	Material Transfer to North Stockpile, MOY 0 to 1	Reasonable Precautions/Dust	☒	☐	☒	☐

		Suppression				
F14	Excess Reclamation Stockpile (North)	Reasonable Precautions/Dust Suppression	☒	☐	☒	☐
F15	Material Transfer from North Stockpile, MOY 16 to 18	Reasonable Precautions/Dust Suppression	☒	☐	☒	☐
F16	Soil Removal and Stockpiling, MOR 0 to 1	Reasonable Precautions/Dust Suppression	☒	☐	☒	☐
F17	Topsoil Pile	Reasonable Precautions/Dust Suppression	☒	☐	☒	☐
F18	Subsoil Pile	Reasonable Precautions/Dust Suppression	☒	☐	☒	☐
F19	Soil Return, MOY 16 to 18	Reasonable Precautions/Dust Suppression	☒	☐	☒	☐
F20	Copper-enriched Rock Drop to Stockpile, MOY 2 to 3	Reasonable Precautions/Dust Suppression	☒	☐	☒	☐
F21	Copper-enriched Rock Stockpile (Mill Feed)	Reasonable Precautions/Dust Suppression	☒	☐	☒	☐
F22	Waste Rock Drop at Waste Rock Storage (WRS) Pad, MOY 0 to 1.5, at CTF, MOY 1.5 to 4 and 8	Reasonable Precautions/Dust Suppression	☒	☐	☒	☐
F23	Temporary WRS	Reasonable Precautions/Dust Suppression	☒	☐	☒	☐
F24	Waste Rock Transfer from WRS to CTF, MOY 2 to 3	Reasonable Precautions/Dust Suppression	☒	☐	☒	☐
F25	Waste Rock Storage Pad Reclamation, MOY 3	Reasonable Precautions/Dust Suppression	☒	☐	☒	☐
F26	11 - 14-hp Portable Diesel-powered Light Plants	NSPS Subpart IIII	☒	☐	☐	☒
F27	500-gal Gasoline Storage Tank (double-walled)	None	☒	☐	☐	☒
F28	9 -Temporary Portable Propane-fired Heaters (37.8 MMBtu/hr total)	Good combustion practices	☒	☐	☐	☒
F29	Road Dust, Construction Access Road, Year 0-2 Avg.	Reasonable Precautions/Dust Suppression	☒	☐	☒	☐
F30	Road Dust, Main Access Road, Year 2-15 Avg.	Reasonable Precautions/Dust Suppression	☒	☐	☐	☒
IEU	Diesel Storage Tanks (250-gal, 500-gal, 10,000- gal)	N/A	☒	☐	☒	☐

§3.0 Emissions Inventory*

**** Note: Emissions are expressed to the nearest one-hundredth (or one-thousandth, in limited cases) for presentation and calculation purposes. Multiple digit accuracy should not be assumed***

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: P1 Emitting Unit Name: 250 TPH Conical Crusher

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)[1]**		**Actual Emission Rate(s) *(if applicable)*[2]**	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.30	1.31		
PM_{10}	0.14	0.59		
$PM_{2.5}$	0.03	0.11		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[1] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[2] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: P2 Emitting Unit Name: 325 hp Portable Diesel Generator Engine

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[3]		**Actual Emission Rate(s)** ***(if applicable)***[4]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.11	0.47		
PM_{10}	0.11	0.47		
$PM_{2.5}$	0.11	0.47		
SO_2	0.04	0.17		
NO_x	2.14	9.36		
CO	1.87	8.19		
VOC	0.80	3.52		
Pb				
Other (*specify*): CO2e	GHG emissions are calculated based on total facility fuel usage, see Section 3.3 of the application			
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[3] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[4] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: P3   Emitting Unit Name: 2 – Portable Screens (400 TPH each, emission rates are the total)

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[5]		**Actual Emission Rate(s)** ***(if applicable)***[6]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	1.76	7.71		
PM$_{10}$	0.59	2.59		
PM$_{2.5}$	0.04	0.18		
SO$_2$				
NO$_x$				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[5] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[6] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: P4 Emitting Unit Name: 131-hp Portable Diesel Generator Engine

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[7]		**Actual Emission Rate(s) *(if applicable)***[8]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.06	0.28		
PM_{10}	0.06	0.28		
$PM_{2.5}$	0.06	0.28		
SO_2	0.02	0.07		
NO_x	0.86	3.77		
CO	1.08	4.72		
VOC	0.32	1.42		
Pb				
Other (*specify*): CO2e	GHG emissions are calculated based on total facility fuel usage, see Section 3.3 of the application			
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[7] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[8] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: P5 Emitting Unit Name: 545 kW/914-hp Portable Diesel Generator Engine

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[9]		**Actual Emission Rate(s)** ***(if applicable)***[10]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.30	1.32		
PM_{10}	0.30	1.32		
$PM_{2.5}$	0.30	1.32		
SO_2	0.11	0.49		
NO_x	9.61	42.10		
CO	5.26	23.02		
VOC	2.26	9.88		
Pb				
Other (*specify*): CO2e	GHG emissions are calculated based on total facility fuel usage, see Section 3.3 of the application			
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[9] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[10] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: P6 Emitting Unit Name: 320-kW/536-hp Diesel Generator Engine

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[11]		**Actual Emission Rate(s)** ***(if applicable)***[12]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.18	0.77		
PM_{10}	0.18	0.77		
$PM_{2.5}$	0.18	0.77		
SO_2	0.01	0.03		
NO_x	3.53	15.45		
CO	3.09	13.52		
VOC	1.32	5.80		
Pb				
Other (*specify*): CO2e	GHG emissions are calculated based on total facility fuel usage, see Section 3.3 of the application			
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[11] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[12] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: P7 Emitting Unit Name: 2 - 1000-kW/1675-hp Diesel Generator Engines (Emergency)

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[13]		**Actual Emission Rate(s)** ***(if applicable)***[14]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	1.10	0.28		
PM_{10}	1.10	0.28		
$PM_{2.5}$	1.10	0.28		
SO_2	0.41	0.10		
NO_x	35.25	8.81		
CO	19.28	4.82		
VOC	8.27	2.07		
Pb				
Other (*specify*): CO2e	GHG emissions are calculated based on total facility fuel usage, see Section 3.3 of the application			
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[13] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[14] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: P8 Emitting Unit Name: 100-hp Diesel Generator Engine – (Emergency Evac Hoists)

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[15]		**Actual Emission Rate(s)** ***(if applicable)***[16]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.07	0.02		
PM_{10}	0.07	0.02		
$PM_{2.5}$	0.07	0.02		
SO_2	0.01	0.00		
NO_x	0.77	0.19		
CO	0.82	0.21		
VOC	0.25	0.06		
Pb				
Other (*specify*): CO2e	GHG emissions are calculated based on total facility fuel usage, see Section 3.3 of the application			
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[15] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[16] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: P9 Emitting Unit Name: 50-hp Diesel Fire Pump (Emergency)

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[17]		**Actual Emission Rate(s)** ***(if applicable)***[18]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.03	0.01		
PM_{10}	0.03	0.01		
$PM_{2.5}$	0.03	0.01		
SO_2	0.01	0.00		
NO_x	0.39	0.10		
CO	0.41	0.10		
VOC	0.12	0.03		
Pb				
Other (*specify*): CO2e	GHG emissions are calculated based on total facility fuel usage, see Section 3.3 of the application			
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[17] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[18] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: P10A Emitting Unit Name: 23-MMBtu/hr Propane-fired Heater (Upper Copper Zone)

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[19]		**Actual Emission Rate(s)** ***(if applicable)***[20]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.18	0.45		
PM_{10}	0.18	0.45		
$PM_{2.5}$	0.18	0.45		
SO_2	0.01	0.03		
NO_x	3.27	8.33		
CO	1.89	4.80		
VOC	0.25	0.64		
Pb				
Other (*specify*): CO2e	GHG emissions are calculated based on total facility fuel usage, see Section 3.3 of the application			
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[19] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[20] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: P10B Emitting Unit Name: 52-MMBtu/hr Propane-fired Heater (Lower Copper Zone)

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[21]		**Actual Emission Rate(s)** ***(if applicable)***[22]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.40	1.01		
PM_{10}	0.40	1.01		
$PM_{2.5}$	0.40	1.01		
SO_2	0.03	0.08		
NO_x	7.40	18.83		
CO	4.27	10.86		
VOC	0.57	1.45		
Pb				
Other (*specify*): CO2e	GHG emissions are calculated based on total facility fuel usage, see Section 3.3 of the application			
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[21] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[22] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: P11 Emitting Unit Name: 3 - Temporary Diesel Heaters - 1.2 MMBtu/hr total (Portal)

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[23]		**Actual Emission Rate(s)** ***(if applicable)***[24]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.01	0.05		
PM_{10}	0.01	0.05		
$PM_{2.5}$	0.01	0.05		
SO_2	0.02	0.08		
NO_x	0.17	0.75		
CO	0.04	0.19		
VOC	0.00	0.02		
Pb				
Other (*specify*): CO2e	GHG emissions are calculated based on total facility fuel usage, see Section 3.3 of the application			
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[23] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[24] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: P12 Emitting Unit Name: Jaw Crusher (3640 TPD) Building/Dust Collector

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[25]		**Actual Emission Rate(s)** ***(if applicable)***[26]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.73	3.19		
PM_{10}	0.73	3.19		
$PM_{2.5}$	0.73	3.19		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[25] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[26] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: P13A   Emitting Unit Name: Mill Building (mill, lime storage, etc.) Dust Collector

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[27]		**Actual Emission Rate(s)** ***(if applicable)***[28]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.04	0.19		
PM_{10}	0.04	0.19		
$PM_{2.5}$	0.04	0.19		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[27] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[28] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: P13B Emitting Unit Name: Mill Building (lime area/slurry mix tank) Dust Collector

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[29]		**Actual Emission Rate(s)** ***(if applicable)***[30]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.28	1.24		
PM_{10}	0.28	1.24		
$PM_{2.5}$	0.28	1.24		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[29] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[30] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: P14 Emitting Unit Name: Surge Bin Discharge Dust Collector

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[31]		**Actual Emission Rate(s)** ***(if applicable)***[32]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.43	1.88		
PM_{10}	0.43	1.88		
$PM_{2.5}$	0.43	1.88		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[31] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[32] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: P15 Emitting Unit Name: Water Treatment Plant/Lime Area Dust Collector

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[33]		**Actual Emission Rate(s)** ***(if applicable)***[34]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.28	1.24		
PM_{10}	0.28	1.24		
$PM_{2.5}$	0.28	1.24		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[33] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[34] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: P16A Emitting Unit Name: Backfill Plant Cement/Fly Ash Hopper Dust Filter/Collector

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[35]		**Actual Emission Rate(s)** ***(if applicable)***[36]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.05	0.23		
PM_{10}	0.05	0.23		
$PM_{2.5}$	0.05	0.23		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[35] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[36] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: P16B Emitting Unit Name: Backfill Plant Cement/Fly Ash Silo Dust Filter/Collector

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[37]		**Actual Emission Rate(s)** ***(if applicable)***[38]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.10	0.45		
PM_{10}	0.10	0.45		
$PM_{2.5}$	0.10	0.45		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[37] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[38] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: P17 Emitting Unit Name: 4 - Portable Diesel Generator Engines (total 400 hp)

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[39]		**Actual Emission Rate(s)** ***(if applicable)***[40]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.26	1.15		
PM_{10}	0.26	1.15		
$PM_{2.5}$	0.26	1.15		
SO_2	0.05	0.21		
NO_x	3.09	13.54		
CO	3.29	14.40		
VOC	0.99	4.33		
Pb				
Other (*specify*): CO2e	GHG emissions are calculated based on total facility fuel usage, see Section 3.3 of the application			
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[39] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[40] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: P18 Emitting Unit Name: 275-hp Diesel Engine – Air Compressor

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)[41]**		**Actual Emission Rate(s)** ***(if applicable)[42]***	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.09	0.40		
PM_{10}	0.09	0.40		
$PM_{2.5}$	0.09	0.40		
SO_2	0.03	0.15		
NO_x	1.81	7.92		
CO	1.58	6.93		
VOC	0.68	2.98		
Pb				
Other (*specify*): CO2e	GHG emissions are calculated based on total facility fuel usage, see Section 3.3 of the application			
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[41] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[42] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: UG Emitting Unit Name: ANFO

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[43]		**Actual Emission Rate(s)** ***(if applicable)***[44]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.02	0.11		
PM_{10}	0.01	0.06		
$PM_{2.5}$	0.00	0.00		
SO_2	0.35	1.55		
NO_x	3.01	13.19		
CO	11.86	51.97		
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[43] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[44] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F1 Emitting Unit Name: Road Dust, Mine Operating Year (MOY) 0 to 1

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[45]		**Actual Emission Rate(s)** ***(if applicable)***[46]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	34.86	152.70		
PM_{10}	8.89	38.92		
$PM_{2.5}$	0.89	3.90		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[45] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[46] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F2 Emitting Unit Name: Road Dust, MOY 1 to 2

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[47]		**Actual Emission Rate(s)** ***(if applicable)***[48]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	12.88	56.42		
PM_{10}	3.28	14.38		
$PM_{2.5}$	0.33	1.44		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[47] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[48] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F3 Emitting Unit Name: Road Dust, MOY 2 to 15, Annual Average

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[49]		**Actual Emission Rate(s)** ***(if applicable)***[50]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	4.06	17.79		
PM_{10}	1.04	4.53		
$PM_{2.5}$	0.10	0.45		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[49] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[50] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F4 Emitting Unit Name: Road Dust, MOY 16 to 17, Annual Average

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[51]		**Actual Emission Rate(s)** ***(if applicable)***[52]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	16.85	73.80		
PM_{10}	4.30	18.81		
$PM_{2.5}$	0.43	1.88		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[51] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[52] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F5 Emitting Unit Name: Road Dust, MOY 18

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[53]		**Actual Emission Rate(s)** ***(if applicable)***[54]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	2.67	11.68		
PM_{10}	0.68	2.98		
$PM_{2.5}$	0.07	0.30		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[53] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[54] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F6 Emitting Unit Name: Material Transfer to Temporary Stockpile, MOY 0 to 1.5

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[55]		**Actual Emission Rate(s)** ***(if applicable)***[56]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	1.43	3.13		
PM_{10}	0.42	0.91		
$PM_{2.5}$	0.14	0.30		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[55] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[56] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F7 Emitting Unit Name: Temporary Construction Stockpile

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[57]		**Actual Emission Rate(s)** ***(if applicable)***[58]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.00	0.364		
PM_{10}	0.00	0.182		
$PM_{2.5}$	0.00	0.027		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[57] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[58] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F8 Emitting Unit Name: Embankment Construction, MOY 0 to 1.5

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[59]		**Actual Emission Rate(s)** ***(if applicable)***[60]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	1.43	3.13		
PM_{10}	0.42	0.91		
$PM_{2.5}$	0.14	0.30		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[59] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[60] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F9 Emitting Unit Name: Backfill, Non-contact Water Reservoir (NCWR) Embankment Material to Cemented Tailings Facility (CTF), MOY 16 to 18

Attach calculations.

The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)

If possible, calculations should be submitted electronically using an Excel spreadsheet.

See Appendix C.

Regulated Air Pollutant	**Allowable Emission Rate(s)[61]**		**Actual Emission Rate(s) *(if applicable)*[62]**	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.81	1.78		
PM_{10}	0.24	0.52		
$PM_{2.5}$	0.08	0.17		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[61] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[62] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F10 Emitting Unit Name: Material Transfer to South Stockpile, MOY 0 to 1

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[63]		**Actual Emission Rate(s)** ***(if applicable)***[64]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.68	1.49		
PM_{10}	0.20	0.43		
$PM_{2.5}$	0.06	0.14		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[63] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[64] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F11 Emitting Unit Name: Excess Reclamation Stockpile (South)

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[65]		**Actual Emission Rate(s)** ***(if applicable)***[66]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.00	0.083		
PM_{10}	0.00	0.042		
$PM_{2.5}$	0.00	0.006		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[65] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[66] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F12 Emitting Unit Name: Material Transfer from South Stockpile, MOY 16 to 17

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[67]		**Actual Emission Rate(s)** ***(if applicable)***[68]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.68	1.49		
PM_{10}	0.20	0.43		
$PM_{2.5}$	0.06	0.14		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[67] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[68] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F13 Emitting Unit Name: Material Transfer to North Stockpile, MOY 0 to 1

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[69]		**Actual Emission Rate(s)** ***(if applicable)***[70]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.97	2.13		
PM_{10}	0.28	0.62		
$PM_{2.5}$	0.09	0.20		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[69] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[70] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F14 Emitting Unit Name: Excess Reclamation Stockpile (North)

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[71]		**Actual Emission Rate(s)** ***(if applicable)***[72]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.00	0.168		
PM_{10}	0.00	0.084		
$PM_{2.5}$	0.00	0.013		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[71] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[72] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F15   Emitting Unit Name: Material Transfer from North Stockpile, MOY 16 to 18

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[73]		**Actual Emission Rate(s)** ***(if applicable)***[74]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.37	0.82		
PM_{10}	0.11	0.24		
$PM_{2.5}$	0.04	0.08		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[73] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[74] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F16 Emitting Unit Name: Soil Removal and Stockpiling, MOR 0 to 1

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[75]		**Actual Emission Rate(s)** ***(if applicable)***[76]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	2.28	4.99		
PM_{10}	0.66	1.45		
$PM_{2.5}$	0.22	0.47		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[75] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[76] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F17 Emitting Unit Name: Topsoil Pile

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[77]		**Actual Emission Rate(s)** ***(if applicable)***[78]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.00	0.081		
PM_{10}	0.00	0.040		
$PM_{2.5}$	0.00	0.006		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[77] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[78] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F18 Emitting Unit Name: Subsoil Pile

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[79]		**Actual Emission Rate(s)** ***(if applicable)***[80]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.00	0.442		
PM_{10}	0.00	0.221		
$PM_{2.5}$	0.00	0.033		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[79] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[80] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F19 Emitting Unit Name: Soil Return, MOY 16 to 18

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[81]		**Actual Emission Rate(s)** ***(if applicable)***[82]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	1.91	4.17		
PM_{10}	0.55	1.21		
$PM_{2.5}$	0.18	0.39		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[81] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[82] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F20 Emitting Unit Name: Copper-enriched Rock Drop to Stockpile, MOY 2 to 3

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[83]		**Actual Emission Rate(s)** ***(if applicable)***[84]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.04	0.16		
PM_{10}	0.01	0.06		
$PM_{2.5}$	0.01	0.06		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[83] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[84] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F21 Emitting Unit Name: Copper-enriched Rock to Stockpile (Mill Feed)

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[85]		**Actual Emission Rate(s)** ***(if applicable)***[86]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.00	0.001		
PM_{10}	0.00	0.000		
$PM_{2.5}$	0.00	0.000		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[85] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[86] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F22 Emitting Unit Name: Waste Rock Drop at Waste Rock Storage (WRS) Pad, MOY 0 to 1.5, at CTF, MOY 1.5 to 4 and 8

Attach calculations.

The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)

If possible, calculations should be submitted electronically using an Excel spreadsheet.

See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[87]		**Actual Emission Rate(s)** ***(if applicable)***[88]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.20	0.87		
PM_{10}	0.08	0.35		
$PM_{2.5}$	0.08	0.35		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[87] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[88] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F23   Emitting Unit Name: Temporary WRS

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[89]		**Actual Emission Rate(s)** ***(if applicable)***[90]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.00	0.019		
PM_{10}	0.00	0.010		
$PM_{2.5}$	0.00	0.001		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[89] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[90] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F24 Emitting Unit Name: Waste Rock Transfer from WRS to CTF, MOY 2 to 3

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[91]		**Actual Emission Rate(s)** ***(if applicable)***[92]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.32	1.39		
PM_{10}	0.13	0.56		
$PM_{2.5}$	0.13	0.56		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[91] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[92] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F25 Emitting Unit Name: Waste Rock Storage Pad Reclamation, MOY 3

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[93]		**Actual Emission Rate(s)** ***(if applicable)***[94]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.75	1.65		
PM_{10}	0.22	0.48		
$PM_{2.5}$	0.07	0.16		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[93] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[94] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F26 Emitting Unit Name: 11 – 14-hp Portable Diesel-powered Light Plants (total)

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[95]		**Actual Emission Rate(s)** ***(if applicable)***[96]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.34	1.48		
PM_{10}	0.34	1.48		
$PM_{2.5}$	0.34	1.48		
SO_2	0.00	0.01		
NO_x	4.77	20.91		
CO	1.03	4.51		
VOC	0.38	1.67		
Pb				
Other (*specify*): CO2e	GHG emissions are calculated based on total facility fuel usage, see Section 3.3 of the application			
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[95] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[96] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F27 Emitting Unit Name: 500-gal Gasoline Storage Tank (double-walled)

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[97]		**Actual Emission Rate(s)** ***(if applicable)***[98]	
	(Lb/ Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM				
PM_{10}				
$PM_{2.5}$				
SO_2				
NO_x				
CO				
VOC	0.00	0.07		
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[97] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[98] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F28 Emitting Unit Name: 9 -Temporary Portable Propane-fired Heaters (37.8 MMBtu/hr total)

Attach calculations.

The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)

If possible, calculations should be submitted electronically using an Excel spreadsheet.

See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[99]		**Actual Emission Rate(s)** ***(if applicable)***[100]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.29	1.27		
PM_{10}	0.29	1.27		
$PM_{2.5}$	0.29	1.27		
SO_2	0.02	0.10		
NO_x	5.38	23.57		
CO	3.10	13.60		
VOC	0.41	1.81		
Pb				
Other (*specify*): CO2e	GHG emissions are calculated based on total facility fuel usage, see Section 3.3 of the application			
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[99] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[100] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F29 Emitting Unit Name: Road Dust, Construction Access Road, Year 0-2 Avg.

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[101]		**Actual Emission Rate(s)** ***(if applicable)***[102]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	0.21	0.90		
PM_{10}	0.05	0.23		
$PM_{2.5}$	0.01	0.02		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[101] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[102] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: F30 Emitting Unit Name: Road Dust, Main Access Road, Year 2-15 Avg.

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[103]		**Actual Emission Rate(s)** ***(if applicable)***[104]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM	23.33	102.19		
PM_{10}	5.95	26.05		
$PM_{2.5}$	0.60	2.61		
SO_2				
NO_x				
CO				
VOC				
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[103] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[104] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§3.0 Emissions Inventory

A separate Section 3.0 must be completed for each emitting unit listed in Section 2.0.

Emitting Unit ID: IEU1 Emitting Unit Name: Diesel Storage Tanks (250-gal, 500-gal, 10,000- gal)

Attach calculations.
The source(s) of all emissions estimates must be indicated (e.g. manufacturer's data, AP-42, source tests, etc.)
If possible, calculations should be submitted electronically using an Excel spreadsheet.
See Appendix C

Regulated Air Pollutant	**Allowable Emission Rate(s)**[105]		**Actual Emission Rate(s) *(if applicable)***[106]	
	(Lb/Hour)	(Tons/Year)	(Lb/Hour)	(Tons/Year)
PM				
PM_{10}				
$PM_{2.5}$				
SO_2				
NO_x				
CO				
VOC	negligible	negligible		
Pb				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				
Other (*specify*):				

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[105] Allowable emission rate(s) should equal the potential to emit, unless a federally enforceable permit limit is proposed. Potential emissions are to be calculated based on production at the maximum capacity for 8,760 hours per year. Only control practices or equipment which is proposed to be made federally enforceable may be used to limit the potential to emit of the unit.

[106] Actual emission rate(s) should equal the average rate at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: P1 Emitting Unit Name: 250 TPH Portable Conical Crusher

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) The crusher will process waste rock in the development phase.

Proposed Operational Limitations (*if any*) N/A

Source Classification Code (SCC)/ Description: 30502001

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☒ NSPS: 40 CFR 60, Subpart(s): LL

☐ NESHAPS: 40 CFR 61, Subpart(s): _____

☐ MACT: 40 CFR 63, Subpart(s): _____

☒ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ______________________________

§4.2 Process Information (*include units***)**:

Type of Material Processed Aggregate, metallic minerals, etc.

Average Process Rate (tons/hr, gal/hr, etc.)______________________________

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______________________________

§4.3 Process Identification

Make TBD Model TBD

Type________________________________ Size up to 250 TPH

Year of Manufacture/Reconstruction TBD Year of Installation ________________

Power Source (engine/generators are listed separately)

§4.4 Fuel/Combustion Information: *Not applicable*

§4.5 Emitting Unit Location – *Various, Portable Unit*

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): *Not applicable*

§4.7 Approximate Operating Schedule:

Hours/Day24 (permitted) Days/Week_________________________

Hours/Year8760 (permitted) Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression and reasonable precautions.

Primary Air Pollution Control Equipment Description (see above)

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: P2 Emitting Unit Name: 325-hp Portable Diesel Eng/Generator

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) The generator will supply power to the conical crusher during the development phase.

Proposed Operational Limitations (*if any*) NSPS Subpart IIII, minimum Tier 3

Source Classification Code (SCC)/ Description: 20200102

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☒ NSPS: 40 CFR 60, Subpart(s): IIII

☐ NESHAPS: 40 CFR 61, Subpart(s): ______

☒ MACT: 40 CFR 63, Subpart(s): ZZZZ which applies 40 CFR 60 Subpart IIII

☒ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ____

§4.2 Process Information (*include units***)**:

Type of Material Processed Diesel fuel

Average Process Rate (tons/hr, gal/hr, etc.)______________________________

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______________________________

§4.3 Process Identification

Make TBD Model NSPS Subpart IIII, Tier 3 minimum

Type______________________ Size up to 325-hp

Year of Manufacture/Reconstruction TBD Year of Installation ____________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) 325

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) diesel

§4.5 Emitting Unit Location - ***Various, Portable Unit***

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*)**:** ***See modeling information in Section 6 and Appendix E***

Height (feet) ______________________ Inside Diameter (feet) ____________________

Exit Gas Temperature (˚F) ___________ Exit Gas Flow Rate (ACFM) ______________

Exit Gas Velocity (ft/sec) ___________ Exit Gas Moisture Content (%)_____________

Stack Type (check one): ☐ Downward Exit ☐ Multiple Actual Stacks ☐ Fugitive Source

☐ Horizontal Exit ☐ Building Roof Vent ☐ Process Vent

☐ Vertical Exit ☐ Vertical Exit with Cap

§4.7 Approximate Operating Schedule:

Hours/Day24 (permitted) Days/Week_________________________

Hours/Year8760 (permitted) Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Use of NSPS Subpart IIII engines.

Primary Air Pollution Control Equipment Description:

Make NSPS Subpart IIII - Tier 3 Minimum Engines Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency______________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining a MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: P3 Emitting Unit Name: 2 Portable Screens (400 TPH each)

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) The screens will process waste rock in the development phase.

Proposed Operational Limitations (*if any*) N/A

Source Classification Code (SCC)/ Description: 30502002

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☒ NSPS: 40 CFR 60, Subpart(s): LL

☐ NESHAPS: 40 CFR 61, Subpart(s): ______

☐ MACT: 40 CFR 63, Subpart(s): ______

☒ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ____

§4.2 Process Information (*include units***)**:

Type of Material Processed Aggregate, metallic minerals, etc.

Average Process Rate (tons/hr, gal/hr, etc.) TBD

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) 2 Portable Screens – each rated at 400 TPH

§4.3 Process Identification

Make TBD Model TBD

Type________________________________ Size up to 800 TPH (total, 400 TPH each screen)

Year of Manufacture/Reconstruction TBD Year of Installation ________________

Power Source (engine/generators are listed separately)

§4.4 Fuel/Combustion Information: *Not applicable*

§4.5 Emitting Unit Location – *Various, Portable Unit*

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): *Not applicable*

§4.7 Approximate Operating Schedule:

Hours/Day24 (permitted) Days/Week_________________________

Hours/Year8760 (permitted) Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression and reasonable precautions.

Primary Air Pollution Control Equipment Description (see above)

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: P4 Emitting Unit Name: 131-hp Portable Diesel Eng/Generator

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) The generator will supply power to the portable screens during the development phase.

Proposed Operational Limitations (*if any*) NSPS Subpart IIII, minimum Tier 3

Source Classification Code (SCC)/ Description: 20200102

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☒ NSPS: 40 CFR 60, Subpart(s): IIII

☐ NESHAPS: 40 CFR 61, Subpart(s): ______

☒ MACT: 40 CFR 63, Subpart(s): ZZZZ which applies 40 CFR 60 Subpart IIII

☒ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ____

§4.2 Process Information (*include units***)**:

Type of Material Processed Diesel fuel

Average Process Rate (tons/hr, gal/hr, etc.)____

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______________________________________

§4.3 Process Identification

Make TBD Model NSPS Subpart IIII, Tier 3 minimum

Type________________________________ Size up to 131-hp

Year of Manufacture/Reconstruction TBD Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) __________

Rated Size of Engine powering the generator (hp) 131

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) diesel

§4.5 Emitting Unit Location - *Various, Portable Unit*

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*)**: *See modeling information in Section 6 and Appendix E***

Height (feet) ______________________ Inside Diameter (feet) ____________________

Exit Gas Temperature (˚F) ___________ Exit Gas Flow Rate (ACFM) ______________

Exit Gas Velocity (ft/sec) ___________ Exit Gas Moisture Content (%)_____________

Stack Type (check one):

Stack Type (check one):	☐ Downward Exit	☐ Multiple Actual Stacks	☐ Fugitive Source
	☐ Horizontal Exit	☐ Building Roof Vent	☐ Process Vent
	☐ Vertical Exit	☐ Vertical Exit with Cap	

§4.7 Approximate Operating Schedule:

Hours/Day24 (permitted) Days/Week_________________________

Hours/Year8760 (permitted) Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Use of NSPS Subpart IIII engines.

Primary Air Pollution Control Equipment Description:

Make NSPS Subpart IIII - Tier 3 Minimum Engines Model_________________________________

Type_________________________ Size___________________________________

Year of Manufacture_____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency______________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining a MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: P5 Emitting Unit Name: 545 kW/914-hp Diesel Eng/Generator

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) The generator will supply power to the facility during the development phase and backup power during the production phase.

Proposed Operational Limitations (*if any*) NSPS Subpart IIII, minimum Tier 3

Source Classification Code (SCC)/ Description: 20200102

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☒ NSPS: 40 CFR 60, Subpart(s): IIII

☐ NESHAPS: 40 CFR 61, Subpart(s): ______

☒ MACT: 40 CFR 63, Subpart(s): ZZZZ which applies 40 CFR 60 Subpart IIII

☒ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ______________________________

§4.2 Process Information (*include units***):**

Type of Material Processed Diesel fuel

Average Process Rate (tons/hr, gal/hr, etc.)______________________________

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______________________________

§4.3 Process Identification

Make TBD Model NSPS Subpart IIII, Tier 3 minimum

Type______________________________ Size up to 914-hp

Year of Manufacture/Reconstruction TBD Year of Installation ________________

Power Source ______________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) 545

Rated Size of Engine powering the generator (hp) 914

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) diesel

§4.5 Emitting Unit Location - ***See modeling information in Section 6 and Appendix E***

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*)**:** ***See modeling information in Section 6 and Appendix E***

Height (feet) ______________________ Inside Diameter (feet) ____________________

Exit Gas Temperature (˚F) ___________ Exit Gas Flow Rate (ACFM) ______________

Exit Gas Velocity (ft/sec) ____________ Exit Gas Moisture Content (%)_____________

Stack Type (check one): ☐ Downward Exit ☐ Multiple Actual Stacks ☐ Fugitive Source

☐ Horizontal Exit ☐ Building Roof Vent ☐ Process Vent

☐ Vertical Exit ☐ Vertical Exit with Cap

§4.7 Approximate Operating Schedule:

Hours/Day24 (permitted) Days/Week_________________________

Hours/Year8760 (permitted development), 500 in production Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Use of NSPS Subpart IIII engines.

Primary Air Pollution Control Equipment Description:

Make NSPS Subpart IIII - Tier 3 Minimum Engines Model_________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency______________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining a MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: P6 Emitting Unit Name: 320-kW/536-hp Diesel Eng/Generator

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) The generator will supply power to the facility during the development phase and backup power during the production phase.

Proposed Operational Limitations (*if any*) NSPS Subpart IIII, minimum Tier 3

Source Classification Code (SCC)/ Description: 20200102

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☒ NSPS: 40 CFR 60, Subpart(s): IIII

☐ NESHAPS: 40 CFR 61, Subpart(s): _____

☒ MACT: 40 CFR 63, Subpart(s): ZZZZ which applies 40 CFR 60 Subpart IIII

☒ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ____________________

§4.2 Process Information (*include units***)**:

Type of Material Processed Diesel fuel

Average Process Rate (tons/hr, gal/hr, etc.)____________________

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ____________________

§4.3 Process Identification

Make TBD Model NSPS Subpart IIII, Tier 3 minimum

Type____________________ Size up to 536-hp

Year of Manufacture/Reconstruction TBD Year of Installation ____________

Power Source ____________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) 320

Rated Size of Engine powering the generator (hp) 536

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) diesel

§4.5 Emitting Unit Location - *See modeling information in Section 6 and Appendix E*

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*)**: *See modeling information in Section 6 and Appendix E***

Height (feet) ______________________ Inside Diameter (feet) ____________________

Exit Gas Temperature (˚F) ___________ Exit Gas Flow Rate (ACFM) ______________

Exit Gas Velocity (ft/sec) ____________ Exit Gas Moisture Content (%)_____________

Stack Type (check one): ☐ Downward Exit ☐ Multiple Actual Stacks ☐ Fugitive Source

☐ Horizontal Exit ☐ Building Roof Vent ☐ Process Vent

☐ Vertical Exit ☐ Vertical Exit with Cap

§4.7 Approximate Operating Schedule:

Hours/Day 24 (permitted) Days/Week_________________________

Hours/Year 8760 (permitted development), 500 in production Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Use of NSPS Subpart IIII engines.

Primary Air Pollution Control Equipment Description:

Make NSPS Subpart IIII - Tier 3 Minimum Engines Model_________________________________

Type_________________________ Size___________________________________

Year of Manufacture_____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency______________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable***

§4.10 Continuous Emission Monitoring System (CEMS) – ***Not applicable***

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining a MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: P7 Emitting Unit Name: 2- 1000-kW/1675-hp Diesel Eng/Generators – Emergency

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) The generators will supply backup/emergency power to the facility during the production phase.

Proposed Operational Limitations (*if any*) NSPS Subpart IIII, minimum Tier 3

Source Classification Code (SCC)/ Description: 20200102

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☒ NSPS: 40 CFR 60, Subpart(s): IIII

☐ NESHAPS: 40 CFR 61, Subpart(s): _____

☒ MACT: 40 CFR 63, Subpart(s): ZZZZ which applies 40 CFR 60 Subpart IIII

☒ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ____________________

§4.2 Process Information (*include units***):**

Type of Material Processed Diesel fuel

Average Process Rate (tons/hr, gal/hr, etc.)____________________

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ____________________

§4.3 Process Identification

Make TBD Model NSPS Subpart IIII, Tier 3 minimum

Type____________________ Size up to 1675-hp each

Year of Manufacture/Reconstruction TBD Year of Installation ________________

Power Source ____________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) 1000 each

Rated Size of Engine powering the generator (hp) 1675 each

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) diesel

§4.5 Emitting Unit Location - *See modeling information in Section 6 and Appendix E*

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): *See modeling information in Section 6 and Appendix E*

Height (feet) ______________________ Inside Diameter (feet) ____________________

Exit Gas Temperature (˚F) ___________ Exit Gas Flow Rate (ACFM) ______________

Exit Gas Velocity (ft/sec) ____________ Exit Gas Moisture Content (%)_____________

Stack Type (check one): ☐ Downward Exit ☐ Multiple Actual Stacks ☐ Fugitive Source

☐ Horizontal Exit ☐ Building Roof Vent ☐ Process Vent

☐Vertical Exit ☐ Vertical Exit with Cap

§4.7 Approximate Operating Schedule:

Hours/Day24 (permitted) Days/Week_________________________

Hours/Year 500 (permitted) Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Use of NSPS Subpart IIII engines.

Primary Air Pollution Control Equipment Description:

Make NSPS Subpart IIII - Tier 3 Minimum Engines Model_________________________________

Type_________________________ Size___________________________________

Year of Manufacture_____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency______________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining a MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: P8 Emitting Unit Name: 100-hp Portable Diesel Eng/Generator – Emergency Evac Hoists

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) The generator will supply power to the emergency evacuation hoists as needed during production phase.

Proposed Operational Limitations (*if any*) NSPS Subpart IIII, minimum Tier 3

Source Classification Code (SCC)/ Description: 20200102

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☒ NSPS: 40 CFR 60, Subpart(s): IIII

☐ NESHAPS: 40 CFR 61, Subpart(s): _____

☒ MACT: 40 CFR 63, Subpart(s): ZZZZ which applies 40 CFR 60 Subpart IIII

☒ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ____________________

§4.2 Process Information (*include units*):

Type of Material Processed Diesel fuel

Average Process Rate (tons/hr, gal/hr, etc.)____________________

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ____________________

§4.3 Process Identification

Make TBD Model NSPS Subpart IIII, Tier 3 minimum

Type____________________ Size up to 100-hp

Year of Manufacture/Reconstruction TBD Year of Installation ______________

Power Source ____________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) __________

Rated Size of Engine powering the generator (hp) 100

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) diesel

§4.5 Emitting Unit Location - *See modeling information in Section 6 and Appendix E*

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*)**: *See modeling information in Section 6 and Appendix E***

Height (feet) ______________________ Inside Diameter (feet) ____________________

Exit Gas Temperature (˚F) ___________ Exit Gas Flow Rate (ACFM) ______________

Exit Gas Velocity (ft/sec) ____________ Exit Gas Moisture Content (%)_____________

Stack Type (check one): ☐ Downward Exit ☐ Multiple Actual Stacks ☐ Fugitive Source

☐ Horizontal Exit ☐ Building Roof Vent ☐ Process Vent

☐ Vertical Exit ☐ Vertical Exit with Cap

§4.7 Approximate Operating Schedule:

Hours/Day24 (permitted) Days/Week_________________________

Hours/Year 500 (permitted) Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Use of NSPS Subpart IIII engines.

Primary Air Pollution Control Equipment Description:

Make NSPS Subpart IIII - Tier 3 Minimum Engines Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency______________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining a MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: P9 Emitting Unit Name: 50-hp Diesel Fire Pump - Emergency

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) The fire pump will provide power to pump water in the event of a fire, will be available in all phases.

Proposed Operational Limitations (*if any*) NSPS Subpart IIII, minimum Tier 3

Source Classification Code (SCC)/ Description: 20200102

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☒ NSPS: 40 CFR 60, Subpart(s): IIII

☐ NESHAPS: 40 CFR 61, Subpart(s): _____

☒ MACT: 40 CFR 63, Subpart(s): ZZZZ which applies 40 CFR 60 Subpart IIII

☒ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ____

§4.2 Process Information (*include units***):**

Type of Material Processed Diesel fuel

Average Process Rate (tons/hr, gal/hr, etc.)________________________________

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ________________________

§4.3 Process Identification

Make TBD Model NSPS Subpart IIII, Tier 3 minimum

Type________________________ Size up to 50-hp

Year of Manufacture/Reconstruction TBD Year of Installation ____________

Power Source ________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) __________

Rated Size of Engine powering the generator (hp) 50

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) diesel

§4.5 Emitting Unit Location - *Various, Portable Unit*

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*)**: *See modeling information in Section 6 and Appendix E***

Height (feet) ______________________ Inside Diameter (feet) ____________________

Exit Gas Temperature (˚F) ___________ Exit Gas Flow Rate (ACFM) ______________

Exit Gas Velocity (ft/sec) ___________ Exit Gas Moisture Content (%)_____________

Stack Type (check one):

☐ Downward Exit ☐ Multiple Actual Stacks ☐ Fugitive Source

☐ Horizontal Exit ☐ Building Roof Vent ☐ Process Vent

☐ Vertical Exit ☐ Vertical Exit with Cap

§4.7 Approximate Operating Schedule:

Hours/Day24 (permitted) Days/Week________________________

Hours/Year 500 (permitted) Weeks/Year________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Use of NSPS Subpart IIII engines.

Primary Air Pollution Control Equipment Description:

Make NSPS Subpart IIII - Tier 3 Minimum Engines Model________________________________

Type________________________ Size__________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency______________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining a MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: P10A Emitting Unit Name: 23 MMBtu/hr Propane-fired Heater (Upper Copper Zone)

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) The upper copper zone heater provides heat to underground mining operations at the Upper Copper Zone intake vent during production phase.

Proposed Operational Limitations (*if any*) N/A

Source Classification Code (SCC)/ Description: 30590005

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☐ NSPS: 40 CFR 60, Subpart(s): _____

☐ NESHAPS: 40 CFR 61, Subpart(s): _____

☐ MACT: 40 CFR 63, Subpart(s): _____

☒ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ____

§4.2 Process Information (*include units***)**:

Type of Material Processed Propane

Average Process Rate (tons/hr, gal/hr, etc.)____

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) _____________________________________

§4.3 Process Identification

Make TBD Model TBD

Type________________________________ Size up to 23 MMBtu/hr

Year of Manufacture/Reconstruction TBD Year of Installation ________________

Power Source N/A

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) _____________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) Propane

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location: *See modeling information in Section 6 and Appendix E*

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): *See modeling information in Section 6 and Appendix E*

Height (feet) ______________________ Inside Diameter (feet) ____________________

Exit Gas Temperature (˚F) ___________ Exit Gas Flow Rate (ACFM) ______________

Exit Gas Velocity (ft/sec) ____________ Exit Gas Moisture Content (%)_____________

Stack Type (check one): ☐ Downward Exit ☐ Multiple Actual Stacks ☐ Fugitive Source

☐ Horizontal Exit ☐ Building Roof Vent ☐ Process Vent

☐ Vertical Exit ☐ Vertical Exit with Cap

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours/day Days/Week________________________

Hours/Year 5088 hours (seasonal use October-April) Weeks/Year________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Good combustion practices

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type________________________ Size__________________________________

Year of Manufacture____________ Year of Installation ____________________

Fuel Type(s) __________________ Estimated Control Efficiency______________

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not Applicable*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: P10B Emitting Unit Name: 52 MMBtu/hr Propane-fired Heater (Lower Copper Zone)

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) The lower copper zone heater provides heat to underground mining operations at the Lower Copper Zone intake vent during production phase.

Proposed Operational Limitations (*if any*) N/A

Source Classification Code (SCC)/ Description: 30590005

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☐ NSPS: 40 CFR 60, Subpart(s): _____

☐ NESHAPS: 40 CFR 61, Subpart(s): _____

☐ MACT: 40 CFR 63, Subpart(s): _____

☒ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ____

§4.2 Process Information (*include units***):**

Type of Material Processed Propane

Average Process Rate (tons/hr, gal/hr, etc.)______________________________________

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ____________________________

§4.3 Process Identification

Make TBD Model TBD

Type________________________________ Size up to 52 MMBtu/hr

Year of Manufacture/Reconstruction TBD Year of Installation ________________

Power Source N/A

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) _____________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) Propane

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location: ***See modeling information in Section 6 and Appendix E***

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*)**:** ***See modeling information in Section 6 and Appendix E***

Height (feet) ______________________ Inside Diameter (feet) ____________________

Exit Gas Temperature (˚F) ___________ Exit Gas Flow Rate (ACFM) ______________

Exit Gas Velocity (ft/sec) ____________ Exit Gas Moisture Content (%)_____________

Stack Type (check one):

☐ Downward Exit

☐ Horizontal Exit

☐ Vertical Exit

☐ Multiple Actual Stacks

☐ Building Roof Vent

☐ Vertical Exit with Cap

☐ Fugitive Source

☐ Process Vent

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours/day Days/Week________________________

Hours/Year 5088 hours (seasonal use October-April)____ Weeks/Year________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Good Combustion Practices

Primary Air Pollution Control Equipment Description:

Make__N/A_ Model_______________________________

Type________________________ Size__________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency______________

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not Applicable*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: P11 Emitting Unit Name: 3 Temporary Diesel Heaters at Portal (1.2 MMBtu/hr total)

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) The temporary diesel heaters will provide heat to development phase operations where necessary.

Proposed Operational Limitations (*if any*) N/A

Source Classification Code (SCC)/ Description: 30590001

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

- ☐ NSPS: 40 CFR 60, Subpart(s): _____
- ☐ NESHAPS: 40 CFR 61, Subpart(s): _____
- ☐ MACT: 40 CFR 63, Subpart(s): _____
- ☐ Title V Operating Permit – Significant Emitting Unit
- ☐ Acid Rain (Title IV)
- ☐ Risk Management Plan
- ☐ CAM Plan
- ☐ Other: ______________________________

§4.2 Process Information (*include units***):**

Type of Material Processed Diesel

Average Process Rate (tons/hr, gal/hr, etc.)______________________________

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______________________________

§4.3 Process Identification

Make TBD Model TBD

Type_______________________________ Size up to 1.2 MMBtu/hr (total)

Year of Manufacture/Reconstruction TBD Year of Installation ________________

Power Source N/A

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) _____________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) Diesel

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location - *Various, Portable Units*

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): ***See modeling information in Section 6 and Appendix E***

Height (feet) ______________________ Inside Diameter (feet) ____________________

Exit Gas Temperature (˚F) ___________ Exit Gas Flow Rate (ACFM) ______________

Exit Gas Velocity (ft/sec) ____________ Exit Gas Moisture Content (%)_____________

Stack Type (check one):

☐ Downward Exit ☐ Multiple Actual Stacks ☐ Fugitive Source

☐ Horizontal Exit ☐ Building Roof Vent ☐ Process Vent

☐ Vertical Exit ☐ Vertical Exit with Cap

§4.7 Approximate Operating Schedule:

Hours/Day 24 (permitted) Days/Week________________________

Hours/Year 8760 (permitted) Weeks/Year________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
N/A

Primary Air Pollution Control Equipment Description:

Make___ Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency______________

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not Applicable*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: P12 Emitting Unit Name: 3640 TPD Jaw Crusher/Building

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) The jaw crusher process building will enclose the jaw crusher, conveyors and initial rock drop operations and is controlled by a dust collector. This operates during production phase.

Proposed Operational Limitations (*if any*) N/A

Source Classification Code (SCC)/ Description: 30502001

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

- ☒ NSPS: 40 CFR 60, Subpart(s): LL
- ☐ NESHAPS: 40 CFR 61, Subpart(s): _____
- ☐ MACT: 40 CFR 63, Subpart(s): _____
- ☒ Title V Operating Permit – Significant Emitting Unit
- ☐ Acid Rain (Title IV)
- ☐ Risk Management Plan
- ☐ CAM Plan
- ☐ Other: ____

§4.2 Process Information (*include units***):**

Type of Material Processed Copper-enriched rock

Average Process Rate (tons/hr, gal/hr, etc.)____

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) 3640 TPD

§4.3 Process Identification

Make TBD Model TBD

Type________________________________ Size up to 3640 TPD

Year of Manufacture/Reconstruction TBD Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ___

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location - *See modeling information in Section 6 and Appendix E*

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): *See modeling information in Section 6 and Appendix E*

Height (feet) ______________________ Inside Diameter (feet) ____________________

Exit Gas Temperature (˚F) ___________ Exit Gas Flow Rate (ACFM) _______________

Exit Gas Velocity (ft/sec) ____________ Exit Gas Moisture Content (%)_____________

Stack Type (check one):

☐ Downward Exit ☐ Multiple Actual Stacks ☐ Fugitive Source

☐ Horizontal Exit ☐ Building Roof Vent ☐ Process Vent

☐ Vertical Exit ☐ Vertical Exit with Cap

§4.7 Approximate Operating Schedule:

Hours/Day24 (permitted) Days/Week________________________

Hours/Year8760 (permitted) Weeks/Year________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Controlled by a dust collector meeting a 0.01 gr/dscf BACT limitation

Primary Air Pollution Control Equipment Description:

Make_TBD___ Model________________________________

Type________________________ Size__________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency99+%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

Secondary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type________________________ Size__________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency______________

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period:
Not applicable

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining a MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: P13A Emitting Unit Name: Mill Building (mill, lime storage, etc.)

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) This portion of the mill building contains the copper milling/flotation processes and lime storage during production phase.

Proposed Operational Limitations (*if any*) N/A

Source Classification Code (SCC)/ Description: 30502005

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☒ NSPS: 40 CFR 60, Subpart(s): LL

☐ NESHAPS: 40 CFR 61, Subpart(s): _____

☐ MACT: 40 CFR 63, Subpart(s): _____

☒ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ____

§4.2 Process Information (*include units*):

Type of Material Processed Copper-enriched rock

Average Process Rate (tons/hr, gal/hr, etc.)____

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) 3640 TPD

§4.3 Process Identification

Make TBD Model TBD

Type_______________________________ Size N/A

Year of Manufacture/Reconstruction TBD Year of Installation ________________

Power Source _______________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) __________

Rated Size of Engine powering the generator (hp) __________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ___

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) ____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location - *See modeling information in Section 6 and Appendix E*

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): *See modeling information in Section 6 and Appendix E*

Height (feet) ______________________ Inside Diameter (feet) ____________________

Exit Gas Temperature (˚F) ___________ Exit Gas Flow Rate (ACFM) ______________

Exit Gas Velocity (ft/sec) ____________ Exit Gas Moisture Content (%)_____________

Stack Type (check one):

☐ Downward Exit
☐ Horizontal Exit
☐ Vertical Exit
☐ Multiple Actual Stacks
☐ Building Roof Vent
☐ Vertical Exit with Cap
☐ Fugitive Source
☐ Process Vent

§4.7 Approximate Operating Schedule:

Hours/Day24 (permitted) Days/Week________________________

Hours/Year8760 (permitted) Weeks/Year________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Controlled by a dust collector meeting a 0.01 gr/dscf BACT limitation

Primary Air Pollution Control Equipment Description:

Make_TBD___ Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency99+%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

Secondary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency______________

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period:
Not applicable

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining a MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: P13B Emitting Unit Name: Mill Building (lime area, slurry mix tank, etc.

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) This portion of the mill building contains the lime processing area and slurry mix tank during production phase.

Proposed Operational Limitations (*if any*) N/A

Source Classification Code (SCC)/ Description: 30502005

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☒ NSPS: 40 CFR 60, Subpart(s): LL

☐ NESHAPS: 40 CFR 61, Subpart(s): _____

☐ MACT: 40 CFR 63, Subpart(s): _____

☒ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ____

§4.2 Process Information (*include units***)**:

Type of Material Processed Copper-bearing material

Average Process Rate (tons/hr, gal/hr, etc.)____

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) 3640 TPD

§4.3 Process Identification

Make TBD Model TBD

Type________________________________ Size up to 3640 TPD

Year of Manufacture/Reconstruction TBD Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ___

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location - *See modeling information in Section 6 and Appendix E*

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): *See modeling information in Section 6 and Appendix E*

Height (feet) ______________________ Inside Diameter (feet) ____________________

Exit Gas Temperature (˚F) ___________ Exit Gas Flow Rate (ACFM) ______________

Exit Gas Velocity (ft/sec) ____________ Exit Gas Moisture Content (%)_____________

Stack Type (check one): ☐ Downward Exit ☐ Multiple Actual Stacks ☐ Fugitive Source

☐ Horizontal Exit ☐ Building Roof Vent ☐ Process Vent

☐ Vertical Exit ☐ Vertical Exit with Cap

§4.7 Approximate Operating Schedule:

Hours/Day24 (permitted) Days/Week________________________

Hours/Year8760 (permitted) Weeks/Year________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Controlled by a dust collector meeting a 0.01 gr/dscf BACT limitation

____

____

____

Primary Air Pollution Control Equipment Description:

Make_TBD___ Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency99+%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

Secondary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency______________

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period:
Not applicable

____

____

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining a MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)
If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: P14 Emitting Unit Name: Surge Bin Discharge

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) The surge bin would contain materials in preparation for further size reduction in the milling process during production phase.

Proposed Operational Limitations (*if any*) N/A

Source Classification Code (SCC)/ Description: 30510298

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☒ NSPS: 40 CFR 60, Subpart(s): LL

☐ NESHAPS: 40 CFR 61, Subpart(s): _____

☐ MACT: 40 CFR 63, Subpart(s): _____

☒ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ____

§4.2 Process Information (*include units***)**:

Type of Material Processed Copper-bearing material

Average Process Rate (tons/hr, gal/hr, etc.)____

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) up to 2755 tons

§4.3 Process Identification

Make TBD Model TBD

Type________________________________ Size up to 2755 tons

Year of Manufacture/Reconstruction TBD Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ___

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location - *See modeling information in Section 6 and Appendix E*

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): *See modeling information in Section 6 and Appendix E*

Height (feet) ______________________ Inside Diameter (feet) ____________________

Exit Gas Temperature (˚F) ___________ Exit Gas Flow Rate (ACFM) ______________

Exit Gas Velocity (ft/sec) ____________ Exit Gas Moisture Content (%)_____________

Stack Type (check one): ☐ Downward Exit ☐ Multiple Actual Stacks ☐ Fugitive Source

☐ Horizontal Exit ☐ Building Roof Vent ☐ Process Vent

☐ Vertical Exit ☐ Vertical Exit with Cap

§4.7 Approximate Operating Schedule:

Hours/Day24 (permitted) Days/Week________________________

Hours/Year8760 (permitted) Weeks/Year________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Controlled by a dust collector meeting a 0.01 gr/dscf BACT limitation

Primary Air Pollution Control Equipment Description:

Make_TBD___ Model________________________________

Type________________________ Size__________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency99+%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

Secondary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type________________________ Size__________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency______________

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period:
Not applicable

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining a MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: P15 Emitting Unit Name: Water Treatment Plant Lime Area

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) The water treatment plant lime area contains lime for use in water treatment during production phase.

Proposed Operational Limitations (*if any*) N/A

Source Classification Code (SCC)/ Description: 2630010000

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

- ☐ NSPS: 40 CFR 60, Subpart(s): _____
- ☐ NESHAPS: 40 CFR 61, Subpart(s): _____
- ☐ MACT: 40 CFR 63, Subpart(s): _____
- ☒ Title V Operating Permit – Significant Emitting Unit
- ☐ Acid Rain (Title IV)
- ☐ Risk Management Plan
- ☐ CAM Plan
- ☐ Other: ____

§4.2 Process Information (*include units***)**:

Type of Material Processed Lime for water treatment

Average Process Rate (tons/hr, gal/hr, etc.)____

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) 500 gpm of water treated

§4.3 Process Identification

Make TBD Model TBD

Type________________________________ Size 500 gpm of water treated

Year of Manufacture/Reconstruction TBD Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ___

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location - *See modeling information in Section 6 and Appendix E*

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): *See modeling information in Section 6 and Appendix E*

Height (feet) ______________________ Inside Diameter (feet) ____________________

Exit Gas Temperature (˚F) ___________ Exit Gas Flow Rate (ACFM) ______________

Exit Gas Velocity (ft/sec) ____________ Exit Gas Moisture Content (%)_____________

Stack Type (check one): ☐ Downward Exit ☐ Multiple Actual Stacks ☐ Fugitive Source

☐ Horizontal Exit ☐ Building Roof Vent ☐ Process Vent

☐ Vertical Exit ☐ Vertical Exit with Cap

§4.7 Approximate Operating Schedule:

Hours/Day24 (permitted) Days/Week________________________

Hours/Year8760 (permitted) Weeks/Year________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Controlled by a dust collector meeting a 0.01 gr/dscf BACT limitation

____

____

____

Primary Air Pollution Control Equipment Description:

Make_TBD___ Model________________________________

Type________________________ Size__________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency99+%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

Secondary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type________________________ Size__________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency______________

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period:
Not applicable

____

____

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining a MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: P16A Emitting Unit Name: Backfill Plant Cement/Fly Ash Hopper

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) The backfill plant cement/fly ash hopper will store cement/fly ash during production phase.

Proposed Operational Limitations (*if any*) N/A

Source Classification Code (SCC)/ Description: 30502001

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☐ NSPS: 40 CFR 60, Subpart(s): _____

☐ NESHAPS: 40 CFR 61, Subpart(s): _____

☐ MACT: 40 CFR 63, Subpart(s): _____

☒ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ____

§4.2 Process Information (*include units*):

Type of Material Processed Cement/fly ash

Average Process Rate (tons/hr, gal/hr, etc.)____

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) 100 metric tons

§4.3 Process Identification

Make TBD Model TBD

Type________________________________ Size up to 100 metric tons

Year of Manufacture/Reconstruction TBD Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ___

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location - *See modeling information in Section 6 and Appendix E*

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): *See modeling information in Section 6 and Appendix E*

Height (feet) ______________________ Inside Diameter (feet) ____________________

Exit Gas Temperature (˚F) ___________ Exit Gas Flow Rate (ACFM) ______________

Exit Gas Velocity (ft/sec) ____________ Exit Gas Moisture Content (%)_____________

Stack Type (check one):
☐ Downward Exit ☐ Multiple Actual Stacks ☐ Fugitive Source
☐ Horizontal Exit ☐ Building Roof Vent ☐ Process Vent
☐ Vertical Exit ☐ Vertical Exit with Cap

§4.7 Approximate Operating Schedule:

Hours/Day24 (permitted) Days/Week________________________

Hours/Year8760 (permitted) Weeks/Year________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Controlled by a dust collector meeting a 0.01 gr/dscf BACT limitation

____

____

____

Primary Air Pollution Control Equipment Description:

Make_TBD___ Model________________________________

Type________________________ Size__________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency99+%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

Secondary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type________________________ Size__________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency______________

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period:
Not applicable

____

____

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining a MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: P16B Emitting Unit Name: Backfill Plant Cement/Fly Ash Silo

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) The backfill plant cement/fly ash silo will store cement/fly ash in production phase.

Proposed Operational Limitations (*if any*) N/A

Source Classification Code (SCC)/ Description: 30502001

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

- ☐ NSPS: 40 CFR 60, Subpart(s): _____
- ☐ NESHAPS: 40 CFR 61, Subpart(s): _____
- ☐ MACT: 40 CFR 63, Subpart(s): _____
- ☒ Title V Operating Permit – Significant Emitting Unit
- ☐ Acid Rain (Title IV)
- ☐ Risk Management Plan
- ☐ CAM Plan
- ☐ Other: ____

§4.2 Process Information (*include units***)**:

Type of Material Processed Cement/fly ash

Average Process Rate (tons/hr, gal/hr, etc.)____

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) 100 metric tons

§4.3 Process Identification

Make TBD Model TBD

Type________________________________ Size up to 100 metric tons

Year of Manufacture/Reconstruction TBD Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ___

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location - *See modeling information in Section 6 and Appendix E*

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): *See modeling information in Section 6 and Appendix E*

Height (feet) ______________________ Inside Diameter (feet) ____________________

Exit Gas Temperature (˚F) ___________ Exit Gas Flow Rate (ACFM) ______________

Exit Gas Velocity (ft/sec) ____________ Exit Gas Moisture Content (%)_____________

Stack Type (check one):

☐ Downward Exit
☐ Horizontal Exit
☐ Vertical Exit
☐ Multiple Actual Stacks
☐ Building Roof Vent
☐ Vertical Exit with Cap
☐ Fugitive Source
☐ Process Vent

§4.7 Approximate Operating Schedule:

Hours/Day24 (permitted) Days/Week________________________

Hours/Year8760 (permitted) Weeks/Year________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Controlled by a dust collector meeting a 0.01 gr/dscf BACT limitation

Primary Air Pollution Control Equipment Description:

Make_TBD___ Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency99+%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

Secondary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency______________

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period:
Not applicable

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining a MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: P17 Emitting Unit Name: 4 Portable Diesel Eng/Generators (total 400-hp)

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) The generators will supply portable power as needed during during the development and production phases.

Proposed Operational Limitations (*if any*) NSPS Subpart IIII, minimum Tier 3

Source Classification Code (SCC)/ Description: 20200102

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

- ☒ NSPS: 40 CFR 60, Subpart(s): IIII
- ☐ NESHAPS: 40 CFR 61, Subpart(s): _____
- ☒ MACT: 40 CFR 63, Subpart(s): ZZZZ which applies 40 CFR 60 Subpart IIII
- ☒ Title V Operating Permit – Significant Emitting Unit
- ☐ Acid Rain (Title IV)
- ☐ Risk Management Plan
- ☐ CAM Plan
- ☐ Other: ____________________

§4.2 Process Information (*include units***)**:

Type of Material Processed Diesel fuel

Average Process Rate (tons/hr, gal/hr, etc.)____________________

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ____________________

§4.3 Process Identification

Make TBD Model NSPS Subpart IIII, Tier 3 minimum

Type____________________ Size up to 400-hp (total for 4 engines)

Year of Manufacture/Reconstruction TBD Year of Installation ________________

Power Source ____________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) __________

Rated Size of Engine powering the generator (hp) up to 400-hp (total for 4 engines)

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) diesel

§4.5 Emitting Unit Location - *Various, Portable Unit*

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*)**: *See modeling information in Section 6 and Appendix E***

Height (feet) ______________________ Inside Diameter (feet) ____________________

Exit Gas Temperature (˚F) ___________ Exit Gas Flow Rate (ACFM) ______________

Exit Gas Velocity (ft/sec) ___________ Exit Gas Moisture Content (%)_____________

Stack Type (check one): ☐ Downward Exit ☐ Multiple Actual Stacks ☐ Fugitive Source

☐ Horizontal Exit ☐ Building Roof Vent ☐ Process Vent

☐ Vertical Exit ☐ Vertical Exit with Cap

§4.7 Approximate Operating Schedule:

Hours/Day 24 (permitted) Days/Week_________________________

Hours/Year 8760 (permitted) Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Use of NSPS Subpart IIII engines.

Primary Air Pollution Control Equipment Description:

Make NSPS Subpart IIII - Tier 3 Minimum Engines Model_________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency______________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining a MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: P18 Emitting Unit Name: 275-hp Portable Diesel Eng/Generator for Air Compressor

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) The generator will supply power to the air compressor during the development phase (an electric compressor will replace it in production phase).

Proposed Operational Limitations (*if any*) NSPS Subpart IIII, minimum Tier 3

Source Classification Code (SCC)/ Description: 20200102

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☒ NSPS: 40 CFR 60, Subpart(s): IIII

☐ NESHAPS: 40 CFR 61, Subpart(s): ______

☒ MACT: 40 CFR 63, Subpart(s): ZZZZ which applies 40 CFR 60 Subpart IIII

☒ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ____

§4.2 Process Information (*include units*):

Type of Material Processed Diesel fuel

Average Process Rate (tons/hr, gal/hr, etc.)____

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ____________________________________

§4.3 Process Identification

Make TBD Model NSPS Subpart IIII, Tier 3 minimum

Type________________________ Size up to 275-hp

Year of Manufacture/Reconstruction TBD Year of Installation ____________

Power Source ______________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) __________

Rated Size of Engine powering the generator (hp) 275

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) diesel

§4.5 Emitting Unit Location - *Various, Portable Unit*

Latitude (in decimal degrees): ___________________ Longitude (in decimal degrees): ___________________

Datum (NAD27, NAD83, etc.): ___________________

§4.6 Stack Information (*if applicable*)**: *See modeling information in Section 6 and Appendix E***

Height (feet) _____________________ Inside Diameter (feet) ___________________

Exit Gas Temperature (˚F) __________ Exit Gas Flow Rate (ACFM) ______________

Exit Gas Velocity (ft/sec) ___________ Exit Gas Moisture Content (%)____________

Stack Type (check one):

☐ Downward Exit

☐ Horizontal Exit

☐ Vertical Exit

☐ Multiple Actual Stacks

☐ Building Roof Vent

☐ Vertical Exit with Cap

☐ Fugitive Source

☐ Process Vent

§4.7 Approximate Operating Schedule:

Hours/Day24 (permitted) Days/Week________________________

Hours/Year8760 (permitted) Weeks/Year________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:

Use of NSPS Subpart IIII engines.

Primary Air Pollution Control Equipment Description:

Make NSPS Subpart IIII - Tier 3 Minimum Engine Model________________________________

Type________________________ Size__________________________________

Year of Manufacture___________ Year of Installation ____________________

Fuel Type(s) _________________ Estimated Control Efficiency_____________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining a MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: UG Emitting Unit Name: ANFO

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) ANFO will be used underground during both development phase and production phase (less ANFO planned for daily use in development phase, 2 blasts per day instead of 8.5).

Proposed Operational Limitations (*if any*) ______

______

Source Classification Code (SCC)/ Description: **30102123**

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☐ NSPS: 40 CFR 60, Subpart(s): ______

☐ NESHAPS: 40 CFR 61, Subpart(s): ______

☐ MACT: 40 CFR 63, Subpart(s): ______

☒ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ______

§4.2 Process Information (*include units***)**:

Type of Material Processed ANFO, explosive

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) 8.5 blasts per day, 0.5 tons of ANFO per blast

§4.3 Process Identification

MakeTBD Model______________________________

Type______________________________ Size

Year of Manufacture/Reconstruction ____________ Year of Installation ________________

Power Source ______________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) __________

Rated Size of Engine powering the generator (hp) __________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) ____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location: Immediately SW of the staff parking lot in the mill area

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): Not applicable

§4.7 Approximate Operating Schedule:

Hours/Day24 hr/day Days/Week_________________________

Hours/Year 8760 hr/yr____________________ Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Best Operating Practices.

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency___________

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) ___________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period:

Not applicable

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F1 Emitting Unit Name: Road Dust, MOY 0 to 1

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Road dust generated from vehicles MOY 0 to 1, development phase.

Proposed Operational Limitations (*if any*) ____

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

- ☐ NSPS: 40 CFR 60, Subpart(s): ____________________________________
- ☐ NESHAPS: 40 CFR 61, Subpart(s): ________________________________
- ☐ MACT: 40 CFR 63, Subpart(s): ___________________________________
- ☒ Title V Operating Permit – Significant Emitting Unit
- ☐ Acid Rain (Title IV)
- ☐ Risk Management Plan
- ☐ CAM Plan
- ☐ Other: ____

§4.2 Process Information (*include units***):**

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______

§4.3 Process Identification

Make_______________________________ Model_______________________________

Type_______________________________ Size________________________________

Year of Manufacture/Reconstruction ____________ Year of Installation _______________

Power Source _______________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) __________

Rated Size of Engine powering the generator (hp) __________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) ____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location Various on mine site

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): ***Not applicable – fugitive source, see modeling information in Section 6 and Appendix E***

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week________________________

Hours/Year 8760 hours/year Weeks/Year________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F2 Emitting Unit Name: Road Dust, MOY 1 to 2

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Road dust generated from vehicles MOY 1 to 2, development phase.

Proposed Operational Limitations (*if any*) ____________________

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☐ NSPS: 40 CFR 60, Subpart(s): ____________________

☐ NESHAPS: 40 CFR 61, Subpart(s): ____________________

☐ MACT: 40 CFR 63, Subpart(s): ____________________

☒ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ____________________

§4.2 Process Information (*include units*):

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______

§4.3 Process Identification

Make______________________________ Model______________________________

Type______________________________ Size______________________________

Year of Manufacture/Reconstruction ____________ Year of Installation _______________

Power Source ______________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) __________

Rated Size of Engine powering the generator (hp) __________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) ____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location **Various on mine site**

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*)**:** ***Not applicable – fugitive source, see modeling information in Section 6 and Appendix E***

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) ___________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F3 Emitting Unit Name: Road Dust, MOY 2 to 15, Annual Average

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Road dust generated from vehicles MOY 2 to 15, Annual Average, production phase.

Proposed Operational Limitations (*if any*) ____

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☐ NSPS: 40 CFR 60, Subpart(s): ____

☐ NESHAPS: 40 CFR 61, Subpart(s): ____

☐ MACT: 40 CFR 63, Subpart(s): ____

☐ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ____

§4.2 Process Information (*include units*):

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______

§4.3 Process Identification

Make_______________________________ Model_______________________________

Type_______________________________ Size________________________________

Year of Manufacture/Reconstruction _____________ Year of Installation ________________

Power Source _______________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location **Various on mine site**

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): ***Not applicable – fugitive source, see modeling information in Section 6 and Appendix E***

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency 50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) ___________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F4 Emitting Unit Name: Road Dust, MOY 16 and 17, Annual Average

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Road dust generated from vehicles MOY 16 and 17, Annual Average, reclamation phase.

Proposed Operational Limitations (*if any*) ____

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

- ☐ NSPS: 40 CFR 60, Subpart(s): ____________________
- ☐ NESHAPS: 40 CFR 61, Subpart(s): ____________________
- ☐ MACT: 40 CFR 63, Subpart(s): ____________________
- ☒ Title V Operating Permit – Significant Emitting Unit
- ☐ Acid Rain (Title IV)
- ☐ Risk Management Plan
- ☐ CAM Plan
- ☐ Other: ____________________

§4.2 Process Information (*include units*):

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______

§4.3 Process Identification

Make________________________________ Model________________________________

Type________________________________ Size_________________________________

Year of Manufacture/Reconstruction _____________ Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location   Various on mine site

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): ***Not applicable – fugitive source, see modeling information in Section 6 and Appendix E***

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F5 Emitting Unit Name: Road Dust, MOY 18

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Road dust generated from vehicles MOY 18, reclamation phase.

Proposed Operational Limitations (*if any*) ______________________________

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

- ☐ NSPS: 40 CFR 60, Subpart(s): ______________________________
- ☐ NESHAPS: 40 CFR 61, Subpart(s): ______________________________
- ☐ MACT: 40 CFR 63, Subpart(s): ______________________________
- ☐ Title V Operating Permit – Significant Emitting Unit
- ☐ Acid Rain (Title IV)
- ☐ Risk Management Plan
- ☐ CAM Plan
- ☐ Other: ______________________________

§4.2 Process Information (*include units***)**:

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______

§4.3 Process Identification

Make________________________________ Model________________________________

Type________________________________ Size_________________________________

Year of Manufacture/Reconstruction _____________ Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location **Various on mine site**

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): ***Not applicable – fugitive source, see modeling information in Section 6 and Appendix E***

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model______________________________

Type_______________________ Size_________________________________

Year of Manufacture___________ Year of Installation ____________________

Fuel Type(s) _________________ Estimated Control Efficiency 50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F6 Emitting Unit Name: Material Transfer to Temporary Stockpile, MOY 0 to 1.5

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Fugitive emissions generated from transferring soil/material to the temporary stockpile during development phase.

Proposed Operational Limitations (*if any*) ____

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

- ☐ NSPS: 40 CFR 60, Subpart(s): ______________________________
- ☐ NESHAPS: 40 CFR 61, Subpart(s): ______________________________
- ☐ MACT: 40 CFR 63, Subpart(s): ______________________________
- ☐ Title V Operating Permit – Significant Emitting Unit
- ☐ Acid Rain (Title IV)
- ☐ Risk Management Plan
- ☐ CAM Plan
- ☐ Other: ______________________________

§4.2 Process Information (*include units***):**

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______

§4.3 Process Identification

Make________________________________ Model________________________________

Type________________________________ Size_________________________________

Year of Manufacture/Reconstruction _____________ Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location **Various on mine site**

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*)**: *Not applicable – fugitive source, see modeling information in Section 6 and Appendix E***

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) ___________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F7 Emitting Unit Name: Temporary Construction Stockpile

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Fugitive dust emissions from wind during development phase.

Proposed Operational Limitations (*if any*) ____

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

- ☐ NSPS: 40 CFR 60, Subpart(s): ______________________________
- ☐ NESHAPS: 40 CFR 61, Subpart(s): ______________________________
- ☐ MACT: 40 CFR 63, Subpart(s): ______________________________
- ☐ Title V Operating Permit – Significant Emitting Unit
- ☐ Acid Rain (Title IV)
- ☐ Risk Management Plan
- ☐ CAM Plan
- ☐ Other: ______________________________

§4.2 Process Information (*include units***)**:

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______

§4.3 Process Identification

Make________________________________ Model________________________________

Type________________________________ Size_________________________________

Year of Manufacture/Reconstruction _____________ Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location   Various on mine site

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): ***Not applicable – fugitive source, see modeling information in Section 6 and Appendix E***

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) ___________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F8 Emitting Unit Name: Embankment Construction, MOY 0 to 1.5

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Fugitive dust from construction of embankments from MOY 0 to 1.5, development phase.

Proposed Operational Limitations (*if any*) ____________________

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☐ NSPS: 40 CFR 60, Subpart(s): ____________________

☐ NESHAPS: 40 CFR 61, Subpart(s): ____________________

☐ MACT: 40 CFR 63, Subpart(s): ____________________

☐ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ____________________

§4.2 Process Information (*include units***):**

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______

§4.3 Process Identification

Make_______________________________ Model_______________________________

Type_______________________________ Size________________________________

Year of Manufacture/Reconstruction ____________ Year of Installation ________________

Power Source _______________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) __________

Rated Size of Engine powering the generator (hp) __________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) ____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location   Various on mine site

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): *Not applicable – fugitive source, see modeling information in Section 6 and Appendix E*

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week________________________

Hours/Year 8760 hours/year Weeks/Year________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) ___________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F9 Emitting Unit Name: Backfill, Non-contact Water Reservoir (NCWR) Embankment Material to Cemented Tailings Facility (CTF), MOY 16 to 18, reclamation phase.

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Fugitive dust generated from backfill, NCWR Embankment Material to CTF, MOY 16 to 18 during reclamation.

Proposed Operational Limitations (*if any*) ____

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☐ NSPS: 40 CFR 60, Subpart(s): ____________________________________

☐ NESHAPS: 40 CFR 61, Subpart(s): ____________________________________

☐ MACT: 40 CFR 63, Subpart(s): ____________________________________

☐ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ____

§4.2 Process Information (*include units***)**:

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) _____

§4.3 Process Identification

Make________________________________ Model________________________________

Type________________________________ Size_________________________________

Year of Manufacture/Reconstruction _____________ Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location Various on mine site

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*)***: Not applicable – fugitive source, see modeling information in Section 6 and Appendix E***

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – ***Not applicable.***

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F10 Emitting Unit Name: Material Transfer to South Stockpile, MOY 0 to 1

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Fugitive dust generated from transferring soil/materials to south stockpile during development phase.

Proposed Operational Limitations (*if any*) ____________________

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

- ☐ NSPS: 40 CFR 60, Subpart(s): ____________________
- ☐ NESHAPS: 40 CFR 61, Subpart(s): ____________________
- ☐ MACT: 40 CFR 63, Subpart(s): ____________________
- ☐ Title V Operating Permit – Significant Emitting Unit
- ☐ Acid Rain (Title IV)
- ☐ Risk Management Plan
- ☐ CAM Plan
- ☐ Other: ____________________

§4.2 Process Information (*include units***):**

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______

§4.3 Process Identification

Make________________________________ Model________________________________

Type________________________________ Size_________________________________

Year of Manufacture/Reconstruction _____________ Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location   Various on mine site

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): ***Not applicable – fugitive source, see modeling information in Section 6 and Appendix E***

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) ___________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F11 Emitting Unit Name: Excess Reclamation Stockpile (South)

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Fugitive dust generated from the south reclamation stockpile, will be used in all phases.

Proposed Operational Limitations (*if any*) ____

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☐ NSPS: 40 CFR 60, Subpart(s): ______________________________

☐ NESHAPS: 40 CFR 61, Subpart(s): ______________________________

☐ MACT: 40 CFR 63, Subpart(s): ______________________________

☐ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ______________________________

§4.2 Process Information (*include units*):

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______

§4.3 Process Identification

Make________________________________ Model________________________________

Type________________________________ Size_________________________________

Year of Manufacture/Reconstruction _____________ Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location   Various on mine site

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): ***Not applicable – fugitive source, see modeling information in Section 6 and Appendix E***

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) ___________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F12 Emitting Unit Name: Material Transfer from South Stockpile, MOY 16 to 17

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Fugitive dust generated from material transfer from south stockpile during reclamation phase.

Proposed Operational Limitations (*if any*) ____

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

- ☐ NSPS: 40 CFR 60, Subpart(s): ____
- ☐ NESHAPS: 40 CFR 61, Subpart(s): ____
- ☐ MACT: 40 CFR 63, Subpart(s): ____
- ☐ Title V Operating Permit – Significant Emitting Unit
- ☐ Acid Rain (Title IV)
- ☐ Risk Management Plan
- ☐ CAM Plan
- ☐ Other: ____

§4.2 Process Information (*include units***)**:

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______

§4.3 Process Identification

Make________________________________ Model________________________________

Type________________________________ Size_________________________________

Year of Manufacture/Reconstruction _____________ Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location Various on mine site

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): ***Not applicable – fugitive source, see modeling information in Section 6 and Appendix E***

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency 50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) ___________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F13 Emitting Unit Name: Material Transfer to North Stockpile, MOY 0 to 1

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Fugitive dust generated from material transfer to North Stockpile MOY 0 to 1, development phase.

Proposed Operational Limitations (*if any*) ____

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

- ☐ NSPS: 40 CFR 60, Subpart(s): ____
- ☐ NESHAPS: 40 CFR 61, Subpart(s): ____
- ☐ MACT: 40 CFR 63, Subpart(s): ____
- ☐ Title V Operating Permit – Significant Emitting Unit
- ☐ Acid Rain (Title IV)
- ☐ Risk Management Plan
- ☐ CAM Plan
- ☐ Other: ____

§4.2 Process Information (*include units***)**:

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______

§4.3 Process Identification

Make________________________________ Model________________________________

Type________________________________ Size_________________________________

Year of Manufacture/Reconstruction _____________ Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location Various on mine site

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): *Not applicable – fugitive source, see modeling information in Section 6 and Appendix E*

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model______________________________

Type_______________________ Size_________________________________

Year of Manufacture___________ Year of Installation ____________________

Fuel Type(s) _________________ Estimated Control Efficiency50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F14 Emitting Unit Name: Excess Reclamation Stockpile (North)

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Fugitive dust generated from wind off of the stockpile, will be used in all phases.

Proposed Operational Limitations (*if any*) ____

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

- ☐ NSPS: 40 CFR 60, Subpart(s): ______________________________
- ☐ NESHAPS: 40 CFR 61, Subpart(s): ______________________________
- ☐ MACT: 40 CFR 63, Subpart(s): ______________________________
- ☐ Title V Operating Permit – Significant Emitting Unit
- ☐ Acid Rain (Title IV)
- ☐ Risk Management Plan
- ☐ CAM Plan
- ☐ Other: ______________________________

§4.2 Process Information (*include units***)**:

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______

§4.3 Process Identification

Make________________________________ Model________________________________

Type________________________________ Size_________________________________

Year of Manufacture/Reconstruction _____________ Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location   Various on mine site

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): ***Not applicable – fugitive source, see modeling information in Section 6 and Appendix E***

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency 50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F15 Emitting Unit Name: Material Transfer from North Stockpile, MOY 16 to 18

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Fugitive dust generated from material transfer to North Stockpile during mine reclamation phase.

Proposed Operational Limitations (*if any*) ______

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

- ☐ NSPS: 40 CFR 60, Subpart(s): ______
- ☐ NESHAPS: 40 CFR 61, Subpart(s): ______
- ☐ MACT: 40 CFR 63, Subpart(s): ______
- ☐ Title V Operating Permit – Significant Emitting Unit
- ☐ Acid Rain (Title IV)
- ☐ Risk Management Plan
- ☐ CAM Plan
- ☐ Other: ______

§4.2 Process Information (*include units***):**

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______

§4.3 Process Identification

Make________________________________ Model________________________________

Type________________________________ Size_________________________________

Year of Manufacture/Reconstruction _____________ Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location Various on mine site

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): *Not applicable – fugitive source, see modeling information in Section 6 and Appendix E*

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model______________________________

Type________________________ Size_________________________________

Year of Manufacture____________ Year of Installation ____________________

Fuel Type(s) _________________ Estimated Control Efficiency50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F16 Emitting Unit Name: Soil Removal and Stockpiling, MOY 0 to 1

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Fugitive dust generated from soil removal and stockpiling during the development phase.

Proposed Operational Limitations (*if any*) ____

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

- ☐ NSPS: 40 CFR 60, Subpart(s): ______________________________
- ☐ NESHAPS: 40 CFR 61, Subpart(s): ______________________________
- ☐ MACT: 40 CFR 63, Subpart(s): ______________________________
- ☐ Title V Operating Permit – Significant Emitting Unit
- ☐ Acid Rain (Title IV)
- ☐ Risk Management Plan
- ☐ CAM Plan
- ☐ Other: ______________________________

§4.2 Process Information (*include units***):**

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______

§4.3 Process Identification

Make________________________________ Model________________________________

Type________________________________ Size_________________________________

Year of Manufacture/Reconstruction _____________ Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location Various on mine site

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): ***Not applicable – fugitive source, see modeling information in Section 6 and Appendix E***

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model______________________________

Type_______________________ Size________________________________

Year of Manufacture___________ Year of Installation ____________________

Fuel Type(s) _________________ Estimated Control Efficiency50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F17 Emitting Unit Name: Topsoil Pile

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary* Fugitive dust generated from the topsoil pile, used in all phases.

Proposed Operational Limitations (*if any*) ____

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☐ NSPS: 40 CFR 60, Subpart(s): ______________________________

☐ NESHAPS: 40 CFR 61, Subpart(s): ______________________________

☐ MACT: 40 CFR 63, Subpart(s): ______________________________

☐ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ______________________________

§4.2 Process Information (*include units***):**

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______

§4.3 Process Identification

Make________________________________ Model________________________________

Type________________________________ Size_________________________________

Year of Manufacture/Reconstruction _____________ Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location Various on mine site

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): ***Not applicable – fugitive source, see modeling information in Section 6 and Appendix E***

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) ___________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F18 Emitting Unit Name: Subsoil Pile

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Fugitive dust generated from the subsoil pile, used in all phases.

Proposed Operational Limitations (*if any*) ____

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

- ☐ NSPS: 40 CFR 60, Subpart(s): ____
- ☐ NESHAPS: 40 CFR 61, Subpart(s): ____
- ☐ MACT: 40 CFR 63, Subpart(s): ____
- ☐ Title V Operating Permit – Significant Emitting Unit
- ☐ Acid Rain (Title IV)
- ☐ Risk Management Plan
- ☐ CAM Plan
- ☐ Other: ____

§4.2 Process Information (*include units***)**:

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______

§4.3 Process Identification

Make________________________________ Model________________________________

Type________________________________ Size_________________________________

Year of Manufacture/Reconstruction _____________ Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location **Various on mine site**

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*)**: *Not applicable – fugitive source, see modeling information in Section 6 and Appendix E***

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency 50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) ___________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F19 Emitting Unit Name: Soil Return, MOY 16 to 18

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Fugitive dust generated from during reclamation soil return (reclamation phase).

Proposed Operational Limitations (*if any*) ______________________________

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

- ☐ NSPS: 40 CFR 60, Subpart(s): ______________________________
- ☐ NESHAPS: 40 CFR 61, Subpart(s): ______________________________
- ☐ MACT: 40 CFR 63, Subpart(s): ______________________________
- ☐ Title V Operating Permit – Significant Emitting Unit
- ☐ Acid Rain (Title IV)
- ☐ Risk Management Plan
- ☐ CAM Plan
- ☐ Other: ______________________________

§4.2 Process Information (*include units***):**

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______

§4.3 Process Identification

Make________________________________ Model________________________________

Type________________________________ Size_________________________________

Year of Manufacture/Reconstruction _____________ Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)_____________ Ash Content (%)_____________

§4.5 Emitting Unit Location Various on mine site

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*)***: Not applicable – fugitive source, see modeling information in Section 6 and Appendix E***

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) ___________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F20 Emitting Unit Name: Copper-enriched Rock Drop to Stockpile, MOY 2 to 3

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Fugitive dust associated with copper-enriched rocks dropping into stockpile for further processing MOY 2 to 3, development phase.

Proposed Operational Limitations (*if any*) ____

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

- ☐ NSPS: 40 CFR 60, Subpart(s): ____
- ☐ NESHAPS: 40 CFR 61, Subpart(s): ____
- ☐ MACT: 40 CFR 63, Subpart(s): ____
- ☐ Title V Operating Permit – Significant Emitting Unit
- ☐ Acid Rain (Title IV)
- ☐ Risk Management Plan
- ☐ CAM Plan
- ☐ Other: ____

§4.2 Process Information (*include units***)**:

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______

§4.3 Process Identification

Make_______________________________ Model_______________________________

Type_______________________________ Size________________________________

Year of Manufacture/Reconstruction _____________ Year of Installation ________________

Power Source _______________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) __________

Rated Size of Engine powering the generator (hp) __________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location Various on mine site

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): ***Not applicable – fugitive source, see modeling information in Section 6 and Appendix E***

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F21 Emitting Unit Name: Copper-enriched Rock Stockpile (Mill Feed)

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Fugitive dust associated with wind on the copper-enriched rock stockpile during production phase.

Proposed Operational Limitations (*if any*) ____

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

- ☐ NSPS: 40 CFR 60, Subpart(s): ____
- ☐ NESHAPS: 40 CFR 61, Subpart(s): ____
- ☐ MACT: 40 CFR 63, Subpart(s): ____
- ☐ Title V Operating Permit – Significant Emitting Unit
- ☐ Acid Rain (Title IV)
- ☐ Risk Management Plan
- ☐ CAM Plan
- ☐ Other: ____

§4.2 Process Information (*include units***):**

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______

§4.3 Process Identification

Make________________________________ Model________________________________

Type________________________________ Size_________________________________

Year of Manufacture/Reconstruction _____________ Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location   Various on mine site

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): *Not applicable – fugitive source, see modeling information in Section 6 and Appendix E*

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type__________________________ Size____________________________________

Year of Manufacture_____________ Year of Installation ______________________

Fuel Type(s) ___________________ Estimated Control Efficiency50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) ___________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F22 Emitting Unit Name: Waste Rock Drop at Waste Rock Storage (WRS) Pad, MOY 0 to 1.5, at CTF, MOY 1.5 to 4 and 8

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Fugitive dust generated from handling of waste rock to storage, the time periods describe both development and production phases.

Proposed Operational Limitations (*if any*) ____

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☐ NSPS: 40 CFR 60, Subpart(s): ______________________________

☐ NESHAPS: 40 CFR 61, Subpart(s): ______________________________

☐ MACT: 40 CFR 63, Subpart(s): ______________________________

☐ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ______________________________

§4.2 Process Information (*include units***):**

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) _____

§4.3 Process Identification

Make________________________________ Model________________________________

Type________________________________ Size_________________________________

Year of Manufacture/Reconstruction _____________ Year of Installation _________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)_____________ Ash Content (%)_____________

§4.5 Emitting Unit Location Various on mine site

Latitude (in decimal degrees): _____________________ Longitude (in decimal degrees): _____________________

Datum (NAD27, NAD83, etc.): _____________________

§4.6 Stack Information (*if applicable*): *Not applicable – fugitive source, see modeling information in Section 6 and Appendix E*

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency 50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) ___________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F23 Emitting Unit Name: Temporary WRS

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Fugitive dust generated from temporary waste rock storage activities during development phase.

Proposed Operational Limitations (*if any*) ______________________________

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

- ☐ NSPS: 40 CFR 60, Subpart(s): ______________________________
- ☐ NESHAPS: 40 CFR 61, Subpart(s): ______________________________
- ☐ MACT: 40 CFR 63, Subpart(s): ______________________________
- ☐ Title V Operating Permit – Significant Emitting Unit
- ☐ Acid Rain (Title IV)
- ☐ Risk Management Plan
- ☐ CAM Plan
- ☐ Other: ______________________________

§4.2 Process Information (*include units*):

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______

§4.3 Process Identification

Make________________________________ Model________________________________

Type________________________________ Size_________________________________

Year of Manufacture/Reconstruction _____________ Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location Various on mine site

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*)**: *Not applicable – fugitive source, see modeling information in Section 6 and Appendix E***

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) ___________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F24 Emitting Unit Name: Waste Rock Transfer from WRS to CTF, MOY 2 to 3

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Fugitive dust generated from waste rock transfer to CTF during development phase.

Proposed Operational Limitations (*if any*) ____

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

- ☐ NSPS: 40 CFR 60, Subpart(s): ____
- ☐ NESHAPS: 40 CFR 61, Subpart(s): ____
- ☐ MACT: 40 CFR 63, Subpart(s): ____
- ☐ Title V Operating Permit – Significant Emitting Unit
- ☐ Acid Rain (Title IV)
- ☐ Risk Management Plan
- ☐ CAM Plan
- ☐ Other: ____

§4.2 Process Information (*include units***)**:

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______

§4.3 Process Identification

Make________________________________ Model________________________________

Type________________________________ Size_________________________________

Year of Manufacture/Reconstruction _____________ Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location   Various on mine site

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): ***Not applicable – fugitive source, see modeling information in Section 6 and Appendix E***

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency 50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) ___________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F25 Emitting Unit Name: Waste Rock Storage Pad Reclamation, MOY 3

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Fugitive dust generated from waste rock storage pad reclamation during the end of development phase.

Proposed Operational Limitations (*if any*) ____

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☐ NSPS: 40 CFR 60, Subpart(s): ____

☐ NESHAPS: 40 CFR 61, Subpart(s): ____

☐ MACT: 40 CFR 63, Subpart(s): ____

☐ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ____

§4.2 Process Information (*include units***)**:

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______

§4.3 Process Identification

Make________________________________ Model________________________________

Type________________________________ Size_________________________________

Year of Manufacture/Reconstruction _____________ Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location Various on mine site

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): ***Not applicable – fugitive source, see modeling information in Section 6 and Appendix E***

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model_______________________________

Type________________________ Size_________________________________

Year of Manufacture____________ Year of Installation ____________________

Fuel Type(s) __________________ Estimated Control Efficiency50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F26 Emitting Unit Name: 11 -14-hp Portable Diesel-fired Light Plants (154 hp total)

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) The light plants will supply portable light during the development phase (4 will remain during production phase).

Proposed Operational Limitations (*if any*) NSPS Subpart IIII, minimum Tier 3

Source Classification Code (SCC)/ Description: 20200102

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☒ NSPS: 40 CFR 60, Subpart(s): IIII

☐ NESHAPS: 40 CFR 61, Subpart(s): _____

☒ MACT: 40 CFR 63, Subpart(s): ZZZZ which applies 40 CFR 60 Subpart IIII

☒ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ____

§4.2 Process Information (*include units***):**

Type of Material Processed Diesel fuel

Average Process Rate (tons/hr, gal/hr, etc.)____

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______________________________

§4.3 Process Identification

Make TBD Model NSPS Subpart IIII, Tier 3 minimum

Type______________________ Size up to 154-hp (total)

Year of Manufacture/Reconstruction TBD Year of Installation ____________

Power Source ______________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) __________

Rated Size of Engine powering the generator (hp) up to 154-hp (total)

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) diesel

§4.5 Emitting Unit Location - *Various, Portable Units*

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*)**: *See modeling information in Section 6 and Appendix E***

Height (feet) ______________________ Inside Diameter (feet) ____________________

Exit Gas Temperature (˚F) ___________ Exit Gas Flow Rate (ACFM) ______________

Exit Gas Velocity (ft/sec) ___________ Exit Gas Moisture Content (%)_____________

Stack Type (check one): ☐ Downward Exit ☐ Multiple Actual Stacks ☐ Fugitive Source

☐ Horizontal Exit ☐ Building Roof Vent ☐ Process Vent

☐ Vertical Exit ☐ Vertical Exit with Cap

§4.7 Approximate Operating Schedule:

Hours/Day24 (permitted) Days/Week________________________

Hours/Year8760 (permitted) Weeks/Year________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Use of NSPS Subpart IIII engines.

Primary Air Pollution Control Equipment Description:

Make NSPS Subpart IIII - Tier 3 Minimum Engines Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency______________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining a MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F27 Emitting Unit Name: 500-gal Gasoline Storage Tank (double-walled)

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) The gasoline storage tank will provide on-site fuel storage during both development and production phases.

Proposed Operational Limitations (*if any*) ______________________________

____

Source Classification Code (SCC)/ Description: **40400109**

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

- ☐ NSPS: 40 CFR 60, Subpart(s): ______________________________
- ☐ NESHAPS: 40 CFR 61, Subpart(s): ______________________________
- ☒ MACT: 40 CFR 63, Subpart(s): Subpart CCCCCC
- ☒ Title V Operating Permit – Significant Emitting Unit
- ☐ Acid Rain (Title IV)
- ☐ Risk Management Plan
- ☐ CAM Plan
- ☐ Other: ______________________________

§4.2 Process Information (*include units*):

Type of Material Processed Gasoline, stored

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) Est. 1000 gal/month

§4.3 Process Identification

Make TBD Model ____________________________

Type ____________________________ Size 500 gal

Year of Manufacture/Reconstruction ____________ Year of Installation ______________

Power Source ____________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) __________

Rated Size of Engine powering the generator (hp) __________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) ____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location: Immediately SW of the staff parking lot in the mill area

Latitude (in decimal degrees): ___________________ Longitude (in decimal degrees): ___________________

Datum (NAD27, NAD83, etc.): ___________________

§4.6 Stack Information (*if applicable*): Not applicable

§4.7 Approximate Operating Schedule:

Hours/Day 24 hr/day Days/Week ________________________

Hours/Year 8760 hr/yr ____________________ Weeks/Year ________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Not applicable.

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size__________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency__________

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period:
Not applicable

§4.10 Continuous Emission Monitoring System (CEMS) – ***Not applicable***

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F28 Emitting Unit Name: 9-Temporary Portable Propane-fired Heaters (37.8 MMBtu/hr total)

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) The portable heaters will provide heat on site during the development phase (3 heaters will remain during production phase).

Proposed Operational Limitations (*if any*) N/A

Source Classification Code (SCC)/ Description: 30590005

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☐ NSPS: 40 CFR 60, Subpart(s): ______

☐ NESHAPS: 40 CFR 61, Subpart(s): ______

☐ MACT: 40 CFR 63, Subpart(s): ______

☒ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ____

§4.2 Process Information (*include units*):

Type of Material Processed Propane

Average Process Rate (tons/hr, gal/hr, etc.)____

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) 37.8 MMBtu/hr total

§4.3 Process Identification

Make TBD Model TBD

Type________________________________ Size up to 37.8 MMBtu/hr

Year of Manufacture/Reconstruction TBD Year of Installation ________________

Power Source N/A

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) _____________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) Propane

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location: *See modeling information in Section 6 and Appendix E*

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): *See modeling information in Section 6 and Appendix E*

Height (feet) ______________________ Inside Diameter (feet) ____________________

Exit Gas Temperature (˚F) ___________ Exit Gas Flow Rate (ACFM) ______________

Exit Gas Velocity (ft/sec) ____________ Exit Gas Moisture Content (%)_____________

Stack Type (check one):

☐ Downward Exit
☐ Horizontal Exit
☐ Vertical Exit
☐ Multiple Actual Stacks
☐ Building Roof Vent
☐ Vertical Exit with Cap
☐ Fugitive Source
☐ Process Vent

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours/day Days/Week________________________

Hours/Year 8760 hours____ Weeks/Year________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Good Combustion Practices

Primary Air Pollution Control Equipment Description:

Make__N/A_ Model________________________________

Type________________________ Size__________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency______________

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) __________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not Applicable*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of the Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F29 Emitting Unit Name: Road Dust, Construction Access Road, MOY 0-2, Avg

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Road dust generated from vehicles on the construction access road, MOY 0-2, averaged (development phase).

Proposed Operational Limitations (*if any*) ____

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☐ NSPS: 40 CFR 60, Subpart(s): ____________________________________

☐ NESHAPS: 40 CFR 61, Subpart(s): ____________________________________

☐ MACT: 40 CFR 63, Subpart(s): ____________________________________

☐ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ____________________________________

§4.2 Process Information (*include units***):**

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) ______

§4.3 Process Identification

Make________________________________ Model________________________________

Type________________________________ Size_________________________________

Year of Manufacture/Reconstruction _____________ Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location   Various on mine site

Latitude (in decimal degrees): ____________________ Longitude (in decimal degrees): ____________________

Datum (NAD27, NAD83, etc.): ____________________

§4.6 Stack Information (*if applicable*): ***Not applicable – fugitive source, see modeling information in Section 6 and Appendix E***

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) ___________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: F30 Emitting Unit Name: Road Dust, Main Access Road, MOY 2-15, Avg

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Road dust generated from vehicles on the main access road (employees, contractors, suppliers, etc.), MOY 2-15 (production phase), averaged.

Proposed Operational Limitations (*if any*) ____________________

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

☐ NSPS: 40 CFR 60, Subpart(s): ____________________

☐ NESHAPS: 40 CFR 61, Subpart(s): ____________________

☐ MACT: 40 CFR 63, Subpart(s): ____________________

☒ Title V Operating Permit – Significant Emitting Unit

☐ Acid Rain (Title IV)

☐ Risk Management Plan

☐ CAM Plan

☐ Other: ____________________

§4.2 Process Information (*include units***)**:

Type of Material Processed Fugitive Particulate Matter

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) _____

§4.3 Process Identification

Make________________________________ Model________________________________

Type________________________________ Size_________________________________

Year of Manufacture/Reconstruction _____________ Year of Installation ________________

Power Source ________________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) ___________

Rated Size of Engine powering the generator (hp) ___________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) _____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location Various on mine site

Latitude (in decimal degrees): _____________________ Longitude (in decimal degrees): _____________________

Datum (NAD27, NAD83, etc.): _____________________

§4.6 Stack Information (*if applicable*): *Not applicable – fugitive source, see modeling information in Section 6 and Appendix E*

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week_________________________

Hours/Year 8760 hours/year Weeks/Year_________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Water suppression used as necessary along with Best Operating Practices.

____

____

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency50%

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) ___________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – *Not applicable.*

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§4.0 Emitting Unit and Control Equipment Information

A separate Section 4.0 must be completed for each emitting unit listed in Section 2.0. Applications for Title V Operating Permits must address significant emission units individually. Insignificant emission units may be addressed as a group. For information that has been previously submitted, the applicant may instead reference the previously submitted information, including the date the material was submitted and the source (i.e. permit application number, etc.)

Emitting Unit ID: IEU1 Emitting Unit Name: Diesel Storage Tanks (250-gal, 500-gal, 10,000-gal), in use for Development and Production Phases

§4.1 Emitting Unit Overview:

Narrative Process Equipment/Process Description (*attach additional sheets as necessary*) Diesel storage tanks for support of vehicle/engines.

Proposed Operational Limitations (*if any*) ____

____

Source Classification Code (SCC)/ Description: 30301101

(*Note: SCC Codes can be found at the following website*: http://cfpub.epa.gov/oarweb/download/WebFIRESCCs.csv)

Regulatory Programs: Indicate all air pollution control programs applicable to this emitting unit:

- ☐ NSPS: 40 CFR 60, Subpart(s): ____________________________
- ☐ NESHAPS: 40 CFR 61, Subpart(s): ____________________________
- ☐ MACT: 40 CFR 63, Subpart(s): ____________________________
- ☐ Title V Operating Permit – Significant Emitting Unit
- ☐ Acid Rain (Title IV)
- ☐ Risk Management Plan
- ☐ CAM Plan
- ☐ Other: ____________________________

§4.2 Process Information (*include units***)**:

Type of Material Processed Diesel

Average Process Rate (tons/hr, gal/hr, etc.)______

Maximum Rated Design Process Rate (tons/hr, gal/hr, etc.) 250-gal, 500-gal, 10,000 gal

§4.3 Process Identification

Make TBD Model______________________________

Type______________________________ Size_______________________________

Year of Manufacture/Reconstruction ____________ Year of Installation _______________

Power Source ______________________________

If applicable, provide the following generator information:

Rated Output of the generator (kW) __________

Rated Size of Engine powering the generator (hp) __________

§4.4 Fuel/Combustion Information:

(For variable parameters, indicate the maximum value or a range)

Fuel Type(s) ____

Average Fuel Combustion Rate: ____

Maximum Rated Combustion Rate: ____

Heat Content (Btu rating) ____________ Sulfur Content (%)____________ Ash Content (%)____________

§4.5 Emitting Unit Location Various on mine site

Latitude (in decimal degrees): ___________________ Longitude (in decimal degrees): ___________________

Datum (NAD27, NAD83, etc.): ___________________

§4.6 Stack Information (*if applicable*): ***Not applicable –***

§4.7 Approximate Operating Schedule:

Hours/Day 24 hours Days/Week________________________

Hours/Year 8760 hours/year Weeks/Year________________________

§4.8 Air Pollution Control Equipment and Practices

Primary and Secondary Air Pollution Control Equipment and/or Procedure Description:
Emissions are negligible from diesel storage.

Primary Air Pollution Control Equipment Description:

Make N/A Model________________________________

Type_________________________ Size___________________________________

Year of Manufacture____________ Year of Installation _____________________

Fuel Type(s) __________________ Estimated Control Efficiency____

Estimated Capital Equipment Cost (*not required for Title V Operating Permit applications*) ___________

§4.9 Shakedown Procedures (*not required for Title V Operating Permit applications*)

Describe any shakedown procedures that are expected to affect emissions, including the duration of the shakedown period: ***Not applicable.***

§4.10 Continuous Emission Monitoring System (CEMS) – ***Not applicable.***

§4.11 Emissions Control Analysis (*not required for Title V Operating permit applications*)

Best Available Control Technology (BACT) is required for all sources obtaining an MAQP. The BACT analysis should be conducted separately for each pollutant emitted from each emitting unit. Control costs (cost per ton of air pollutant controlled) should be calculated for each option. Options may then be eliminated for economic, energy or environmental reasons. The control option that is selected should have controls or control costs similar to other recently permitted similar sources and should be capable of achieving appropriate emission standards. If necessary, a separate start-up/shut-down BACT analyses should be conducted.

Lowest Achievable Emission Rate (LAER) is required for major stationary sources and major modifications located in a nonattainment area. LAER is also required for major stationary sources or major modifications located in an area designated as attainment or unclassified under 40 CFR 81.327, but would cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) in a nearby nonattainment area. The LAER analysis shall demonstrate that the emission rate proposed is equivalent to the most stringent emission rate achievable or contained in any state implementation plan for a similar source.

Attach BACT/LAER Analysis Results, as applicable.

Applicable Requirement (*check all that apply*): ☒ BACT ☐ LAER

See Section 5 of Application

§4.12 Stack Height and Dispersion Technique Analysis (*not required for Title V Operating Permit applications*)

If applicable, supply a stack height and dispersion technique analysis demonstrating compliance with the requirements of the Stack Heights and Dispersion Technique Rule (ARM 17.8, Subchapter 4)

§ 5.0 Project and Site Information

Note: This section is not required to be completed for Title V Operating Permit applications.

These questions will be answered in the Environmental Impact Statement (EIS) being prepared for the Tintina Black Butte Copper Project in conjunction with the Mine Operating Permit process.

Identify the landowner of the proposed project site and the current land use (industrial, agricultural, residential, etc.):
Please refer to the Mine Operating Permit Application and Environmental Impact Statement (EIS) being developed for the Tintina Black Butte Copper Project.

Indicate the approximate distance to the nearest home and/or structure not associated with the proposed project site:
Please refer to the Mine Operating Permit Application and EIS being developed for the Tintina Black Butte Copper Project.

Summarize the aesthetic character of the proposed project site and the surrounding community or neighborhood. Include a description of recreational opportunities and any unique cultures in the area that may be affected by the proposed project:
Please refer to the Mine Operating Permit Application and EIS being developed for the Tintina Black Butte Copper Project.

Describe the noise levels created by the proposed project:
Please refer to the Mine Operating Permit Application and EIS being developed for the Tintina Black Butte Copper Project.

Summarize other industrial activities at or near the site:
Please refer to the Mine Operating Permit Application and EIS being developed for the Tintina Black Butte Copper Project.

List other permits and/or approvals which have been obtained or will be obtained for this project (including MPDES permits, open cut permit, hazardous waste permit, etc.):
Please refer to the Mine Operating Permit Application and EIS being developed for the Tintina Black Butte Copper Project.

Indicate the number of employees currently employed and the increase or decrease in the number of people employed at this site as a result of the proposed project:
Please refer to the Mine Operating Permit Application and EIS being developed for the Tintina Black Butte Copper Project.

Describe any upgrades of utilities that may be necessary to meet the power demands for this proposed project:
Please refer to the Mine Operating Permit Application and EIS being developed for the Tintina Black Butte Copper Project.

Identify the amount of land that will be disturbed, in acres, as a result of this proposed project:
Please refer to the Mine Operating Permit Application and EIS being developed for the Tintina Black Butte Copper Project.

Identify any fish or wildlife habitat, animal or bird species, or any known migration or movement of animals at the project site: Identify any plant species (including types of trees, shrubs, grasses, crops, and aquatic plants) at the proposed project site:
Please refer to the Mine Operating Permit Application and EIS being developed for the Tintina Black Butte Copper Project.

Describe any proposed discharges into surface water or onto the proposed project site:
Please refer to the Mine Operating Permit Application and EIS being developed for the Tintina Black Butte Copper Project.

Identify any potential impacts to wetlands and/or changes in the drainage patterns at the proposed project site:
Please refer to the Mine Operating Permit Application and EIS being developed for the Tintina Black Butte Copper Project.

Summarize the soils and geology of the project site. Include a description of any disruption, displacement, erosion, compaction, moisture loss, or over-covering of soil that would reduce the productivity or fertility of the soil at the site:
Please refer to the Mine Operating Permit Application and EIS being developed for the Tintina Black Butte Copper Project.

Summarize any access to recreational activities or wilderness areas near the proposed project site:
Please refer to the Mine Operating Permit Application and EIS being developed for the Tintina Black Butte Copper Project.

Describe any state, county, city, United States Forest Service (USFS), Bureau of Land Management (BLM), or tribal zoning or management plans and/or goals that might affect the site:
Please refer to the Mine Operating Permit Application and EIS being developed for the Tintina Black Butte Copper Project.

§ 6.0 Instructions on Public Notice For Montana Air Quality Permit

Note: This section is not required to be completed for Title V Operating Permit applications.

The applicant shall publish the following notification no earlier than 10 days prior to the date the applicant's MAQP application will be submitted to the Department, and no later than 10 days following the date of submittal. The notice shall be published **once** in the legal notice section of a newspaper of general circulation in the area affected. (*Note: MAQP applications for solid waste incinerators, subject to 75-10-221, Montana Code Annotated (MCA), or hazardous waste incinerators or boilers or industrial furnaces, subject to 75-10-406, MCA, must publish* ***three*** *public notices, each on separate days, in the legal notice section of a newspaper in the county in which the source is proposed be located.*) Any fees associated with publication of this notice are the responsibility of the permit applicant. Questions regarding an appropriate newspaper should be addressed to the Department.

An Affidavit of Publication of Public Notice must be submitted with the application or the permit application will be deemed incomplete. This notice is required by the air quality rules. **The notice to be published must contain all text, excluding the text in italics, within the box below.**

Public Notice

Notice of Application for a Montana Air Quality Permit (MAQP), pursuant to Sections 75-2-211 and 75-2-215, MCA, and the Air Quality Rules. Tintina Montana Inc., will file on or about February 20, 2018, an application for an MAQP from the Montana Department of Environmental Quality. Applicant(s) seeks approval of its application for:

The development and operation of a new underground copper mine and mill at the Black Butte Copper Project site, located 15 miles north of White Sulphur Springs. The project will produce and ship copper concentrate mined from both the upper and lower zones of the Johnny Lee copper deposit.

The legal description of the site is: Sections 24, 25, and 36 Township 12 North, Range 6 East and Sections 19, 29, 30, 31, and 32 in Township 12 North, Range 7 East, in Meagher, County, Montana.

Within 40 days of the receipt of a completed application, the Department will make a preliminary determination whether the permit should be issued, issued with conditions, or denied. Any member of the public with questions or who wishes to receive notice of the preliminary determination, and the location where a copy of the application and the Department's analysis of it can be reviewed, or to submit comments on the preliminary determination, must contact the Department at Department of Environmental Quality, Air Quality Bureau, Air Permitting Services Section Supervisor at P.O. Box 200901, Helena, MT 59620-0901, telephone (406) 444-3490. Any comments on the preliminary determination must be submitted to the Department within the specified timeframe (within 30 days after the preliminary determination is issued).

§ 7.0 Applicable Requirements

§7.1 Applicable Requirements

Attach a complete listing and description of all applicable air pollution control requirements, including rules and regulations which have been promulgated at the time of the submittal of the application, but which will become effective at a later date. Explain any proposed exemptions from otherwise applicable requirements. Describe or reference any applicable test methods for determining compliance with each applicable requirement.

§7.2 Additional Requirements

Additional requirements may apply. A description of the requirements listed below is included in the Section 7.2 Supplement included on page 18 of this application. **Note which of the following requirements apply to this permit application** (*check each that applies*):

☒ Ambient Air Quality Impact Analysis

☐ Alternative Siting Analysis

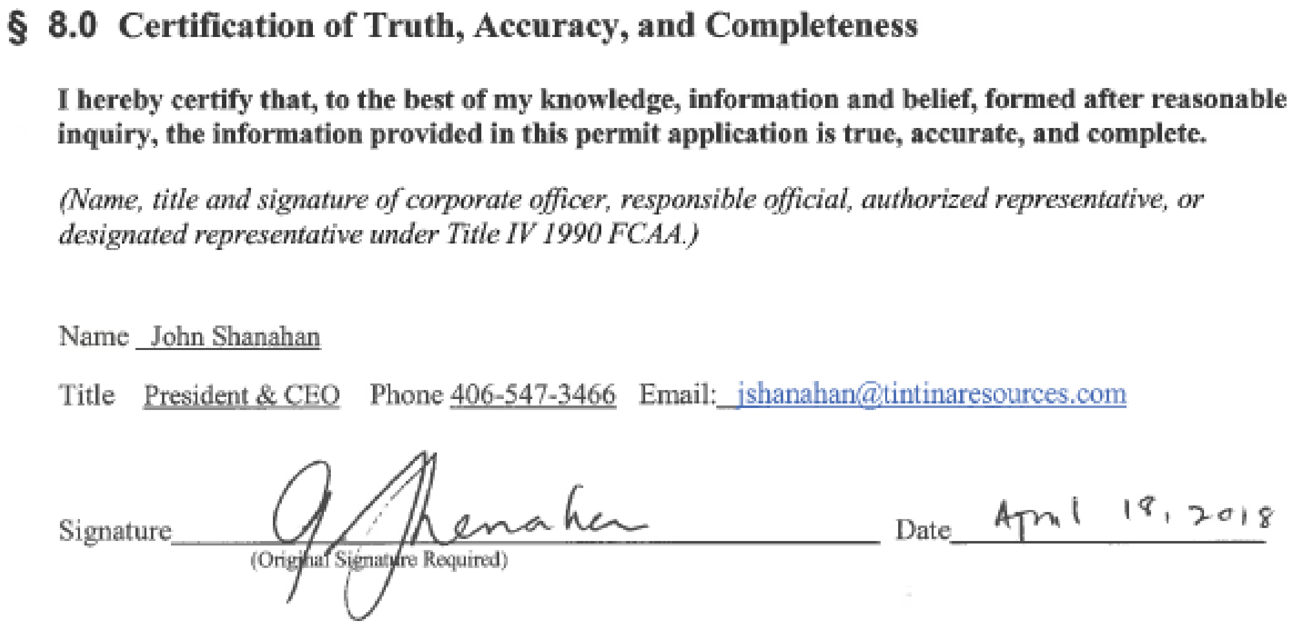
☐ Alternative Operating Scenario

☐ Compliance Schedule/Plan

☐ Compliance Certification

☐ Additional Requirements for solid or hazardous waste incinerators or BIFS subject to 75-10-406, MCA

☐ Additional Requirements for Commercial Medical and Commercial Hazardous Waste Incinerators, including BIFS Subject to 75-10-406, MCA



§ 8.0 Certification of Truth, Accuracy, and Completeness

I hereby certify that, to the best of my knowledge, information and belief, formed after reasonable inquiry, the information provided in this permit application is true, accurate, and complete.

(Name, title and signature of corporate officer, responsible official, authorized representative, or designated representative under Title IV 1990 FCAA.)

Name John Shanahan

Title President & CEO Phone 406-547-3466 Email: jshanahan@tintinaresources.com

Signature J Shanahan Date April 19, 2018

(Original Signature Required)

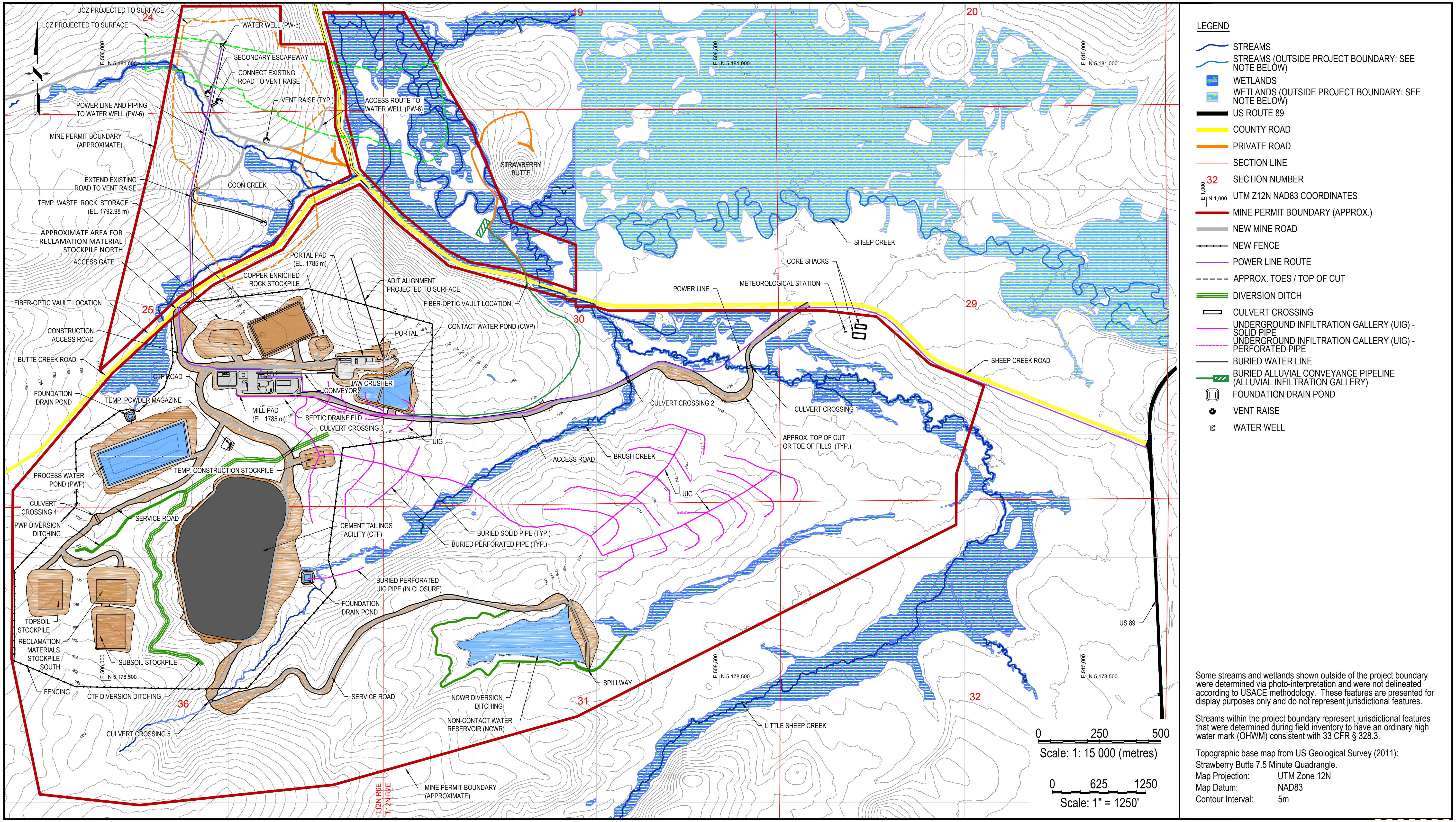
APPLICATION CHECKLIST

The information contained in the checklist below must be submitted in order for the application to be considered complete. Additional information may be required by the Department. Please contact the Department if there are any questions or if the applicant would like a pre-application meeting with Department personnel.

__X__ Completed Application Form
__X__ Application Fee
__X__ Site Map (Not required for Title V Operating Permit applications)
__X__ Process Flow Diagrams (Not required for Title V Operating Permit applications)
Maps, not process flow diagrams, are included with this application.
__X__ Emission Inventory Calculations
__X__ BACT/LAER Analysis (Not required for Title V Operating Permit applications)
__X__ Stack Height and Dispersion Techniques Analysis (if applicable, not required for Title V Operating Permit applications)
__NA__Modeling/Risk Assessment Analysis (if applicable, not required for Title V Operating Permit applications) – ***Modeling is included under Dispersion Techniques, no Risk Assessment is Required***
__X__ List of Applicable Requirements
__X__ Affidavit of Public Notice to be submitted when available (Not required for Title V Operating permit applications)
__X__ Certification of Truth, Accuracy, and Completeness – Original Signature (if application form is submitted electronically)

APPENDIX B: FACILITIES SITE PLAN, MILL DIAGRAM, AND UNDERGROUND WORKINGS/MINE VENT LOCATIONS

Figure 1 - BBCP Facilities Site Plan



Some streams and wetlands shown outside of the project boundary were determined via photo-interpretation and were not delineated according to USACE methodology. These features are presented for display purposes only and do not represent jurisdictional features.

Streams within the project boundary represent jurisdictional features that were determined during field inventory to have an ordinary high water mark (OHWM) consistent with 33 CFR § 328.3.

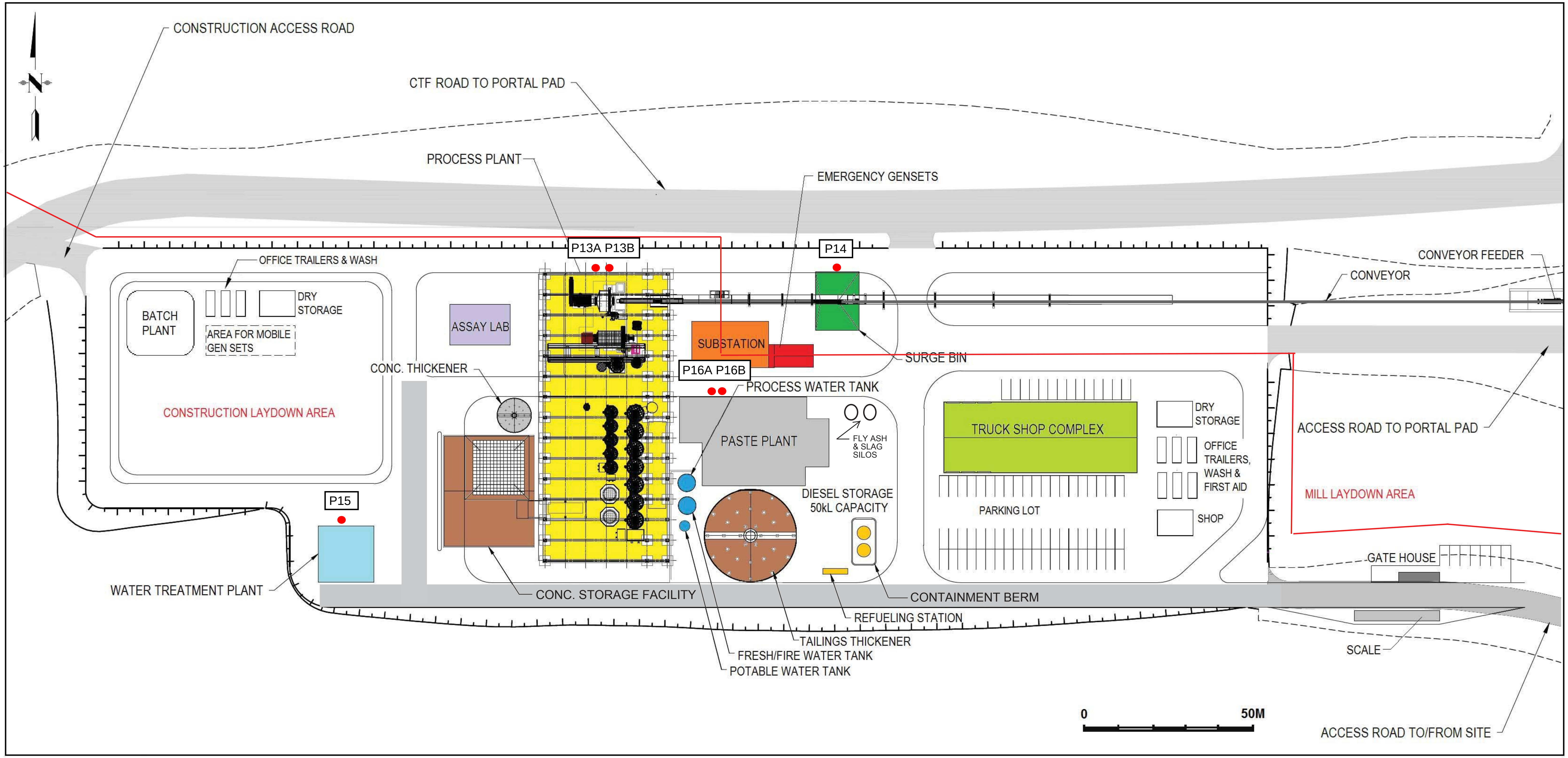
Topographic base map from US Geological Survey (2011): Strawberry Butte 7.5 Minute Quadrangle.

Map Projection:	UTM Zone 12N
Map Datum:	NAD83
Contour Interval:	5m

Prepared by Tetra Tech Inc. (Revised July 2017)

Facilities Site Plan
Black Butte Copper Project
Mine Operating Permit Application
Meagher County, Montana

Figure 2 - Mill Site Diagram



Prepared by Tetra Tech Inc. 2016

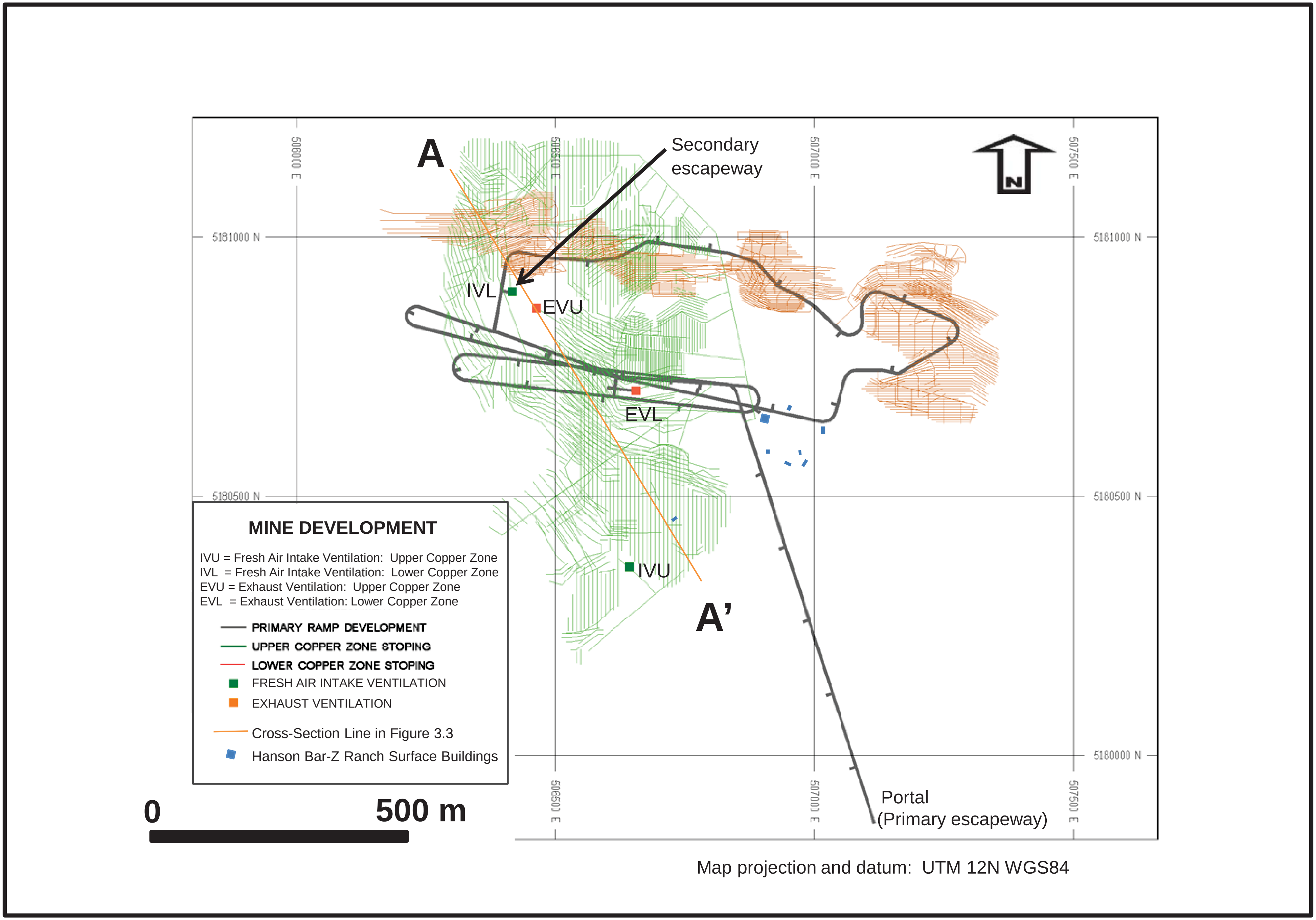
🟥	Proposed Powerline
	CONC. = Concentrate
P15 ●	Baghouse Stack Locations

Plan Map Showing Mill Facilities

Black Butte Copper Project

Meagher County, Montana

Figure 3 - Underground Workings/Vent Locations



Prepared by AMEC FW and Tintina

Plan Map of Underground Workings and Mining Stopes
Mine Operating Permit Application
Meagher County, Montana

APPENDIX C: EMISSIONS INVENTORY

(Example Wind Data for Piles follows the individual emitting unit forms for point, underground, and fugitive sources)

Black Butte Copper Project - Tintina Montana Inc.
Underground copper mine and milling facility
White Sulphur Springs, Montana

Potential Emissions Summary - Criteria Pollutants (Controlled)

Point #	Emitting Unit	PM tons per year	PM$_{10}$ tons per year	PM$_{2.5}$ tons per year	SO2 tons per year	NOx tons per year	CO tons per year	VOC tons per year
	POINT SOURCES							
P1	250 TPH Portable Conical Crusher	1.31	0.59	0.11	--	--	--	--
P2	325-hp Portable Diesel Engine/generator	0.47	0.47	0.47	0.17	9.36	8.19	3.52
P3	2 Portable Screens (400 TPH each)	7.71	2.59	0.18	--	--	--	--
P4	131-hp Portable Diesel Engine/generator	0.28	0.28	0.28	0.07	3.77	4.72	1.42
P5	545-kW /914-hp Diesel Engine/generator	1.32	1.32	1.32	0.49	42.10	23.02	9.88
P6	320-kW /536-hp Diesel Engine/generator	0.77	0.77	0.77	0.03	15.45	13.52	5.80
P7	1000-kW /1675-hp Diesel Engine/generators (2) - Emergency	0.28	0.28	0.28	0.10	8.81	4.82	2.07
P8	100-hp Diesel Engine/generator - Emergency evac hoists	0.02	0.02	0.02	0.00	0.19	0.21	0.06
P9	50-hp Diesel Fire Pump - Emergency	0.01	0.01	0.01	0.00	0.10	0.10	0.03
P10A	23 MMBtu/hr Propane-fired heater @ Intake Vent for Upper Copper Zone	0.45	0.45	0.45	0.03	8.33	4.80	0.64
P10B	52 MMBtu/hr Propane-fired heater @ Intake Vent for Lower Copper Zone	1.01	1.01	1.01	0.08	18.83	10.86	1.45
P11	3 Temporary diesel heaters at Portal - (1.2 MMBtu/hr total)	0.05	0.05	0.05	0.08	0.75	0.19	0.02
P12	Jaw Crusher (3640 TPD), Building/Dust Collector	3.19	3.19	3.19	--	--	--	--
P13A	Mill Building (mill, lime storage, etc.) Dust Collector	0.19	0.19	0.19	--	--	--	--
P13B	Mill Building (lime area/slurry mix tank) Dust Collector	1.24	1.24	1.24	--	--	--	--
P14	Surge Bin Discharge Dust Collector	1.88	1.88	1.88	--	--	--	--
P15	Water Trtmt Plant Lime Area Dust Collector	1.24	1.24	1.24	--	--	--	--
P16A	Backfill Plant Cement/Fly Ash Hopper Dust Filter/Collector	0.23	0.23	0.23	--	--	--	--
P16B	Backfill Plant Cement/Fly Ash Silo Dust Filter/Collector	0.45	0.45	0.45	--	--	--	--
P17	Portable diesel engine/generators (total of 400 hp, 4 units)	1.15	1.15	1.15	0.21	13.54	14.40	4.33
P18	Air Compressor - Diesel Engine (275 hp)	0.40	0.40	0.40	0.15	7.92	6.93	2.98
F26	Diesel-powered Light plants - 11 - 14 hp each	1.48	1.48	1.48	0.008	20.91	4.51	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	1.27	1.27	0.10	23.57	13.60	1.81
UG	ANFO	0.11	0.06	0.00	1.55	13.19	51.97	--
	TOTAL POINT SOURCES	**26.49**	**20.60**	**17.65**	**3.07**	**186.82**	**161.83**	**35.74**

		Controlled PTE						
		PM tons per year	PM_{10} tons per year	$PM_{2.5}$ tons per year	SO2 tons per yea	NOx tons per yea	CO tons per yea	VOC tons per yea
FUGITIVE SOURCES (not included in Title V applicability)								
F1	Road Dust, Mine Operating Year 0 to 1	152.70	38.92	3.90				
F2	Road Dust, Mine Operating Year 1 to 2	56.42	14.38	1.44				
F3	Road Dust, Mine Operating Year 2 to 15, annual average	17.79	4.53	0.45				
F4	Road Dust, Mine Operating Years 16 and 17, annual average	73.80	18.81	1.88				
F5	Road Dust, Mine Operating Year 18	11.68	2.98	0.30				
F6	Material transfer to Temporary Stockpile, MOY 0 to 1.5	3.13	0.91	0.30				
F7	Temporary construction stockpile (Table 3-13, 3.4.1)	0.36	0.18	0.03				
F8	Embankment Construction, Mine Operating Year 0 to 1.5	3.13	0.91	0.30				
F9	Backfill, NWCR Embankment Material to CTF, MOY 16 to 18	1.78	0.52	0.17				
F10	Material transfer to South Stockpile, MOY 0 to 1	1.49	0.43	0.14				
F11	Excess reclamation stockpile (South) (Table 3-13, 3.4.1)	0.08	0.04	0.01				
F12	Material transfer from South Stockpile, MOY 16 to 17	1.49	0.43	0.14				
F13	Material transfer to North Stockpile, MOY 0 to 1	2.13	0.62	0.20				
F14	Excess reclamation stockpile (North) (Table 3-13, 3.4.1)	0.17	0.08	0.01				
F15	Material transfer from North Stockpile, MOY 16 to 18	0.82	0.24	0.08				
F16	Soil Removal and Stockpiling, Mine Operating Year 0 to 1	4.99	1.45	0.47				
F17	Topsoil pile (Table 3-13, 3.4.1, 3.6.10)	0.08	0.04	0.01				
F18	Subsoil pile (Table 3-13, 3.4.1, 3.6.10)	0.44	0.22	0.03				
F19	Soil Return, Mine Operating Year 16 to 18	4.17	1.21	0.39				
F20	Copper-enriched rock drop to stockpile, MOY 2 to 3	0.16	0.06	0.06				
F21	Copper-enriched rock stockpile (mill feed) (Tables 3-5 & 3-13, 3.4.1)	0.00	0.00	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	0.35	0.35				
F23	Temporary waste rock storage (WRS) (Table 3-5, 3-13, 3.4.1)	0.019	0.010	0.001				
F24	Waste Rock Transfer from WRS to CTF, MOY 2 to 3	1.39	0.56	0.56				
F25	Waste Rock Storage Pad Reclamation, MOY 3	1.65	0.48	0.16				
F29	Road Dust, Construction Access Road, Year 0 - 2 Avg.	0.90	0.23	0.02				
F30	Road Dust, Main Access Road, Year 2 - 15 Avg.	102.19	26.05	2.61				
	TOTAL (all rows)*	**340.77**	**88.38**	**11.38**	**0.00**	**0.00**	**0.00**	**0.00**

*This total contains emissions that occur during different time periods

Model Emission Inputs

Provides emission rates for input into AERMOD modeling files

Point Sources

Source ID	Source Description	PM_{10}		$PM_{2.5}$		SO2		NOx		CO		Operating	Note
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	hrs/yr	
P2	325-hp Portable Diesel Engine/generator		0.47		0.47		0.17		9.36		8.19	8760	
P4	131-hp Portable Diesel Engine/generator		0.28		0.28		0.07		3.77		4.72	8760	
P5	545-kW /914-hp Diesel Engine/generator		1.32		1.32		0.49		42.10		23.02	8760	
P6	320-kW /536-hp Diesel Engine/generator		0.77		0.77		0.03		15.45		13.52	8760	
P7A	1000-kW /1675-hp Diesel Engine/generator - Emergency	0.55		0.55		0.203		17.62		9.638		500	a
P7B	1000-kW /1675-hp Diesel Engine/generator - Emergency	0.55		0.55		0.203		17.62		9.638		500	a
P8	100-hp Diesel Engine/generator - Emergency evac hoists (IVL)	0.066		0.066		0.012		0.77		0.82		500	a
P9	50-hp Diesel Fire Pump - Emergency	0.033		3.29E-02		6.07E-03		3.86E-01		4.11E-01		500	a
P10A	23 MMBtu/hr Propane-fired heater - Intake Vent for Upper Copper Zone	0.176		0.176		0.014		3.27		1.89		5088	b
P10B	52 MMBtu/hr Propane-fired heater - Intake Vent for Lower Copper Zone	0.40		0.40		0.031		7.40		4.27		5088	b
P11	3 Temporary diesel heaters at Portal - Diesel (1.2 MMBtu/hr total)		0.05		0.05		0.08		0.75		0.19	8760	
P12	Jaw Crusher (3640 TPD), Building/Dust Collector		3.19		3.19		--		--		--	8760	
P13A	Mill Building (mill, lime storage, etc.) Dust Collector		0.19		0.19		--		--		--	8760	
P13B	Mill Building (lime area/slurry mix tank) Dust Collector		1.24		1.24		--		--		--	8760	
P14	Surge Bin Discharge Dust Collector		1.88		1.88		--		--		--	8760	
P15	Water Treatment Plant Lime Area Dust Collector		1.24		1.24		--		--		--	8760	
P16A	Backfill Plant Cement/Fly Ash Hopper Dust Filter/Collector		0.23		0.23		--		--		--	8760	
P16B	Backfill Plant Cement/Fly Ash Silo Dust Filter/Collector		0.45		0.45		--		--		--	8760	
P17	Portable diesel engine/generators (total of 400 hp, 4 units)		1.15		1.15		0.21		13.54		14.40	8760	
P18	Air Compressor - Diesel Engine (275 hp)		0.40		0.40		0.15		7.92		6.93	8760	
EVU	Mine Ventilation Exhaust Upper Copper Zone - EVU		2.83		2.80		1.77		54.30		78.39	8760	
EVL	Mine Ventilation Exhaust Lower Copper Zone - EVL		1.02		1.00		0.63		19.46		28.09	8760	
PORTAL	Mine Portal		0.95		0.94		0.59		18.22		26.30	8760	
ProA	Temporary portable propane heaters (37.8 MMBtu/hr total) - 9 total - Source represents a group of 3 heaters near the Development Phase workshop		0.42		0.42		0.033		7.86		4.53	8760	
ProB	Temporary portable propane heaters (37.8 MMBtu/hr total) - 9 total - Source represents a group of 3 heaters near the Production Phase truckshop		0.42		0.42		0.033		7.86		4.53	8760	
ProC	Temporary portable propane heaters (37.8 MMBtu/hr total) - 9 total - Source represents a group of 3 heaters near the Development Phase temporary construction stockpile crush/screen facility		0.42		0.42		0.033		7.86		4.53	8760	
LightA	Diesel-powered Light plants - 11 - 14 hp each - Source represents 2 Light plants at road intersection		0.27		0.27		0.001		3.80		0.82	8760	
LightB	Diesel-powered Light plants - 11 - 14 hp each - Source represents 2 Light plants at road intersection		0.27		0.27		0.001		3.80		0.82	8760	
LightC	Diesel-powered Light plants - 11 - 14 hp each - Source represents 3 Light plants at the Temp Cons Pile crusher/screening area		0.40		0.40		0.002		5.70		1.23	8760	
LightD	Diesel-powered Light plants - 11 - 14 hp each - Source represents 4 Light plants at the portal pad		0.54		0.54		0.003		7.60		1.64	8760	

(a) Emergency equipment. Assessed in separate model runs

(b) lb/hr rate inputted into model however only operate from October through April

Model Emission Inputs

Provides emission rates for input into AERMOD modeling files

Volume Sources

Source ID	Source Description	PM_{10}		$PM_{2.5}$	
		lb/hr	tpy	lb/hr	tpy
P1	250 TPH Portable Conical Crusher	0.135	0.59	0.025	0.11
P3A	Portable Screen (400 TPH)	0.296	1.296	0.020	0.088
P3B	Portable Screen (400 TPH)	0.296	1.30	0.020	0.088
CTF_T_1	CTF Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to and from haul trucks	0.188		0.0821	
CTF_T_2	CTF Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to and from haul trucks	0.188		0.0821	
CTF_T_3	CTF Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to and from haul trucks	0.188		0.0821	
CTF_T_4	CTF Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to and from haul trucks	0.188		0.0821	
CUPILE_1	Cu Ore Pile Activities - Wind erosion and pile disturbance; Truck transfer to pile	1.46E-02		1.45E-02	
CUPILE_T_1	Cu Ore Pile Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to haul trucks	3.41E-02		1.31E-02	
CWP_T_1	CWP Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to haul trucks	0.0379		0.0146	
CWP_T_2	CWP Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to haul trucks	0.0379		0.0146	
CWP_T_3	CWP Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to haul trucks	0.0379		0.0146	
DRAIN_CTF	Fugitive excavation, soil removal, and ground disturbance emissions for sources F16	3.91E-04		1.98E-04	
DRAIN_PWP	Fugitive excavation, soil removal, and ground disturbance emissions for sources F16	3.91E-04		1.98E-04	
MILL_T_1	Mill Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to haul trucks	0.01156		0.00445	
MILL_T_2	Mill Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to haul trucks	0.01156		0.00445	
MILL_T_3	Mill Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to haul trucks	0.01156		0.00445	
MILL_T_4	Mill Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to haul trucks	0.01156		0.00445	
NCWR_T_1	NCWR Activities - excavation and ground disturbance; soil and topsoil removal; material transfers from haul trucks	0.0456		0.0177	
NCWR_T_2	NCWR Activities - excavation and ground disturbance; soil and topsoil removal; material transfers from haul trucks	0.0456		0.0177	
NCWR_T_3	NCWR Activities - excavation and ground disturbance; soil and topsoil removal; material transfers from haul trucks	0.0456		0.0177	
NCWR_T_4	NCWR Activities - excavation and ground disturbance; soil and topsoil removal; material transfers from haul trucks	0.0456		0.0177	
NPILE	North Stockpile Activies - wind erosion and pile disturbance; truck transfer to pile	9.10E-02		1.37E-02	
POWDER	Fugitive excavation, soil removal, and ground disturbance emissions for sources F16	5.11E-05		2.58E-05	
PORTAL_T_1	Portal Pad Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to and from haul trucks	0.0153		0.0059	
PORTAL_T_2	Portal Pad Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to and from haul trucks	0.0153		0.0059	
PORTAL_T_3	Portal Pad Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to and from haul trucks	0.0153		0.0059	
PORTAL_T_4	Portal Pad Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to and from haul trucks	0.0153		0.0059	
PWP_T_1	PWP Activities - excavation and ground disturbance; soil and topsoil removal; material transfers from haul trucks	0.0506		0.0195	
PWP_T_2	PWP Activities - excavation and ground disturbance; soil and topsoil removal; material transfers from haul trucks	0.0506		0.0195	
PWP_T_3	PWP Activities - excavation and ground disturbance; soil and topsoil removal; material transfers from haul trucks	0.0506		0.0195	
PWP_T_4	PWP Activities - excavation and ground disturbance; soil and topsoil removal; material transfers from haul trucks	0.0506		0.0195	
SPILE	South Stockpile Activies - wind erosion and pile disturbance; truck transfer to pile	5.99E-02		9.06E-03	
SUBS	Subsoil Stockpile Activies - wind erosion and pile disturbance; truck transfer to pile	1.33E-01		2.01E-02	
TEMP	Temporary construction stockpile - wind erosion and pile distrubance; transfers to and from haul trucks	2.53E-01		3.82E-02	
TOPS	Topsoil Stockpile Activies - wind erosion and pile disturbance; truck transfer to pile	9.23E-02		1.40E-02	
WRS_1	WRS - Wind erosion and pile disturbance; Truck transfer to pile	0.0274		0.0267	
WRS_2	WRS - Wind erosion and pile disturbance; Truck transfer to pile	0.0274		0.0267	
WRS_3	WRS - Wind erosion and pile disturbance; Truck transfer to pile	0.0274		0.0267	
WRS_T_1	WRS Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to haul trucks	0.0687		0.0395	
WRS_T_2	WRS Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to haul trucks	0.0687		0.0395	
WRS_T_3	WRS Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to haul trucks	0.0687		0.0395	

NOTE: Emissions for individual processes (i.e., transfer, pile disturbance, dozing) are itemized in "Emissions by Activity" sheet. Individual process emissions are grouped in the model by the area within the property the emissions will be located. The model inputs represent areas of grouped emissions.

Model Emission Inputs

Provides emission rates for input into AERMOD modeling files

Volume Sources - Access Roads

Source ID	Source Description	PM$_{10}$ per Volume Source		PM$_{2.5}$ per Volume Source	
		lb/hr	tpy	lb/hr	tpy
CON_0001 - CON_0043	Construction Access Road	1.22E-03	5.33E-03	1.22E-04	5.35E-04
ACC_0001 - ACC_0026	Main Access Road (80% Control Efficiency)	0.007984	0.035	0.000801	0.0035
ACC_0027 - ACC_0298	Main Access Road (50% Control Efficiency)	0.01996	0.087	0.002003	0.0088

NOTE: An 80% control efficieny is proposed for the initial 200 - meter length of the main access road. The remaining length of the main access road utilizes a 50% control efficiency.

Volume Sources - Haul Roads

Source ID	Source Description	PM$_{10}$ per Volume Source		PM$_{2.5}$ per Volume Source	
		lb/hr	tpy	lb/hr	tpy
DAC_0001	CTF Road: CTF to PWP junction	4.15E-03	0.01817	4.16E-04	0.00182
DBP_0001	PWP Development Road	8.69E-03	0.03806	8.70E-04	0.00381
DCC_0001	CWP road to N. Reclamation stockpile connector	3.60E-03	0.01575	3.60E-04	0.00158
DCM_0001	Mill Pad Development	1.01E-03	0.00443	1.01E-04	0.00044
DCO_0001	NMR: Cu connector to N. Reclaim connector road	1.25E-03	0.00547	1.25E-04	0.00055
PKX_0001	Portal to Crusher	3.74E-02	0.16375	3.74E-03	0.01640
R10_0001	CTF to NCWR	6.45E-03	0.02825	6.46E-04	0.00283
R16_0001	North Mill Road: WRS connector to CTF	2.21E-02	0.09680	2.21E-03	0.00970
R17_0001	North Mill Road: WRS connector to Portal Pad	1.46E-02	0.06412	1.47E-03	0.00642
R18_0001	North Mill Road: WRS connector to N. Reclamation connector	7.62E-03	0.03337	7.63E-04	0.00334
R19_0001	North Mill Road: Cu-enriched SP connector to Portal Pad	1.30E-03	0.00569	1.30E-04	0.00057
R20_0001	North Mill Road: CU-enriched SP connector road to CTF road	1.46E-04	0.00064	1.46E-05	0.00006
R23_0001	North Mill road connector to WRS Pad	2.40E-02	0.10501	2.40E-03	0.01052
R24_0001	North Mill road connector to Cu-Enriched stockpile	2.70E-03	0.01180	2.70E-04	0.00118
R25_0001	North Mill road connector to N. Reclamation stockpile	1.23E-02	0.05386	1.23E-03	0.00539
RD4_0001	Mill road (north of pad)	1.67E-03	0.00733	1.68E-04	0.00073
RD5_0001	Portal to west end of Portal Pad:	1.59E-02	0.06981	1.60E-03	0.00699
RD6_0001	CTF Road: N. Mill Road to PWP Road	4.36E-03	0.01909	4.37E-04	0.00191
RD7_0001	CTF Road: Middle CTF to junction soil stockpile road	1.68E-02	0.07366	1.68E-03	0.00738
RD8_0001	CTF road	2.02E-02	0.08864	2.03E-03	0.00888
RD9_0001	Truck road to soil stockpiles/PWP	2.57E-02	0.11264	2.58E-03	0.01128
RD9_0102	Truck road to soil stockpiles/PWP - Road split to South Pile and Subsoil Pile	1.58E-02	0.0691	1.58E-03	0.0069
R9B_0001	Truck road to soil stockpiles/PWP - Road split to Topsoil Pile	9.94E-03	0.0436	9.96E-04	0.0044

NOTE: Source IDs represent volume sources corresponding to modeled road segments and the associated emissions for each "Mine Activity". The emissions for each Mine Activity are calculated in F1, F2, and F3 of the emissions inventory. Emissions from Mine Activities are distributed amoungst the road segment volume sources in Appendix E.2.

Emissions by Activity - Non Haul Road Fugitive Emissions

This sheet acts as an intermediary catalog of source emissions that feed into the fugitive source groupings in the "Model Emission Inputs" sheet

Volume Sources

Source ID	Source Description	PM_{10}		$PM_{2.5}$		Model Operating Time[a]		
		lb/hr	tons per year	lb/hr	tons per year	hrs/yr	hrs/day	days/yr
Wind Erosion								
F7	Temporary construction stockpile Wind Erosion	4.15E-02	1.82E-01	6.23E-03	2.73E-02	--	24	--
F11	Excess reclamation stockpile (South) Wind Erosion	9.47E-03	4.15E-02	1.42E-03	6.22E-03	--	24	--
F14	Excess reclamation stockpile (North) Wind Erosion	1.92E-02	8.40E-02	2.88E-03	1.26E-02	--	24	--
F18	Subsoil pile Wind Erosion	5.04E-02	2.21E-01	7.56E-03	3.31E-02	--	24	--
F17	Topsoil pile Wind Erosion	9.21E-03	4.03E-02	1.38E-03	6.05E-03	--	24	--
F21	Copper-enriched rock stockpile (mill feed) Wind Erosion	7.25E-05	3.18E-04	1.09E-05	4.76E-05	--	24	--
F23	Temporary waste rock storage (WRS) Wind Erosion	2.20E-03	9.63E-03	3.30E-04	1.44E-03	--	24	--
Material Transfers								
F6_WRS_T	Material transfer to Temporary Stockpile - WRS to Truck	0.0164	0.072	0.00248	0.0108	--	24	--
F6_CTF_T	Material transfer to Temporary Stockpile - CTF to Truck	0.089	0.391	0.0135	0.059	--	24	--
F6_T_Temp	Material transfer to Temporary Stockpile - Truck to Temp Const Stockpile	0.1056	0.463	0.016	0.070	--	24	--
F8_Temp_T	Embankment Construction, Mine Operating - Temp Const Stockpile to Truck	0.1056	0.463	1.60E-02	0.0700	--	24	--
F8_T_PP	Embankment Construction, Mine Operating - Truck to Portal Pad	0.0164	0.072	2.48E-03	0.0108	--	24	--
F8_T_PWP	Embankment Construction, Mine Operating - Truck to PWP	0.0291	0.128	4.41E-03	0.0193	--	24	--
F8_T_NCWR	Embankment Construction, Mine Operating - Truck to NCWR	0.0601	0.263	9.11E-03	0.0399	--	24	--
F10_CTF_T	Material transfer to South Stockpile - CTF to Truck	0.0504	0.221	7.64E-03	0.0334	--	24	--
F10_T_SS	Material transfer to South Stockpile - Truck to South Stockpile	0.0504	0.221	7.64E-03	0.0334	--	24	--
F13_CWP_T	Material transfer to North Stockpile - CWP to Truck	0.0276	0.121	4.18E-03	0.0183	--	24	--
F13_Cu_T	Material transfer to North Stockpile - Cu-Enriched Ore Stockpile to Truck	0.0104	0.045	1.57E-03	0.0069	--	24	--
F13_WRS_T	Material transfer to North Stockpile - WRS Pad to Truck	0.0240	0.105	3.63E-03	0.0159	--	24	--
F13_Mill_T	Material transfer to North Stockpile - Mill Pad to Truck	9.81E-03	0.043	1.49E-03	0.0065	--	24	--
F13_T_NS	Material transfer to North Stockpile - Truck to North Stockpile	0.0718	0.314	0.0109	0.0476	--	24	--
F16_PP_T	Soil and topsoil removal - Portal Pad to Truck	4.57E-03	0.0200	6.91E-04	3.03E-03	--	24	--
F16_CWP_T	Soil and topsoil removal - CWP to Truck	0.0111	0.0487	1.69E-03	7.38E-03	--	24	--
F16_Cu_T	Soil and topsoil removal - Cu-Enriched Ore Stockpile to Truck	1.26E-03	0.0055	1.90E-04	8.34E-04	--	24	--
F16_WRS_T	Soil and topsoil removal - WRS Pad to Truck	8.27E-03	0.0362	1.25E-03	5.49E-03	--	24	--
F16_Mill_T	Soil and topsoil removal - Mill Pad to Truck	5.96E-03	0.0261	9.02E-04	3.95E-03	--	24	--
F16_PWP_T	Soil and topsoil removal - PWP to Truck	0.0399	0.1748	6.04E-03	0.0265	--	24	--
F16_CTF_T	Soil and topsoil removal - CTF to Truck	0.0950	0.4161	0.0144	0.0630	--	24	--
F16_T_SSoil	Soil and topsoil removal - Truck to Subsoil Pile	0.0830	0.3637	0.0126	0.0551	--	24	--
F16_T_TSoil	Soil and topsoil removal - Truck to Topsoil Pile	0.0830	0.3637	0.0126	0.0551	--	24	--
F20_T_Cu	Copper-enriched rock drop to stockpile, MOY 2 to 3	0.0145	0.064	0.0145	0.064	8760	--	--
F22_T_WRS	Waste Rock Drop -at WRS Pad, MOY 0 to 1.5, at CTF, MOY 1.5 to 4 and 8	0.0799	0.350	0.0799	0.350	8760	--	--
F24_WRS_T	Waste Rock Transfer from WRS to CTF - WRS to Truck	0.0636	0.279	0.0636	0.279	8760	--	--
F24_T_CTF	Waste Rock Transfer from WRS to CTF - Truck to CTF	0.0636	0.279	0.0636	0.279	8760	--	--

Emissions by Activity - Non Haul Road Fugitive Emissions (Continued)

This sheet acts as an intermediary catalog of source emissions that feed into the fugitive source groupings in the "Model Emission Inputs" sheet

Volume Sources

Source ID	Source Description	PM_{10}		$PM_{2.5}$		Model Operating Time[a]		
		lb/hr	tons per year	lb/hr	tons per year	hrs/yr	hrs/day	days/yr
Dozing, Excavation, Soil Removal, Embankment Construction							***24***	
WRS_1	Fugitive excavation, soil removal, and ground disturbance emissions for sources F6, F13, F16	0.0313	0.1372	0.0158	0.0693	--	24	--
WRS_2	Fugitive excavation, soil removal, and ground disturbance emissions for sources F6, F13, F16	0.0313	0.1372	0.0158	0.0693	--	24	--
WRS_3	Fugitive excavation, soil removal, and ground disturbance emissions for sources F6, F13, F16	0.0313	0.1372	0.0158	0.0693	--	24	--
CTF_1	Fugitive excavation, soil removal, and ground disturbance emissions for sources F6, F10, F16	0.1135	0.4969	0.0573	0.2511	--	24	--
CTF_2	Fugitive excavation, soil removal, and ground disturbance emissions for sources F6, F10, F16	0.1135	0.4969	0.0573	0.2511	--	24	--
CTF_3	Fugitive excavation, soil removal, and ground disturbance emissions for sources F6, F10, F16	0.1135	0.4969	0.0573	0.2511	--	24	--
CTF_4	Fugitive excavation, soil removal, and ground disturbance emissions for sources F6, F10, F16	0.1135	0.4969	0.0573	0.2511	--	24	--
PORTAL_1	Fugitive excavation, soil removal, and ground disturbance emissions for sources F8, F16	0.0101	0.0443	5.11E-03	0.0224	--	24	--
PORTAL_2	Fugitive excavation, soil removal, and ground disturbance emissions for sources F8, F16	0.0101	0.0443	5.11E-03	0.0224	--	24	--
PORTAL_3	Fugitive excavation, soil removal, and ground disturbance emissions for sources F8, F16	0.0101	0.0443	5.11E-03	0.0224	--	24	--
PORTAL_4	Fugitive excavation, soil removal, and ground disturbance emissions for sources F8, F16	0.0101	0.0443	5.11E-03	0.0224	--	24	--
PWP_1	Fugitive excavation, soil removal, and ground disturbance emissions for sources F8, F16	0.0334	0.1461	0.0169	0.0738	--	24	--
PWP_2	Fugitive excavation, soil removal, and ground disturbance emissions for sources F8, F16	0.0334	0.1461	0.0169	0.0738	--	24	--
PWP_3	Fugitive excavation, soil removal, and ground disturbance emissions for sources F8, F16	0.0334	0.1461	0.0169	0.0738	--	24	--
PWP_4	Fugitive excavation, soil removal, and ground disturbance emissions for sources F8, F16	0.0334	0.1461	0.0169	0.0738	--	24	--
NCWR_1	Fugitive excavation, soil removal, and ground disturbance emissions for sources F8, F16	0.0306	0.1339	0.0154	0.0677	--	24	--
NCWR_2	Fugitive excavation, soil removal, and ground disturbance emissions for sources F8, F16	0.0306	0.1339	0.0154	0.0677	--	24	--
NCWR_3	Fugitive excavation, soil removal, and ground disturbance emissions for sources F8, F16	0.0306	0.1339	0.0154	0.0677	--	24	--
NCWR_4	Fugitive excavation, soil removal, and ground disturbance emissions for sources F8, F16	0.0306	0.1339	0.0154	0.0677	--	24	--
CWP_1	Fugitive excavation, soil removal, and ground disturbance emissions for sources F13, F16	0.0250	0.1094	0.0126	0.0553	--	24	--
CWP_2	Fugitive excavation, soil removal, and ground disturbance emissions for sources F13, F16	0.0250	0.1094	0.0126	0.0553	--	24	--
CWP_3	Fugitive excavation, soil removal, and ground disturbance emissions for sources F13, F16	0.0250	0.1094	0.0126	0.0553	--	24	--
CuPILE_1	Fugitive excavation, soil removal, and ground disturbance emissions for sources F13, F16	0.0225	0.0984	0.0113	0.0497	--	24	--
MILL_1	Fugitive excavation, soil removal, and ground disturbance emissions for sources F13, F16	0.00762	0.0334	0.00385	0.0169	--	24	--
MILL_2	Fugitive excavation, soil removal, and ground disturbance emissions for sources F13, F16	0.00762	0.0334	0.00385	0.0169	--	24	--
MILL_3	Fugitive excavation, soil removal, and ground disturbance emissions for sources F13, F16	0.00762	0.0334	0.00385	0.0169	--	24	--
MILL_4	Fugitive excavation, soil removal, and ground disturbance emissions for sources F13, F16	0.00762	0.0334	0.00385	0.0169	--	24	--
POWDER	Fugitive excavation, soil removal, and ground disturbance emissions for sources F16	5.11E-05	2.24E-04	2.58E-05	1.13E-04	--	24	--
DRAIN_PWP	Fugitive excavation, soil removal, and ground disturbance emissions for sources F16	3.91E-04	1.71E-03	1.98E-04	8.66E-04	--	24	--
DRAIN_CTF	Fugitive excavation, soil removal, and ground disturbance emissions for sources F16	3.91E-04	1.71E-03	1.98E-04	8.66E-04	--	24	--

(a) Material Transfers and Dozing/Excavation Sources will only operate at 12 hours/day. The 12 hr/day emission rate is input into the model as a lb/hr value however this larger rate is assessed for 24 hrs/day in order to allow Tinitna to operate at the 12 hr/day rate at any hour of the day. This overestimates air quality impacts.

Road Dust Design Values

Road Segments

Rd ID	Road Segment	Meters	Feet	One Way Miles	Road Description	Use
Rd1	*US 89 to Mill pad east end*	*4,184.3*	*13,728.0*	*2.60*	*US 89 to east end of Mill pad (Sheep Creel County and Access roads)*	Non-plant site
Rd2	**Main Access Road - Sheep Creek to Mill Pad**	2,342.0	**7,684**	1.46	**Sheep Creek County Road to Mill Pad**	**Access Road**
Rd3	**Construction Access Road**	332.2	**1,090**	0.21	**Butte Creek County Road to west end of Mill Pad**	**Access Road**
Rd4	**Mill road (north of pad)**	370.4	**1,215.0**	0.23	**Mill road north of mill pad**	**Haul Road**
Rd5	**Portal to west end of Portal Pad**	269.7	**885.0**	0.17	**Portal to west end of Portal Pad:**	**Haul Road**
Rd6	**CTF Road: N. Mill Road to PWP Road**	195.1	**840.0**	0.16	**CTF Road: N. Mill Road to PWP Road**	**Haul Road**
Rd7	**CTF Road: Middle CTF to junction soil stockpile road**	952.2	**3,124.0**	0.59		**Haul Road**
Rd8	**CTF road**	765.8	**2,512.1**	0.48	**CTF road from west end of mill pad to CTF**	**Haul Road**
Rd9	**Truck road to soil stockpiles/PWP**	1,367.7	**4,486.5**	0.85	**Truck road from PWP junction with CTF road to soil and S. reclamation stockpile area**	**Haul Road**
Rd10	**CTF to NCWR**	2,649.3	**8,692.0**	1.65		**Haul Road**
Rd11	*Power Line Corr. N*	*1,420.0*	*4,658.0*	*0.88*	*Powerline Corridor North (access road to Highway)*	Powerline Service
Rd12	*Power Line Corr. S*	*2,224.0*	*7,295.4*	*1.38*	*Powerline Corridor South along access road to substation*	Powerline Service
Rd13	*CWP Access from Access Road*	*32.8*	*107.6*	*0.02*	*From Access road to CWP*	Low volume road
Rd14	*Vent raises new access roads*	*1,416.1*	*4,646.0*	*0.88*	*Vent raises new access roads*	Low volume road
Rd15	*Short access Truck road to CWP:*	*32.9*	*108.0*	*0.02*		Low volume road
North Mill Road Segments						
Rd16	**North Mill Road: WRS connector to CTF**	361.2	**1,185.0**	0.22		**Haul Road**
Rd17	**North Mill Road: WRS connector to Portal Pad**	99.4	**326.0**	0.06		**Haul Road**
Rd18	**North Mill Road: WRS connector to N. Reclamation connector**	254.5	**835.0**	0.16		**Haul Road**
Rd19	**North Mill Road: Cu-enriched SP connector to Portal Pad**	93.0	**305.0**	0.06		**Haul Road**
Rd20	**North Mill Road: CU-enriched SP connector road to CTF road**	503.5	**1,652.0**	0.31		**Haul Road**
Rd21	*North Mill Road: WRS connector to CTF Road*	*361.2*	*1,185.0*	*0.22*		Redundant (Rd 16)
North Mill Road Connectors to Facilities						
Rd22	*North Mill road connector to Portal Pad*	*99.4*	*326.0*	*0.06*	*North Mill road connector to portal pad*	Redundant (Rd 17)
Rd23	**North Mill road connector to WRS Pad**	99.3	**325.7**	0.06	**North Mill road connector to WRS pad**	**Haul Road**
Rd24	**North Mill road connector to Cu-Enriched stockpile**	57.5	**188.6**	0.04	**North Mill road connector to copper enriched ore stockpile**	**Haul Road**
Rd25	**North Mill road connector to N. Reclamation stockpile**	106.7	**350.0**	0.07		**Haul Road**
Ancillary Road Connectors to Facilities						
Rd_DCC	**North Mill road connector to CWP**	399.9	**1312**	0.25		**Haul Road**
Rd_DBP	**PWP Development Road**	349.0	**1145**	0.22		**Haul Road**
Rd_DAC	**CTF Road: CTF to PWP junction**	952.5	**3125**	0.59		**Haul Road**
Rd_DCO	**North Mill road: Cu connector to N. Reclaim connector road**	317.9	**1043**	0.20		**Haul Road**
Rd_DCM	**Mill Pad Development**	254.5	**835**	0.16		**Haul Road**
Rd_PKX	**Portal to Crusher**	280.4	**920**	0.17		**Haul Road**

Road Dust Design Values - Continued

Material Movement and Vehicle Miles Traveled (VMT) Analysis

Road Activity ID	Activity Area	Hauling Distance (meters)	Hauling Distance (feet)	One Way Miles	Notes:	Years	Year	Material Processed (Tons)	EI Sheet	# Trucks Round-trip per Year	# Trucks Round-trip per day	Truck Tonnage	Round-trip Miles per Truck	Total Round-trip Miles/Day VMT All trucks	Years
Pre-production or Development - Construction of Facilities Phase															
Soil and Subsoil Stripping and Hauling all Facilities															
DA2	Portal Pad	2,263.6	7,752.49	1.47		1	1	**16751**	**F16**	418.78	1.1	40	2.94	**3.37**	**Year 0 to 1**
DAC	CWP	2,370.3	7,853.49	1.49		1	1	**40830**	**F16**	1,021	2.8	40	2.97	**8.32**	**Year 0 to 1**
DAO	Cu-Enriched Ore Stockpile	2,184.5	7,167.08	1.36		1	1	**4613**	**F16**	115	0.3	40	2.71	**0.86**	**Year 0 to 1**
DAW	WRS Pad	2,084.0	6,837.20	1.29		1	1	**30347**	**F16**	759	2.1	40	2.59	**5.38**	**Year 0 to 1**
DAM	Mill Pad	1,623.5	5,326.47	1.01		1	1	**21850**	**F16**	546	1.5	40	2.02	**3.02**	**Year 0 to 1**
DAP	PWP	1,217.5	5,631.47	1.07		1	1	**146400**	**F16**	3,660	10.0	40	2.13	**21.39**	**Year 0 to 1**
DAT	CTF	2,319.7	7,610.47	1.44		1	1	**348549**	**F16**	8,714	23.9	40	2.88	**68.82**	**Year 0 to 1**
	NCWR	0	-	0	On-site storage of soils and subsoils	0	0	**11410**	**F16**					0	
	Temporary Powder	0	-	0	On-site storage of soils and subsoils	0	0	**97**	**F16**					0	
	Foundation Drain Ponds	0	-	0	On-site storage of soils and subsoils	0	0	**1485**	**F16**					0	
Embankment Construction															
DB2	Portal Pad	468.4	1,536.73	0.29	Material in-situ and from WRS Excess Materials	1	1	**60000**	**F5/F7**	1,500	4.1	40	0.58	**2.39**	**Year 0 to 1**
DBP	PWP	1208.8	4,270.00	0.81	Material in-situ and from CTF Const. Materials	1	1	**106800**	**F5/F7**	2,670	7.3	40	1.62	**11.83**	**Year 0 to 1**
DBN	NCWR	2,649.3	8,692.00	1.65	Material from CTF Excess Construction Materials										
							0 to 1	**220666**	**F5/F7**	5,516.65	15.1	40	3.29	**49.76**	**Year 0 to 1**
							1 to 1.5	**110333**	**F5/F7**	2,758	7.6	40	3.29	**24.86**	**Year 1 to 1.5**
Excavated Material to North Reclamation Stockpile															
DCC	CWP	506.6	1,662.00	0.31	Material in-situ, excess to Northern Reclamation Stockpile	1	1	**101360**	**F13**	2,534	6.9	40	0.63	**4.37**	**Year 0 to 1**
DCO	Cu-Enriched Ore Stockpile	408	1,581.62	0.30		1	1	**38000**	**F13**	950	2.6	40	0.60	**1.56**	**Year 0 to 1**
DCW	WRS Pad	523.9	1,510.73	0.29		1	1	**88000**	**F13**	2,200	6.0	40	0.57	**3.45**	**Year 0 to 1**
DCM	Mill Pad	361.2	1,185.00	0.22		1	1	**36000**	**F13**	900	2.5	40	0.45	**1.11**	**Year 0 to 1**
Excavated Material to South Reclamation Stockpile															
DDT	CTF	2319.7	7,610.47	1.44	Material in-situ, excess to Southern Reclamation Materials Stockpile										
							0 to 1	185024	F10	4,626	12.7	40	2.88	**36.53**	**Year 0 to 1**
							1 to 1.5	92512		2,313	6.3	40	2.88	**18.25**	**Year 1 to 1.5**
Waste Rock: Portal to WRS															
DF2		468.50	1,536.73	0.29	Waste Rock: Portal to WRS Pad										
					(Development or Pre-production Phase Only)		1	103656		2,591	7.1	40	0.58	**4.13**	**Year 0 to 1**
							1- 1.5	174993		4,375	12.0	40			Year 1 to 1.5
Waste Rock: WRS to CTF															
DFT		1226.20	4,022.79	0.76	Waste Rock: WRS to CTF (Development or Pre-production Phase Only)										
							1.5 to 2	174993		4,375	12.0	40	1.52	**18.22**	**Year 1.5 to 2; W**
							2 - 3	278649	**F24**	6,966	19.1	40	1.52	**29.01**	**Year 2-3**
North Reclamation stockpile to WRS Pad															
DGW		460.55	1,510.73	0.29	Materials from N. Reclamation pile to WRS Pad	Year 3	3	**174308**	**F26**	4,358	11.9	40	0.57	**6.83**	**Year 3**
Soils Replaced from Soil Stockpiles to WRS Pad															
DHW		2,084.0	6,837.20	1.29		1	1	**30347**	**F26**	759	2.1	40	2.59	**5.38**	**Year 3**

Road Dust Design Values - Continued

Material Movement and Vehicle Miles Traveled (VMT) Analysis

Road Activity ID	Activity Area	Hauling Distance (meters)	Hauling Distance (feet)	One Way Miles	Notes:	Years	Year	Tonnage	EI Sheet	# Trucks Round-trip per Year	# Trucks Round-trip per day	Truck Tonnage	Round-trip Miles per Truck	Total Round-trip Miles/Day VMT All trucks	Years
Operational or Production Phase															
Ore: Portal to Cu-Enriched Ore Stockpile															
PJO		420.30	1,378.62	0.26	Ore: Portal to Cu-Enriched Ore Stockpile (Production Phase Only)	1 to 3									
						Construction	1	0							
						Pre-production	2	11429		286	0.8	40	0.4	0.30	Year 2
						Pre-production	3	63571	**F20**	1,589	4.4	40	0.4	1.65	Year 3; Note: S
Ore: Portal to Crusher															
PKX		269.75	920	0.17	Portal to Crusher	3 to 15									
					Ore: Portal to Crusher (Pre-production only)	Pre-production	1	0							
					Ore: Portal to Crusher (Pre-production only)	Pre-production	2	0							
					Ore: Portal to Crusher (Production Phase only)	Production	3	358524		8,963	24.6	40	0.34	8.35	Year 3
					Ore: Portal to Crusher (Production Phase only)	Production	4	1018607		25,465	69.8	40	0.34	23.72	Year 4
					Ore: Portal to Crusher (Production Phase only)	Production	5	1294347		32,359	88.7	40	0.34	30.14	Year 5
					Ore: Portal to Crusher (Production Phase only)	Production	6	1276871		31,922	87.5	40	0.34	29.74	Year 6
					Ore: Portal to Crusher (Production Phase only)	Production	7	1307971		32,699	89.6	40	0.34	30.46	Year 7
					Ore: Portal to Crusher (Production Phase only)	Production	8	1277480		31,937	87.5	40	0.34	29.75	Year 8
					Ore: Portal to Crusher (Production Phase only)	Production	9	1311726		32,793	89.8	40	0.34	30.55	Year 9
					Ore: Portal to Crusher (Production Phase only)	Production	10	1298461		32,462	88.9	40	0.34	30.24	Year 10
					Ore: Portal to Crusher (Production Phase only)	Production	11	1349008		33,725	92.4	40	0.34	31.42	Year 11
					Ore: Portal to Crusher (Production Phase only)	Production	12	1318149		32,954	90.3	40	0.34	30.70	Year 12
					Ore: Portal to Crusher (Production Phase only)	Production	13	1297095		32,427	88.8	40	0.34	30.21	Year 13
					Ore: Portal to Crusher (Production Phase only)	Production	14	1039008		25,975	71.2	40	0.34	24.20	Year 14
					Ore: Portal to Crusher (Production Phase only)	Production	15	348793		8,720	23.9	40	0.34	8.12	Year 15
Waste Rock: Portal to CTF															
PIT			4,908.05	0.93	Waste Rock: Portal to CTF (Production Phase Only)	3 to 15									
							1	0							
							1 to 1.5	0							
							1.5 to 2	174993		4,375	12.0	40	1.86	22.28	Year 1.5 to 2
							3	214560		5,364	14.7	40	1.86	27.32	Year 3
							4	93745		2,344	6.4	40	1.86	11.94	Year 4
							5	0							
							6	0							
							7	0							
							8	16863		422	1.2	40	1.52	1.76	Year 8

P1
Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project
250-TPH Conical Crusher

Maximum Process Rate =	250	TPH
Hours of Operation =	8,760	hr/yr
Conversions:	2000	lbs/ton

Pollutant	Emission Factor	Units	Emission Factor Reference	Emissions (lbs/hr)	Emissions (tons/yr)
PM	0.0012	lb/ton	AP-42 Table 11.19.2-2 (08/04) - Crushing	0.300	1.31
PM_{10}	0.00054	lb/ton	AP-42 Table 11.19.2-2 (08/04) - Crushing	0.135	0.59
$PM_{2.5}$	0.0001	lb/ton	AP-42 Table 11.19.2-2 (08/04) - Crushing	0.025	0.11

Sample Calculation:

PM Emissions = (Emission Factor, lb/ton) / (maximum process rate, tons/hr) = lb/hr
PM Emissions (lb/hr) = (0.0012 lb/ton)*(250 tons/hr) = 0.3 lb/hr
PM Emissions = (Emissions, lb/hr)*(8760 hr/yr)/(2000 lb/ton)
Emissions (tons/yr) = (0.3 lbs/hr) x (8760 hrs/yr) / (2000 lbs/ton) = 1.314 tons/yr

P2
Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project

325-hp portable diesel-fired engine/generator

Process Information

Process Rate:	8,760	hr/yr
Engine power output:	325	hp
Sulfur Content	0.015	percent

Non-Criteria Pollutant Emission Limits

opacity	<20%

Tier 3 Engine - 40 CFR 89.112

Power Rating range: 225< kW < 450

Emission Standards

Non-methane hydrocarbon + NOx:	4.0	g/kW-hr	6.58E-03	lb/hp-hr
CO:	3.5	g/kW-hr	5.75E-03	lb/hp-hr
PM:	0.20	g/kW-hr	3.29E-04	lb/hp-hr

Pollutant	Emission Factor	Units	Source	Uncontrolled Emissions Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Enforceable Control Limit	PTE Emissions Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)
PM	3.29E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.11	2.56	0.47	20% opacity	0.11	2.56	0.47
PM_{10}	3.29E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.11	2.56	0.47	20% opacity	0.11	2.56	0.47
$PM_{2.5}$	3.29E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.11	2.56	0.47	20% opacity	0.11	2.56	0.47
Sulfur Dioxide (SO_2)	1.21E-04	lb/hp-hr	AP-42 Section 3.4, Table 3.4-1 (10/96) Large Stationary Diesel and All Stationary Dual-Fuel Engines	0.04	0.95	0.17	not applicable	0.04	0.95	0.17
Nitrogen Oxides (NO_X)	6.58E-03	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1 - assumes NMHC+NOx is all NOx	2.14	51.29	9.36	not applicable	2.14	51.29	9.36
Carbon Monoxide (CO)	5.75E-03	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1	1.87	44.88	8.19	not applicable	1.87	44.88	8.19
VOC*	2.47E-03	lb/hp-hr	AP-42 Section 3.3, Table 3.3-1 (10/96) Gasoline and Diesel Industrial Engines	0.80	19.27	3.52	not applicable	0.80	19.27	3.52

*NOTE: Emission factor for VOC is assumed to be equal to the emission factor for Total Organic Carbon (TOC) in the exhaust. This would be a conservative estimate as not all TOC is VOC.

P3
Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project
Two 400-TPH Screens

Maximum Process Rate = 800 TPH (total)
Hours of Operation = 8,760 hr/yr
Conversions: 2000 lbs/ton

Pollutant	Emission Factor	Units	Emission Factor Reference	Emissions (lbs/hr)	Emissions (tons/yr)
PM	0.0022	lb/ton	AP-42 Table 11.19.2-2 (08/04) - Controlled Screening	1.760	7.71
PM_{10}	0.00074	lb/ton	AP-42 Table 11.19.2-2 (08/04) - Controlled Screening	0.592	2.59
$PM_{2.5}$	0.00005	lb/ton	AP-42 Table 11.19.2-2 (08/04) - Controlled Screening	0.040	0.18

Sample Calculation:

PM Emissions = (Emission Factor, lb/ton) / (maximum process rate, tons/hr) = lb/hr
PM Emissions (lb/hr) = (0.0022 lb/ton)*(800 tons/hr) = 1.76 lb/hr
PM Emissions = (Emissions, lb/hr)*(8760 hr/yr)/(2000 lb/ton)
PM Emissions (tons/yr) = (1.76 lbs/hr) x (8760 hrs/yr) / (2000 lbs/ton) = 7.709 tons/yr

P4
Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project

131-hp portable engine/generator

Process Information

Process Rate:	8,760	hr/yr
Engine power output:	131	hp
Sulfur Content	0.015	percent

Non-Criteria Pollutant Emission Limits

opacity	<20%

Tier 3 Engine - 40 CFR 89.112

Power Rating range: 75< kW < 130

Emission Standards

Non-methane hydrocarbon + NOx:	4.0	g/kW-hr	6.58E-03	lb/hp-hr
CO:	5	g/kW-hr	8.22E-03	lb/hp-hr
PM:	0.30	g/kW-hr	4.93E-04	lb/hp-hr

Pollutant	Emission Factor	Units	Source	Uncontrolled Emissions			Enforceable Control Limit	PTE Emissions		
				Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)		Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)
PM	4.93E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.06	1.55	0.28	20% opacity	0.06	1.55	0.28
PM$_{10}$	4.93E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.06	1.55	0.28	20% opacity	0.06	1.55	0.28
PM$_{2.5}$	4.93E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.06	1.55	0.28	20% opacity	0.06	1.55	0.28
Sulfur Dioxide (SO$_2$)	1.21E-04	lb/hp-hr	AP-42 Section 3.4, Table 3.4-1 (10/96) Large Stationary Diesel and All Stationary Dual-Fuel Engines	0.02	0.38	0.07	not applicable	0.02	0.38	0.07
Nitrogen Oxides (NO$_X$)	6.58E-03	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1 - assumes NMHC+NOx is all NOx	0.86	20.67	3.77	not applicable	0.86	20.67	3.77
Carbon Monoxide (CO)	8.22E-03	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1	1.08	25.84	4.72	not applicable	1.08	25.84	4.72
VOC*	2.47E-03	lb/hp-hr	AP-42 Section 3.3, Table 3.3-1 (10/96) Gasoline and Diesel Industrial Engines	0.32	7.77	1.42	not applicable	0.32	7.77	1.42

*NOTE: Emission factor for VOC is assumed to be equal to the emission factor for Total Organic Carbon (TOC) in the exhaust. This would be a conservative estimate as not all TOC is VOC.

P5
Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project

545 kW diesel generator - D-Phase

Process Information

Process Rate:	8,760	hr/yr
Engine power output:	914	hp - ESTIMATE
Sulfur Content	0.015	percent

Non-Criteria Pollutant Emission Limits

opacity	<20%

Tier 2 Engine - 40 CFR 89.112 (no Tier 3 for engines of this size; Tier 2 for this size engine has the same date range as Tier 3)

Power Rating range: kW > 560 (hp > 751.0)

Emission Standards

Non-methane hydrocarbon + NOx:	6.4	g/kW-hr	1.05E-02	lb/hp-hr
CO:	3.5	g/kW-hr	5.75E-03	lb/hp-hr
PM:	0.20	g/kW-hr	3.29E-04	lb/hp-hr

Pollutant	Emission Factor	Units	Source	Uncontrolled Emissions Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Enforceable Control Limit	PTE Emissions Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)
PM	3.29E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.30	7.21	1.32	20% opacity	0.30	7.21	1.32
PM_{10}	3.29E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.30	7.21	1.32	20% opacity	0.30	7.21	1.32
$PM_{2.5}$	3.29E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.30	7.21	1.32	20% opacity	0.30	7.21	1.32
Sulfur Dioxide (SO_2)	1.21E-04	lb/hp-hr	AP-42 Section 3.4, Table 3.4-1 (10/96) Large Stationary Diesel and All Stationary Dual-Fuel Engines	0.11	2.66	0.49	not applicable	0.11	2.66	0.49
Nitrogen Oxides (NO_X)	1.05E-02	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1 - assumes NMHC+NOx is all NOx	9.61	230.69	42.10	not applicable	9.61	230.69	42.10
Carbon Monoxide (CO)	5.75E-03	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1	5.26	126.16	23.02	not applicable	5.26	126.16	23.02
VOC*	2.47E-03	lb/hp-hr	AP-42 Section 3.3, Table 3.3-1 (10/96) Gasoline and Diesel Industrial Engines	2.26	54.16	9.88	not applicable	2.26	54.16	9.88

*NOTE: Emission factor for VOC is assumed to be equal to the emission factor for Total Organic Carbon (TOC) in the exhaust. This would be a conservative estimate as not all TOC is VOC.

P6
Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project

320 kW diesel generator - D-Phase

Process Information

Process Rate:	8760	hr/yr
Engine power output:	536	hp - ESTIMATE
Sulfur Content	0.015	percent

Non-Criteria Pollutant Emission Limits

opacity	<20%

Tier 3 Engine - 40 CFR 89.112

Power Rating range: 225 < kW < 450 (301.7 < hp < 603.5)

Emission Standards

Non-methane hydrocarbon + NOx:	4.0	g/kW-hr	6.58E-03	lb/hp-hr
CO:	3.5	g/kW-hr	5.75E-03	lb/hp-hr
PM:	0.20	g/kW-hr	3.29E-04	lb/hp-hr

Pollutant	Emission Factor	Units	Source	Uncontrolled Emissions Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Enforceable Control Limit	PTE Emissions Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)
PM	3.29E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.18	4.23	0.77	20% opacity	0.18	4.23	0.77
PM_{10}	3.29E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.18	4.23	0.77	20% opacity	0.18	4.23	0.77
$PM_{2.5}$	3.29E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.18	4.23	0.77	20% opacity	0.18	4.23	0.77
Sulfur Dioxide (SO_2)	1.21E-05	lb/hp-hr	AP-42 Section 3.4, Table 3.4-1 (10/96) Large Stationary Diesel Industrial Engines	0.01	0.16	0.03	not applicable	0.01	0.16	0.03
Nitrogen Oxides (NO_X)	6.58E-03	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1 - assumes NMHC+NOx is all NOx	3.53	84.66	15.45	not applicable	3.53	84.66	15.45
Carbon Monoxide (CO)	5.75E-03	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1	3.09	74.08	13.52	not applicable	3.09	74.08	13.52
VOC*	2.47E-03	lb/hp-hr	AP-42 Section 3.3, Table 3.3-1 (10/96) Gasoline and Diesel Industrial Engines	1.32	31.80	5.80	not applicable	1.32	31.80	5.80

*NOTE: Emission factor for VOC is assumed to be equal to the emission factor for Total Organic Carbon (TOC) in the exhaust. This would be a conservative estimate as not all TOC is VOC.

P7
Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project

1000-KW (1675-hp) emergency generator - 2

Process Information

Process Rate:	500	hr/yr	
Engine power output:	3350	hp - ESTIMATE	TOTAL for 2
Sulfur Content	0.015	percent	

Non-Criteria Pollutant Emission Limits

opacity	<20%

Tier 2 Engine - 40 CFR 89.112 (no Tier 3 for engines of this size; Tier 2 for this size engine has the same date range as Tier 3)

Power Rating range: kW > 560 (hp > 751.0)

Emission Standards

Non-methane hydrocarbon + NOx:	6.4	g/kW-hr	1.05E-02	lb/hp-hr
CO:	3.5	g/kW-hr	5.75E-03	lb/hp-hr
PM:	0.20	g/kW-hr	3.29E-04	lb/hp-hr

Pollutant	Emission Factor	Units	Source	Uncontrolled Emissions Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Enforceable Control Limit	PTE Emissions Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)
PM	3.29E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	1.10	26.44	0.28	20% opacity	1.10	26.44	0.28
PM_{10}	3.29E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	1.10	26.44	0.28	20% opacity	1.10	26.44	0.28
$PM_{2.5}$	3.29E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	1.10	26.44	0.28	20% opacity	1.10	26.44	0.28
Sulfur Dioxide (SO_2)	1.21E-04	lb/hp-hr	AP-42 Section 3.4, Table 3.4-1 (10/96) Large Stationary Diesel and All Stationary Dual-Fuel Engines	0.41	9.76	0.10	not applicable	0.41	9.76	0.10
Nitrogen Oxides (NO_X)	1.05E-02	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1 - assumes NMHC+NOx is all NOx	35.25	845.93	8.81	not applicable	35.25	845.93	8.81
Carbon Monoxide (CO)	5.75E-03	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1	19.28	462.62	4.82	not applicable	19.28	462.62	4.82
VOC*	2.47E-03	lb/hp-hr	AP-42 Section 3.3, Table 3.3-1 (10/96) Gasoline and Diesel Industrial Engines	8.27	198.59	2.07	not applicable	8.27	198.59	2.07

*NOTE: Emission factor for VOC is assumed to be equal to the emission factor for Total Organic Carbon (TOC) in the exhaust. This would be a conservative estimate as not all TOC is VOC.

P8
Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project

100-hp emergency generator for emergency evacuation hoists

Process Information

Process Rate:	500	hr/yr
Engine power output:	100	hp
Sulfur Content	0.015	percent

Non-Criteria Pollutant Emission Limits

opacity	<20%

Tier 3 Engine - 40 CFR 89.112

Power Rating range: 37< kW < 75

Emission Standards

Non-methane hydrocarbon + NOx:	4.7	g/kW-hr	7.73E-03	lb/hp-hr
CO:	5	g/kW-hr	8.22E-03	lb/hp-hr
PM:	0.40	g/kW-hr	6.58E-04	lb/hp-hr

				Uncontrolled Emissions				PTE Emissions		
Pollutant	**Emission Factor**	**Units**	**Source**	**Hourly (lb/hr)**	**Daily (lb/day)**	**Annual (tpy)**	**Enforceable Control Limit**	**Hourly (lb/hr)**	**Daily (lb/day)**	**Annual (tpy)**
PM	6.58E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.07	1.58	0.02	20% opacity	0.07	1.58	0.02
PM$_{10}$	6.58E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.07	1.58	0.02	20% opacity	0.07	1.58	0.02
PM$_{2.5}$	6.58E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.07	1.58	0.02	20% opacity	0.07	1.58	0.02
Sulfur Dioxide (SO_2)	1.21E-04	lb/hp-hr	AP-42 Section 3.4, Table 3.4-1 (10/96) Large Stationary Diesel and All Stationary Dual-Fuel Engines	0.01	0.29	0.00	not applicable	0.01	0.29	0.003
Nitrogen Oxides (NO_X)	7.73E-03	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1 - assumes NMHC+NOx is all NOx	0.77	18.54	0.19	not applicable	0.77	18.54	0.19
Carbon Monoxide (CO)	8.22E-03	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1	0.82	19.73	0.21	not applicable	0.82	19.73	0.21
VOC*	2.47E-03	lb/hp-hr	AP-42 Section 3.3, Table 3.3-1 (10/96) Gasoline and Diesel Industrial Engines	0.25	5.93	0.06	not applicable	0.25	5.93	0.06

*NOTE: Emission factor for VOC is assumed to be equal to the emission factor for Total Organic Carbon (TOC) in the exhaust. This would be a conservative estimate as not all TOC is VOC.

P9

Tintina Montana Inc. Black Butte Copper Project

50-hp fire pump engine (emergency use)

Process Information

Process Rate:	500	hr/yr
Engine power output:	50	hp
Sulfur Content	0.015	percent

Non-Criteria Pollutant Emission Limits

opacity	<20%

Tier 3 Engine - 40 CFR 89.112

Power Rating range: 37 < kW < 75

Emission Standards

Non-methane hydrocarbon + NOx:	4.7	g/kW-hr	7.73E-03	lb/hp-hr
CO:	5	g/kW-hr	8.22E-03	lb/hp-hr
PM:	0.40	g/kW-hr	6.58E-04	lb/hp-hr

Pollutant	**Emission Factor**	**Units**	**Source**	**Uncontrolled Emissions**			**Enforceable Control Limit**	**PTE Emissions**		
				Hourly (lb/hr)	**Daily (lb/day)**	**Annual (tpy)**		**Hourly (lb/hr)**	**Daily (lb/day)**	**Annual (tpy)**
PM	6.58E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.03	0.79	0.01	20% opacity	0.03	0.79	0.01
PM$_{10}$	6.58E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.03	0.79	0.01	20% opacity	0.03	0.79	0.01
PM$_{2.5}$	6.58E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.03	0.79	0.01	20% opacity	0.03	0.79	0.01
Sulfur Dioxide (SO_2)	1.21E-04	lb/hp-hr	AP-42 Section 3.4, Table 3.4-1 (10/96) Large Stationary Diesel and All Stationary Dual-Fuel Engines	0.01	0.15	0.00	not applicable	0.01	0.15	0.0015
Nitrogen Oxides (NO_X)	7.73E-03	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1 - assumes NMHC+NOx is all NOx	0.39	9.27	0.10	not applicable	0.39	9.27	0.10
Carbon Monoxide (CO)	8.22E-03	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1	0.41	9.86	0.10	not applicable	0.41	9.86	0.10
VOC*	2.47E-03	lb/hp-hr	AP-42 Section 3.3, Table 3.3-1 (10/96) Gasoline and Diesel Industrial Engines	0.12	2.96	0.03	not applicable	0.12	2.96	0.03

*NOTE: Emission factor for VOC is assumed to be equal to the emission factor for Total Organic Carbon (TOC) in the exhaust. This would be a conservative estimate as not all TOC is VOC.

P10A
Tintina Montana Inc. Black Butte Copper Project

EMISSIONS CALCULATIONS

Propane-fired heater at Intake Vent for Upper Copper Zone

Max. Fuel Combustion Rate =	23.00	MMBtu/hr
Fuel Usage =	1,281.33	10^3 gal/yr
Hours of Operation =	5,088	hr/yr
Fuel High Heating Value=	91.33	MMBtu/10^3 gal
Conversions:	454	grams/lb
	2000	lbs/ton

Criteria Pollutants (HAPs)

Pollutant	Emission Factor	Units	Emission Factor Reference	Emissions (lbs/hr)	Emissions (tons/yr)
PM/PM10/PM2.5	0.7	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	0.176	0.45
NOx	13	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	3.27	8.33
CO	7.5	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	1.89	4.80
VOC	1	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	0.25	0.64
SO_2	0.054	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	0.01	0.03
CO2	12500.0	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	3.15E+03	8008.32
CH4	0.2	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	5.04E-02	0.13
N2O	0.9	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	2.27E-01	0.58
Total CO2e	12783.2	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	3.22E+03	8189.76

Sample Calculation:

PM Emissions = (Emission Factor, lbs/MMscf) / (Fuel Heating Value, MMBtu/MMscf) x (Fuel Combustion Rate MMBtu/hr)
M Emissions (lb/hr) = (0.7 lb/MMscf) / (91.33 MMBtu/MMscf) x (23 MMBtu/hr) = 0.1763 lbs/hr
PM Emissions (tons/yr) = (0.1763 lbs/hr) x (5088 hrs/yr) / (2000 lbs/ton) = 0.448 tons/yr

P10B

Tintina Montana Inc. Black Butte Copper Project

EMISSIONS CALCULATIONS

Propane-fired heater at Intake Vent for Lower Copper Zone

Max. Fuel Combustion Rate =	52.00	MMBtu/hr
Fuel Usage =	2,896.92	10^3 gal/yr
Hours of Operation =	5,088	hr/yr
Fuel High Heating Value=	91.33	MMBtu/10^3 gal
Conversions:	454	grams/lb
	2000	lbs/ton

Criteria Pollutants (HAPs)

Pollutant	Emission Factor	Units	Emission Factor Reference	Emissions (lbs/hr)	Emissions (tons/yr)
PM/PM10/PM2.5	0.7	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	0.40	1.01
NOx	13	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	7.40	18.83
CO	7.5	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	4.27	10.86
VOC	1	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	0.57	1.45
SO_2	0.054	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	0.03	0.08
CO2	12500.0	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	7117.05	18105.77
CH4	0.2	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	0.11	0.29
N2O	0.9	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	0.51	1.30
Total CO2e	12783.2	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	7278.29	18515.97

Sample Calculation:

PM Emissions = (Emission Factor, lbs/MMscf) / (Fuel Heating Value, MMBtu/MMscf) x (Fuel Combustion Rate MMBtu/hr)

Emissions (lb/hr) = (0.7 lb/MMscf) / (91.33 MMBtu/MMscf) x (52 MMBtu/hr) = 0.3986 lbs/hr

PM Emissions (tons/yr) = (0.3986 lbs/hr) x (5088 hrs/yr) / (2000 lbs/ton) = 1.014 tons/yr

P11

Tintina Montana Inc. Black Butte Copper Project

EMISSIONS CALCULATIONS

Temporary Diesel-fired Heaters at Portal (1.2 MMBtu/hr total between 3)

Max. Fuel Combustion Rate =	1.20	MMBtu/hr
Fuel Usage =	75.30	10^3 gal/yr
Hours of Operation =	8,760	hr/yr
Fuel High Heating Value=	139.60	MMBtu/10^3 gal
Conversions:	454	grams/lb
	2000	lbs/ton

Criteria Pollutants (HAPs)

Pollutant	Emission Factor	Units	Emission Factor Reference	Emissions (lbs/hr)	Emissions (tons/yr)
PM/PM10/PM2.5	1.3	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	0.01	0.05
NOx	20	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	0.17	0.75
CO	5	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	0.04	0.19
VOC	0.556	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	0.00	0.02
SO_2	2.13	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	0.02	0.08
CO2	22300.0	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	191.69	839.60
CH4	0.2	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	0.00	0.01
N2O	0.3	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	0.00	0.01
Total CO2e	22385.1	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	192.42	842.81

EMISSIONS CALCULATIONS

Source Name:	**Jaw Crusher (enclosed in crushing building, vented to dust collector)**
Source Description:	**Jaw Crusher Dust Collection System/Dust Collector**
Pollutants:	**PM/PM10/PM2.5**
Emission Factor From:	**BACT Determination**

Explanation:

BACT for these types/sizes of dust collectors was determined to be 0.01 grains per dry standard cubic foot. The other particulate fractions are also conservatively assumed to also be 0.01 gr/dscf.

Emissions are from the jaw crusher (enclosed in the crushing building) vented through the dust collection system

Emissions are calculated by multiplying the emission factors by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which the process will be performed (by default, 8760, unless otherwise limited). This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM Emission Factor =	**0.01**	**gr/dscf**
	8,500	**scfm**
PM_{10} Emission Factor =	**0.010**	**gr/dscf**
	8,500	**scfm**
$PM_{2.5}$ Emission Factor =	**0.010**	**gr/dscf**
	8,500	**scfm**

Short Term Emissions: **pound per hour = (baghouse flow rate scfm)*(grain load gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **tons per year = (Short Term emission)(8760 hr/yr)/(2000 lb/ton)**

Annual PM EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
3.19	0.092	0.73	0.092

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
3.19	0.092	0.73	0.092

Annual $PM_{2.5}$ EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
3.19	0.092	0.73	0.092

EMISSIONS CALCULATIONS

Source Name:	**P13A**
Source Description:	**Mill Building Lime Silo Dust Collector**
Pollutants:	**PM/PM10/PM2.5**
Emission Factor From:	**BACT Determination**

Explanation:

BACT for these types/sizes of dust collectors was determined to be 0.01 grains per dry standard cubic foot. The other particulate fractions are also conservatively assumed to also be 0.01 gr/dscf.

Emissions are from the mill building lime silo dust collection system

Emissions are calculated by multiplying the emission factors by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which the process will be performed (by default, 8760, unless otherwise limited). This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM Emission Factor =	**0.01**	**gr/dscf**
	500	**scfm**
PM_{10} Emission Factor =	**0.010**	**gr/dscf**
	500	**scfm**
$PM_{2.5}$ Emission Factor =	**0.010**	**gr/dscf**
	500	**scfm**

Short Term Emissions: **pound per hour = (baghouse flow rate scfm)*(grain load gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **tons per year = (Short Term emission)(8760 hr/yr)/(2000 lb/ton)**

Annual PM EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.19	0.005	0.04	0.005

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.19	0.005	0.04	0.005

Annual $PM_{2.5}$ EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.19	0.005	0.04	0.005

EMISSIONS CALCULATIONS

Source Name: **P13B**
Source Description: **Mill Building Lime Area Dust Collector**
Pollutants: **PM/PM10/PM2.5**

Emission Factor From: **BACT Determination**

Explanation:

BACT for these types/sizes of dust collectors was determined to be 0.01 grains per dry standard cubic foot. The other particulate fractions are also conservatively assumed to also be 0.01 gr/dscf.

Emissions are from the mill building lime silo dust collection system

Emissions are calculated by multiplying the emission factors by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which the process will be performed (by default, 8760, unless otherwise limited). This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM Emission Factor =	**0.01**	**gr/dscf**
	3,300	**scfm**
PM_{10} Emission Factor =	**0.010**	**gr/dscf**
	3,300	**scfm**
$PM_{2.5}$ Emission Factor =	**0.010**	**gr/dscf**
	3,300	**scfm**

Short Term Emissions: **pound per hour = (baghouse flow rate scfm)*(grain load gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **tons per year = (Short Term emission)(8760 hr/yr)/(2000 lb/ton)**

Annual PM EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
1.24	0.036	0.28	0.036

Annual PM_{10} EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
1.24	0.036	0.28	0.036

Annual $PM_{2.5}$ EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
1.24	0.036	0.28	0.036

P14
Tintina Montana Inc. Black Butte Copper Project

EMISSIONS CALCULATIONS

Source Name:	**Crushed Ore - Surge Bin (2500 ton total capacity)**
Source Description:	**Crushed Ore - Surge Bin Dust Collection System/Dust Collector**
Pollutants:	**PM/PM10/PM2.5**

Emission Factor From: **BACT Determination**

Explanation:

BACT for these types/sizes of dust collectors was determined to be 0.01 grains per dry standard cubic foot. The other particulate fractions are also conservatively assumed to also be 0.01 gr/dscf.

Emissions are from the crushed ore surge bin dust collection system

Emissions are calculated by multiplying the emission factors by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which the process will be performed (by default, 8760, unless otherwise limited). This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM Emission Factor =	**0.01**	**gr/dscf**
	5,000	**scfm**
PM_{10} Emission Factor =	**0.010**	**gr/dscf**
	5,000	**scfm**
$PM_{2.5}$ Emission Factor =	**0.010**	**gr/dscf**
	5,000	**scfm**

Short Term Emissions: **pound per hour = (baghouse flow rate scfm)*(grain load gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **tons per year = (Short Term emission)(8760 hr/yr)/(2000 lb/ton)**

Annual PM EMISSIONS		**Short Term**	
(TPY)	**(g/s)**	**lb/hr**	**g/s**
1.88	0.054	0.43	0.054

Annual PM_{10} EMISSIONS		**Short Term**	
(TPY)	**(g/s)**	**lb/hr**	**g/s**
1.88	0.054	0.43	0.054

Annual $PM_{2.5}$ EMISSIONS		**Short Term**	
(TPY)	**(g/s)**	**lb/hr**	**g/s**
1.88	0.054	0.43	0.054

EMISSIONS CALCULATIONS

Source Name:	**P15**
Source Description:	**Water Treatment Plant - Lime Area Dust Collector**
Pollutants:	**PM/PM10/PM2.5**
Emission Factor From:	**BACT Determination**

Explanation:

BACT for these types/sizes of dust collectors was determined to be 0.01 grains per dry standard cubic foot. The other particulate fractions are also conservatively assumed to also be 0.01 gr/dscf.

Emissions are from the lime area dust collection system

Emissions are calculated by multiplying the emission factors by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which the process will be performed (by default, 8760, unless otherwise limited). This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM Emission Factor =	**0.01**	**gr/dscf**
	3,300	**scfm**
PM_{10} Emission Factor =	**0.010**	**gr/dscf**
	3,300	**scfm**
$PM_{2.5}$ Emission Factor =	**0.010**	**gr/dscf**
	3,300	**scfm**

Short Term Emissions: **pound per hour = (baghouse flow rate scfm)*(grain load gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **tons per year = (Short Term emission)(8760 hr/yr)/(2000 lb/ton)**

Annual PM EMISSIONS		**Short Term**	
(TPY)	**(g/s)**	**lb/hr**	**g/s**
1.24	0.036	0.28	0.036

Annual PM_{10} EMISSIONS		**Short Term**	
(TPY)	**(g/s)**	**lb/hr**	**g/s**
1.24	0.036	0.28	0.036

Annual $PM_{2.5}$ EMISSIONS		**Short Term**	
(TPY)	**(g/s)**	**lb/hr**	**g/s**
1.24	0.036	0.28	0.036

EMISSIONS CALCULATIONS

Source Name:	**P16A**
Source Description:	**Backfill Plant - Cement Hopper dust collector**
Pollutants:	**PM/PM10/PM2.5**
Emission Factor From:	**BACT Determination**

Explanation:

BACT for these types/sizes of dust collectors was determined to be 0.01 grains per dry standard cubic foot. The other particulate fractions are also conservatively assumed to also be 0.01 gr/dscf.

Emissions are from the backfill plant cement hopper dust collector

Emissions are calculated by multiplying the emission factors by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which the process will be performed (by default, 8760, unless otherwise limited). This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM Emission Factor =	**0.01**	**gr/dscf**
	600	**scfm**
PM_{10} Emission Factor =	**0.010**	**gr/dscf**
	600	**scfm**
$PM_{2.5}$ Emission Factor =	**0.010**	**gr/dscf**
	600	**scfm**

Short Term Emissions: **pound per hour = (baghouse flow rate scfm)*(grain load gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **tons per year = (Short Term emission)(8760 hr/yr)/(2000 lb/ton)**

Annual PM EMISSIONS		**Short Term**	
(TPY)	**(g/s)**	**lb/hr**	**g/s**
0.23	0.006	0.05	0.006

Annual PM_{10} EMISSIONS		**Short Term**	
(TPY)	**(g/s)**	**lb/hr**	**g/s**
0.23	0.006	0.05	0.006

Annual $PM_{2.5}$ EMISSIONS		**Short Term**	
(TPY)	**(g/s)**	**lb/hr**	**g/s**
0.23	0.006	0.05	0.006

EMISSIONS CALCULATIONS

Source Name:	**P16B**
Source Description:	**Backfill Plant -Cement silo dust collector**
Pollutants:	**PM/PM10/PM2.5**
Emission Factor From:	**BACT Determination**

Explanation:

BACT for these types/sizes of dust collectors was determined to be 0.01 grains per dry standard cubic foot. The other particulate fractions are also conservatively assumed to also be 0.01 gr/dscf.

Emissions are from the cement silo dust collector

Emissions are calculated by multiplying the emission factors by the maximum flow rating of the baghouse in standard cubic feet per minute. This yields an emissions rate in grains per minute. To generate a short term emission rate in pounds per hour, the calculated emission rate is multiplied by 60 minutes per hour, which is subsequently divided by 7000 grains per pound. To generate an annual emission rate, the short term emission rate is multiplied by the number of hours of operation per year in which the process will be performed (by default, 8760, unless otherwise limited). This yields an emission rate in pounds per year, which is subsequently divided by 2000 to yield tons per year.

PM Emission Factor =	**0.01**	**gr/dscf**
	1,200	**scfm**
PM$_{10}$ Emission Factor =	**0.010**	**gr/dscf**
	1,200	**scfm**
PM$_{2.5}$ Emission Factor =	**0.010**	**gr/dscf**
	1,200	**scfm**

Short Term Emissions: **pound per hour = (baghouse flow rate scfm)*(grain load gr/dscf)/(7000 gr/lb)*(60 min/hr)**

Annual Emissions: **tons per year = (Short Term emission)(8760 hr/yr)/(2000 lb/ton)**

Annual PM EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.45	0.013	0.10	0.013

Annual PM$_{10}$ EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.45	0.013	0.10	0.013

Annual PM$_{2.5}$ EMISSIONS		Short Term	
(TPY)	(g/s)	lb/hr	g/s
0.45	0.013	0.10	0.013

P17

Air Emissions Calculations

Tintina Montana Inc. Black Butte Copper Project

4 100-hp portable enginge/generators

Process Information

Process Rate:	8,760	hr/yr	
Engine power output:	400	hp	(Total for all four engines)
Sulfur Content	0.015	percent	

Non-Criteria Pollutant Emission Limits

opacity	<20%

Tier 3 Engine - 40 CFR 89.112

Power Rating range: 37< kW < 75

Emission Standards

Non-methane hydrocarbon + NOx:	4.7	g/kW-hr	7.73E-03	lb/hp-hr
CO:	5	g/kW-hr	8.22E-03	lb/hp-hr
PM:	0.40	g/kW-hr	6.58E-04	lb/hp-hr

Pollutant	Emission Factor	Units	Source	Uncontrolled Emissions Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Enforceable Control Limit	PTE Emissions Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)
PM	6.58E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.26	6.31	1.15	20% opacity	0.26	6.31	1.15
PM_{10}	6.58E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.26	6.31	1.15	20% opacity	0.26	6.31	1.15
$PM_{2.5}$	6.58E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.26	6.31	1.15	20% opacity	0.26	6.31	1.15
Sulfur Dioxide (SO_2)	1.21E-04	lb/hp-hr	AP-42 Section 3.4, Table 3.4-1 (10/96) Large Stationary Diesel and All Stationary Dual-Fuel Engines	0.05	1.16	0.21	not applicable	0.05	1.16	0.21
Nitrogen Oxides (NO_X)	7.73E-03	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1 - assumes NMHC+NOx is all NOx	3.09	74.18	13.54	not applicable	3.09	74.18	13.54
Carbon Monoxide (CO)	8.22E-03	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1	3.29	78.91	14.40	not applicable	3.29	78.91	14.40
VOC*	2.47E-03	lb/hp-hr	AP-42 Section 3.3, Table 3.3-1 (10/96) Gasoline and Diesel Industrial Engines	0.99	23.71	4.33	not applicable	0.99	23.71	4.33

*NOTE: Emission factor for VOC is assumed to be equal to the emission factor for Total Organic Carbon (TOC) in the exhaust. This would be a conservative estimate as not all TOC is VOC.

P18
Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project

Air Compressor - Diesel Engine 275 hp

Process Information

Process Rate:	8,760	hr/yr
Engine power output:	275	hp
Sulfur Content	0.015	percent

(Total for all four engines)

Non-Criteria Pollutant Emission Limits

opacity	<20%

Tier 3 Engine - 40 CFR 89.112

Power Rating range: 130< kW < 225

Emission Standards

Non-methane hydrocarbon + NOx:	4.0	g/kW-hr	6.58E-03	lb/hp-hr
CO:	3.5	g/kW-hr	5.75E-03	lb/hp-hr
PM:	0.20	g/kW-hr	3.29E-04	lb/hp-hr

Pollutant	Emission Factor	Units	Source	Uncontrolled Emissions Hourly (lb/hr)	Uncontrolled Emissions Daily (lb/day)	Uncontrolled Emissions Annual (tpy)	Enforceable Control Limit	PTE Emissions Hourly (lb/hr)	PTE Emissions Daily (lb/day)	PTE Emissions Annual (tpy)
PM	3.29E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.09	2.17	0.40	20% opacity	0.09	2.17	0.40
PM_{10}	3.29E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.09	2.17	0.40	20% opacity	0.09	2.17	0.40
$PM_{2.5}$	3.29E-04	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.09	2.17	0.40	20% opacity	0.09	2.17	0.40
Sulfur Dioxide (SO_2)	1.21E-04	lb/hp-hr	AP-42 Section 3.4, Table 3.4-1 (10/96) Large Stationary Diesel and All Stationary Dual-Fuel Engines	0.03	0.80	0.15	not applicable	0.03	0.80	0.15
Nitrogen Oxides (NO_X)	6.58E-03	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1 - assumes NMHC+NOx is all NOx	1.81	43.40	7.92	not applicable	1.81	43.40	7.92
Carbon Monoxide (CO)	5.75E-03	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1	1.58	37.98	6.93	not applicable	1.58	37.98	6.93
VOC*	2.47E-03	lb/hp-hr	AP-42 Section 3.3, Table 3.3-1 (10/96) Gasoline and Diesel Industrial Engines	0.68	16.30	2.98	not applicable	0.68	16.30	2.98

Tintina Montana, Inc. Black Butte Copper Project
Tintina Mine Air Permit Application

Underground sources are exhausted through the two exhaust vents (upper copper zone, lower copper zone) and the portal.

	m^3/s	Total percent of airflow	dscm	acfm[4]	PM_{10}			$PM_{2.5}$			NOx			CO			SO2			VOC		
					lb/hr	**lb/day**	**tpy**	**lb/hr**	**lb/day**	**tpy**	**lb/hr**	**lb/day**	**tpy**	**lb/hr**	**lb/day**	**tpy**	**lb/hr**	**lb/day**	**tpy**	**lb/hr**	**lb/day**	**tpy**
Exhaust airflows - Upper Zone	**307**	59%	**650,502**	804,081.95	0.958	15.526	2.833	0.951	15.356	2.803	17.559	297.530	54.299	23.191	429.512	78.386	0.498	9.692	1.769	5.890	95.124	17.360
Exhaust airflows - Lower Zone	**110**	21%	**233,079**	288,107.54	0.343	5.563	1.015	0.341	5.502	1.004	6.292	106.607	19.456	8.309	153.897	28.086	0.179	3.473	0.634	2.110	34.084	6.220
Exhaust airflows - Portal	**103**	20%	**218,247**	269,773.42	0.321	5.209	0.951	0.319	5.152	0.940	5.891	99.823	18.218	7.781	144.103	26.299	0.167	3.252	0.593	1.976	31.915	5.824
Total exhaust	**520**				1.622	26.297	4.799	1.610	26.011	4.747	29.742	503.959	91.972	39.281	727.511	132.771	0.844	16.416	2.996	9.977	161.123	29.405

UG _ Mobile Sources

EMISSIONS CALCULATIONS

Underground sources

Underground equipment (Table 3-7)

	Est. engine horsepower (hp)	Number of units	EPA Load Factor (fraction of power)	Equipment Availability and Use of Availability	Available hours per day hr/day	Annual Operating Schedule days/yr	PM10/PM2.5				NOx				CO				SO2				VOC			
Upper Zone							EPA Tier 3 Emission factor g/hp-hr	lb/hr	lb/day	tpy	EPA Tier 3 Emission factor g/hp-hr	lb/hr	lb/day	tpy	EPA Tier 3 Emission factor g/hp-hr	lb/hr	lb/day	tpy	Emission factor lb/hp-hr	lb/hr	lb/day	tpy	Emission factor lb/hp-hr	lb/hr	lb/day	tpy
2 Boom Jumbo	118	2	0.21	67.29%	16.1496	365	0.22	0.0240	0.388	0.071	3.0	0.3278	5.294	0.966	3.7	0.4043	6.529	1.192	1.21E-04	0.0060	0.097	0.018	2.47E-03	0.1224	1.977	0.361
Mechanized bolter	150	3	0.21	67.29%	16.1496	365	0.22	0.0458	0.740	0.135	3.0	0.6250	10.094	1.842	3.7	0.7709	12.449	2.272	1.21E-04	0.0115	0.185	0.034	2.47E-03	0.2334	3.770	0.688
7-cu yard LHD	250	2	0.43	67.29%	16.1496	365	0.15	0.0711	1.148	0.210	3.0	1.4220	22.965	4.191	2.6	1.2324	19.903	3.632	1.21E-04	0.0261	0.421	0.077	2.47E-03	0.5311	8.576	1.565
Scissor truck	150	3	0.21	67.29%	16.1496	365	0.22	0.0458	0.740	0.135	3.0	0.6250	10.094	1.842	3.7	0.7709	12.449	2.272	1.21E-04	0.0115	0.185	0.034	2.47E-03	0.2334	3.770	0.688
44-ton haul truck (40-tonne haul truck)	465	4	0.59	67.29%	16.1496	365	0.15	0.3629	5.861	1.070	3.0	7.2581	117.215	21.392	2.6	6.2904	101.587	18.540	1.21E-04	0.1332	2.151	0.392	2.47E-03	2.7106	43.775	7.989
ANFO Loader	150	1	0.21	67.29%	16.1496	365	0.22	0.0153	0.247	0.045	3.0	0.2083	3.365	0.614	3.7	0.2570	4.150	0.757	1.21E-04	0.0038	0.062	0.011	2.47E-03	0.0778	1.257	0.229
Lower Zone																										
2 Boom Jumbo	118	1	0.21	67.29%	16.1496	365	0.22	0.0120	0.194	0.035	3.0	0.1639	2.647	0.483	3.7	0.2021	3.264	0.596	1.21E-04	0.0030	0.049	0.009	2.47E-03	0.0612	0.988	0.180
Mechanized bolter	150	2	0.21	67.29%	16.1496	365	0.22	0.0306	0.493	0.090	3.0	0.4167	6.729	1.228	3.7	0.5139	8.299	1.515	1.21E-04	0.0076	0.123	0.023	2.47E-03	0.1556	2.513	0.459
7-cu yard LHD	250	1	0.43	67.29%	16.1496	365	0.15	0.0355	0.574	0.105	3.0	0.7110	11.482	2.096	2.6	0.6162	9.951	1.816	1.21E-04	0.0130	0.211	0.038	2.47E-03	0.2655	4.288	0.783
5-cu yard LHD	150	2	0.43	67.29%	16.1496	365	0.22	0.0626	1.010	0.184	3.0	0.8532	13.779	2.515	3.7	1.0523	16.994	3.101	1.21E-04	0.0157	0.253	0.046	2.47E-03	0.3186	5.146	0.939
Scissor truck	150	2	0.21	67.29%	16.1496	365	0.22	0.0306	0.493	0.090	3.0	0.4167	6.729	1.228	3.7	0.5139	8.299	1.515	1.21E-04	0.0076	0.123	0.023	2.47E-03	0.1556	2.513	0.459
44-ton haul truck (40-tonne haul truck)	465	2	0.59	67.29%	16.1496	365	0.15	0.1815	2.930	0.535	3.0	3.6290	58.608	10.696	2.6	3.1452	50.793	9.270	1.21E-04	0.0666	1.075	0.196	2.47E-03	1.3553	21.887	3.994
ANFO Loader	150	1	0.21	67.29%	16.1496	365	0.22	0.0153	0.247	0.045	3.0	0.2083	3.365	0.614	3.7	0.2570	4.150	0.757	1.21E-04	0.0038	0.062	0.011	2.47E-03	0.0778	1.257	0.229
Shared upper and lower zone equipment																										
Raise bore, Alimak	300	1	0.21	67.29%	16.1496	365	0.15	0.0208	0.336	0.061	3.0	0.4167	6.729	1.228	2.6	0.3611	5.832	1.064	1.21E-04	0.0076	0.123	0.023	2.47E-03	0.1556	2.513	0.459
Forklift	150	1	0.59	67.29%	16.1496	365	0.22	0.0429	0.693	0.127	3.0	0.5853	9.453	1.725	3.7	0.7219	11.659	2.128	1.21E-04	0.0107	0.173	0.032	2.47E-03	0.2186	3.530	0.644
Boom truck	300	2	0.21	67.29%	16.1496	365	0.15	0.0417	0.673	0.123	3.0	0.8334	13.458	2.456	2.6	0.7222	11.664	2.129	1.21E-04	0.0153	0.247	0.045	2.47E-03	0.3112	5.026	0.917
Grader	220	1	0.59	67.29%	16.1496	365	0.15	0.0429	0.693	0.127	3.0	0.8585	13.864	2.530	2.6	0.7440	12.016	2.193	1.21E-04	0.0158	0.254	0.046	2.47E-03	0.3206	5.178	0.945
Transmixer	114	2	0.43	67.29%	16.1496	365	0.22	0.0476	0.768	0.140	3.0	0.6484	10.472	1.911	3.7	0.7997	12.915	2.357	1.21E-04	0.0119	0.192	0.035	2.47E-03	0.2422	3.911	0.714
Shotcrete sprayer	7	2	0.21	67.29%	16.1496	365	0.75	0.0049	0.079	0.014	5.6	0.0363	0.586	0.107	6.0	0.0389	0.628	0.115	1.21E-04	0.0004	0.006	0.001	2.47E-03	0.0073	0.117	0.021
Pressure grouting equipment	100	1	0.21	67.29%	16.1496	365	0.22	0.0102	0.164	0.030	3.0	0.1389	2.243	0.409	3.7	0.1713	2.766	0.505	1.21E-04	0.0025	0.041	0.008	2.47E-03	0.0519	0.838	0.153
Fuel/lube truck	150	1	0.59	67.29%	16.1496	365	0.22	0.0429	0.693	0.127	3.0	0.5853	9.453	1.725	3.7	0.7219	11.659	2.128	1.21E-04	0.0107	0.173	0.032	2.47E-03	0.2186	3.530	0.644
Underground light truck	150	4	0.21	67.29%	16.1496	365	0.22	0.0611	0.987	0.180	3.0	0.8334	13.458	2.456	3.7	1.0278	16.599	3.029	1.21E-04	0.0153	0.247	0.045	2.47E-03	0.3112	5.026	0.917
Maintenance/elec trucks	150	4	0.21	67.29%	16.1496	365	0.22	0.0611	0.987	0.180	3.0	0.8334	13.458	2.456	3.7	1.0278	16.599	3.029	1.21E-04	0.0153	0.247	0.045	2.47E-03	0.3112	5.026	0.917
Supervisor vehicles	150	4	0.59	67.29%	16.1496	365	0.22	0.1717	2.773	0.506	3.0	2.3413	37.811	6.901	3.7	2.8876	46.634	8.511	1.21E-04	0.0430	0.694	0.127	2.47E-03	0.8744	14.121	2.577
Engineering/geology	150	3	0.59	67.29%	16.1496	365	0.22	0.1288	2.080	0.380	3.0	1.7560	28.359	5.175	3.7	2.1657	34.976	6.383	1.21E-04	0.0322	0.520	0.095	2.47E-03	0.6558	10.591	1.933
Total underground mobile sources								1.61	25.99	4.74		26.73	431.71	78.79		27.42	442.76	80.80		0.49	7.92	1.44		9.98	161.12	29.40

Notes

[1] 12 hour/shift, 2 shifts per day, 0.5 hr lunch, 50 min per hour operation, = 9.5 effective hour/12 hour shift

Availability means the availability of unit due to maintenance or other downtime. Use of availability means percent use of available unit operation time

Use of Avail	Availability	Total Availability per Day
79.16%	85.00%	67.29%

[2] 24-hours per day, 365 days per year, unless otherwise specified by EPA's NONROAD2008a Load Factor and Activity Estimates

[3] PM2.5 assumed to be equal to PM10 for combustion sources

[4] ACFM calculated using the following conversion: Vs/Va = (Ts/Ta)*(Pa/Ps)*[(1-(M/100)]

Ts, Standard Temp (68 F)	528 R	
Ta, Actual Temp (Annual Avg)	47 F	*2012 - 2017 Avg.*
Ta, Actual Temp (Rankin)	507 R	
Ps, Standard Pressure	29.92 in Hg	
Elevation	5702 ft	
Pa, Adjusted Pressure	24.218 in Hg	
M, Moisture (Relative Humidity, Avg)	4 %	*Stillwater Mine source testing*
Vs/Va	**0.809**	

Vs/Va = (Ts/Ta) * (Pa/Ps) * (1-(M/100))

ACFM = SCFM * (Va/Vs)

UG ANFO

Blasting

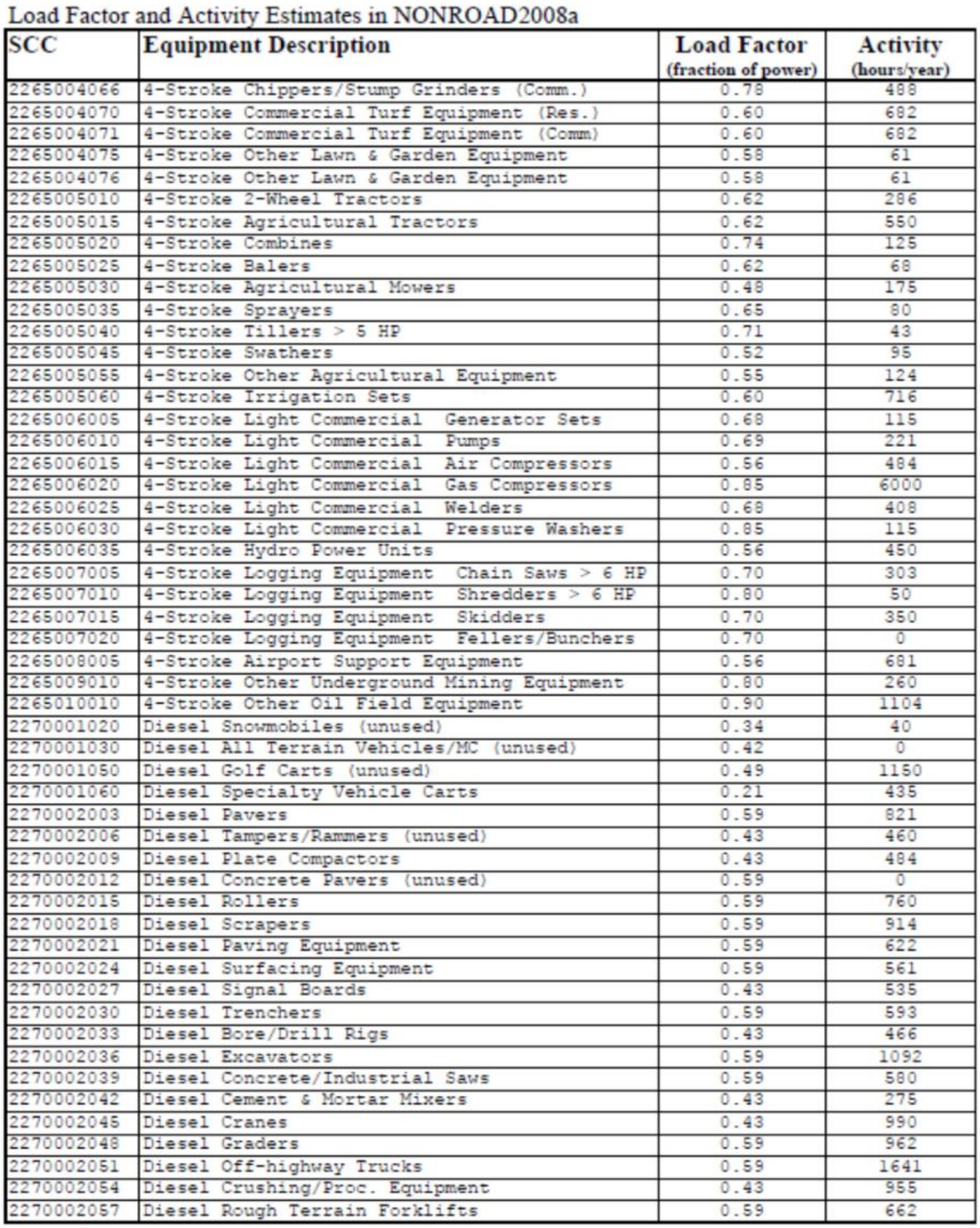
8.5 blasts per day, full production, worst case

0.5 ton of ANFO per blast (1000 lbs)

289 A= horizontal area (ft^2), with blasting depth ≤ 70ft (based on 17'x17' heading)

		Emission factor lb/blast	EF Source	EF Comments	lb/hr (averaged over a day)	Max lb/day	tpy
Based on blasts	PM	0.069	AP-42, Table 11.9-1	EF = $(0.000014(A)^{1.5})$	0.024	0.585	0.11
	PM10	0.036	AP-42, Table 11.9-2	PM10/PM scaling factor = 0.52	0.013	0.304	0.06
	PM2.5	0.002	AP-42, Table 11.9-3	PM2.5/PM scaling factor = 0.03	0.001	0.018	0.00
Based on ANFO		lb/ton of ANFO					
	CO	67	AP-42, Table 13.3-1		11.86	284.75	51.97
	NOx	17	AP-42, Table 13.3-2		3.01	72.25	13.19
	SO2	2	AP-42, Table 13.3-3		0.35	8.50	1.55

NONROAD2008a Load Factors Used in Mobile Source Underground Emissions Estimates



Load Factor and Activity Estimates in NONROAD2008a

SCC	Equipment Description	Load Factor (fraction of power)	Activity (hours/year)
2265004066	4-Stroke Chippers/Stump Grinders (Comm.)	0.78	488
2265004070	4-Stroke Commercial Turf Equipment (Res.)	0.60	682
2265004071	4-Stroke Commercial Turf Equipment (Comm)	0.60	682
2265004075	4-Stroke Other Lawn & Garden Equipment	0.58	61
2265004076	4-Stroke Other Lawn & Garden Equipment	0.58	61
2265005010	4-Stroke 2-Wheel Tractors	0.62	286
2265005015	4-Stroke Agricultural Tractors	0.62	550
2265005020	4-Stroke Combines	0.74	125
2265005025	4-Stroke Balers	0.62	68
2265005030	4-Stroke Agricultural Mowers	0.48	175
2265005035	4-Stroke Sprayers	0.65	80
2265005040	4-Stroke Tillers > 5 HP	0.71	43
2265005045	4-Stroke Swathers	0.52	95
2265005055	4-Stroke Other Agricultural Equipment	0.55	124
2265005060	4-Stroke Irrigation Sets	0.60	716
2265006005	4-Stroke Light Commercial Generator Sets	0.68	115
2265006010	4-Stroke Light Commercial Pumps	0.69	221
2265006015	4-Stroke Light Commercial Air Compressors	0.56	484
2265006020	4-Stroke Light Commercial Gas Compressors	0.85	6000
2265006025	4-Stroke Light Commercial Welders	0.68	408
2265006030	4-Stroke Light Commercial Pressure Washers	0.85	115
2265006035	4-Stroke Hydro Power Units	0.56	450
2265007005	4-Stroke Logging Equipment Chain Saws > 6 HP	0.70	303
2265007010	4-Stroke Logging Equipment Shredders > 6 HP	0.80	50
2265007015	4-Stroke Logging Equipment Skidders	0.70	350
2265007020	4-Stroke Logging Equipment Fellers/Bunchers	0.70	0
2265008005	4-Stroke Airport Support Equipment	0.56	681
2265009010	4-Stroke Other Underground Mining Equipment	0.80	260
2265010010	4-Stroke Other Oil Field Equipment	0.90	1104
2270001020	Diesel Snowmobiles (unused)	0.34	40
2270001030	Diesel All Terrain Vehicles/MC (unused)	0.42	0
2270001050	Diesel Golf Carts (unused)	0.49	1150
2270001060	Diesel Specialty Vehicle Carts	0.21	435
2270002003	Diesel Pavers	0.59	821
2270002006	Diesel Tampers/Rammers (unused)	0.43	460
2270002009	Diesel Plate Compactors	0.43	484
2270002012	Diesel Concrete Pavers (unused)	0.59	0
2270002015	Diesel Rollers	0.59	760
2270002018	Diesel Scrapers	0.59	914
2270002021	Diesel Paving Equipment	0.59	622
2270002024	Diesel Surfacing Equipment	0.59	561
2270002027	Diesel Signal Boards	0.43	535
2270002030	Diesel Trenchers	0.59	593
2270002033	Diesel Bore/Drill Rigs	0.43	466
2270002036	Diesel Excavators	0.59	1092
2270002039	Diesel Concrete/Industrial Saws	0.59	580
2270002042	Diesel Cement & Mortar Mixers	0.43	275
2270002045	Diesel Cranes	0.43	990
2270002048	Diesel Graders	0.59	962
2270002051	Diesel Off-highway Trucks	0.59	1641
2270002054	Diesel Crushing/Proc. Equipment	0.43	955
2270002057	Diesel Rough Terrain Forklifts	0.59	662

Load Factor and Activity Estimates in NONROAD2008a

SCC	Equipment Description	Load Factor (fraction of power)	Activity (hours/year)
2270002060	Diesel Rubber Tire Loaders	0.59	761
2270002063	Diesel Rubber Tire Dozers	0.59	899
2270002066	Diesel Tractors/Loaders/Backhoes	0.21	1135
2270002069	Diesel Crawler Tractors	0.59	936
2270002072	Diesel Skid Steer Loaders	0.21	818
2270002075	Diesel Off-Highway Tractors	0.59	855
2270002078	Diesel Dumpers/Tenders	0.21	566
2270002081	Diesel Other Construction Equipment	0.59	606
2270003010	Diesel Aerial Lifts	0.21	384
2270003020	Diesel Forklifts	0.59	1700
2270003030	Diesel Sweepers/Scrubbers	0.43	1220
2270003040	Diesel Other General Industrial Equipment	0.43	878
2270003050	Diesel Other Material Handling Equipment	0.21	421
2270003060	Diesel AC\Refrigeration	0.43	1341
2270003070	Diesel Terminal Tractors	0.59	1257
2270004010	Diesel Lawn mowers (Residential)	0.43	320
2270004011	Diesel Lawn mowers (Commerical)	0.43	320
2270004015	Diesel Rotary Tillers < 6 HP (Residential)	0.43	172
2270004016	Diesel Rotary Tillers < 6 HP (Commercial)	0.43	172
2270004020	Diesel Chain Saws < 6 HP (Residential)	0.43	70
2270004021	Diesel Chain Saws < 6 HP (Commercial)	0.43	70
2270004025	Diesel Trimmers/Edgers/Brush Cutters (Res.)	0.43	60
2270004026	Diesel Trimmers/Edgers/Brush Cutters (Comm.)	0.43	60
2270004030	Diesel Leafblowers/Vacuums (Residential)	0.43	120
2270004031	Diesel Leafblowers/Vacuums (Commercial)	0.43	120
2270004035	Diesel Snowblowers (Residential)	0.43	400
2270004036	Diesel Snowblowers (Commercial)	0.43	400
2270004040	Diesel Rear Engine Riding Mowers (Res.)	0.43	480
2270004041	Diesel Rear Engine Riding Mowers (Comm.)	0.43	480
2270004045	Diesel Front Mowers (Residential)	0.43	480
2270004046	Diesel Front Mowers (Commercial)	0.43	480
2270004050	Diesel Shredders < 6 HP (Residential)	0.43	120
2270004051	Diesel Shredders < 6 HP (Commercial)	0.43	120
2270004055	Diesel Lawn & Garden Tractors (Residential)	0.43	544
2270004056	Diesel Lawn & Garden Tractors (Commercial)	0.43	544
2270004060	Diesel Wood Splitters (Residential)	0.43	265
2270004061	Diesel Wood Splitters (Commercial)	0.43	265
2270004065	Diesel Chippers/Stump Grinders (Residential)	0.43	465
2270004066	Diesel Chippers/Stump Grinders (Commercial)	0.43	465
2270004070	Diesel Commercial Turf Equipment (Res.)	0.43	1068
2270004071	Diesel Commercial Turf Equipment (Comm.)	0.43	1068
2270004075	Diesel Other Lawn & Garden Equipment (Res.)	0.43	433
2270004076	Diesel Other Lawn & Garden Equipment (Comm.)	0.43	433
2270005010	Diesel 2-Wheel Tractors	0.59	544
2270005015	Diesel Agricultural Tractors	0.59	475
2270005020	Diesel Combines	0.59	150
2270005025	Diesel Balers	0.59	95
2270005030	Diesel Agricultural Mowers	0.59	363
2270005035	Diesel Sprayers	0.59	90
2270005040	Diesel Tillers > 6 HP	0.59	172
2270005045	Diesel Swathers	0.59	110
2270005055	Diesel Other Agricultural Equipment	0.59	381

Load Factor and Activity Estimates in NONROAD2008a

SCC	Equipment Description	Load Factor (fraction of power)	Activity (hours/year)
2270005060	Diesel Irrigation Sets	0.43	749
2270006005	Diesel Light Commercial Generator Sets	0.43	338
2270006010	Diesel Light Commercial Pumps	0.43	403
2270006015	Diesel Light Commercial Air Compressors	0.43	815
2270006020	Diesel Light Commercial Gas Compressors	0.43	8500
2270006025	Diesel Light Commercial Welders	0.21	643
2270006030	Diesel Light Commercial Pressure Washer	0.43	145
2270006035	Diesel Hydro Power Units	0.43	790
2270007005	Diesel Logging Equipment Chain Saws > 6 HP	0.59	70
2270007010	Diesel Logging Equipment Shredders > 6 HP	0.59	120
2270007015	Diesel Logging Equip Fell/Bunch/Skidders	0.59	1276
2270007020	Diesel Logging Equip Fell/Bunch (unused)	0.59	0
2270008005	Diesel Airport Support Equipment	0.59	732
2270009010	Diesel Other Underground Mining Equipment	0.21	1533
2270010010	Diesel Other Oil Field Equipment	0.43	1231
2267001020	LPG Snowmobiles	0.34	40
2267001050	LPG Golf Carts	0.46	1080
2267001060	LPG Specialty Vehicle Carts	0.58	65
2267002003	LPG Asphalt Pavers	0.66	392
2267002006	LPG Tampers/Rammers	0.55	160
2267002009	LPG Plate Compactors	0.55	166
2267002012	LPG Concrete Pavers	0.55	0
2267002015	LPG Rollers	0.62	621
2267002018	LPG Scrapers	0.70	540
2267002021	LPG Paving Equipment	0.59	175
2267002024	LPG Surfacing Equipment	0.49	488
2267002027	LPG Signal Boards	0.72	318
2267002030	LPG Trenchers	0.66	402
2267002033	LPG Bore/Drill Rigs	0.79	107
2267002036	LPG Excavators	0.59	378
2267002039	LPG Concrete/Industrial Saws	0.78	610
2267002042	LPG Cement & Mortar Mixers	0.59	84
2267002045	LPG Cranes	0.47	415
2267002048	LPG Graders	0.64	504
2267002051	LPG Off-highway Trucks	0.80	450
2267002054	LPG Crushing/Proc. Equipment	0.85	241
2267002057	LPG Rough Terrain Forklifts	0.63	413
2267002060	LPG Rubber Tire Loaders	0.71	512
2267002063	LPG Rubber Tire Dozers	0.75	900
2267002066	LPG Tractors/Loaders/Backhoes	0.48	870
2267002069	LPG Crawler Tractors	0.80	700
2267002072	LPG Skid Steer Loaders	0.58	310
2267002075	LPG Off-Highway Tractors	0.70	155
2267002078	LPG Dumpers/Tenders	0.41	127
2267002081	LPG Other Construction Equipment	0.48	371
2267003010	LPG Aerial Lifts	0.46	361
2267003020	LPG Forklifts	0.30	1800
2267003030	LPG Sweepers/Scrubbers	0.71	516
2267003040	LPG Other General Industrial Equipment	0.54	713
2267003050	LPG Other Material Handling Equipment	0.53	386
2267003060	LPG AC\Refrigeration	0.46	605
2267003070	LPG Terminal Tractors	0.78	827

F1
Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project
Road Dust Fugitive Emissions

Road Dust, Mine Operating Year 0 to 1

Non-Criteria Pollutant Emission Limits

opacity	<20%

Process Information

Silt content of road:	4.8	% (sand & gravel plant road)	
Days with ppt>0.01" *	88	days	
	57.5	tons, mean vehicle wt.	See "Road dust design values" worksheet
	226.3	VMT/day	See "Road dust design values" worksheet
Dust suppression control efficiency:	50%	% control	
	24	hr/d	
	365	day/year	VMT calculations are based on 365 days per year in "Road dust design values" worksheet
	2000	lb/ton	

Pollutant	Emission Factor	Units	Source	Uncontrolled Emissions Hourly (lb/hr)	 Daily (lb/day)	 Annual (tpy)	Enforceable Control Limit	PTE Emissions Hourly (lb/hr)	 Daily (lb/day)	 Annual (tpy)	Control Method (Practice or Equipment)	Control Efficiency (percent)	Comments
PM	7.39	lb/VMT	AP-42 Section 13.2.2, (11/06) Unpaved Roads	69.7	1,673	305.4	20% opacity	34.86	836.70	152.70	Water spray and/or chemical dust suppressant as necessary	50%	ARM 17.8.308
PM_{10}	1.89	lb/VMT	AP-42 Section 13.2.2, (11/06) Unpaved Roads	17.8	427	77.8	20% opacity	8.89	213.28	38.92	Water spray and/or chemical dust suppressant as necessary	50%	ARM 17.8.308
$PM_{2.5}$	0.19	lb/VMT	AP-42 Section 13.2.2, (11/06) Unpaved Roads	1.8	42.7	7.8	20% opacity	0.89	21.36	3.90	Water spray and/or chemical dust suppressant as necessary	50%	ARM 17.8.308

Emission Factor = $(k)(s/12)^a(W/3)^b(365-P)/365$ lb/vmt   AP-42 Ch 13.2.2 Eqns 1a and 2
for travel on unpaved surfaces at industrial sites
where:
k = particle size multiplier
= 4.9 for PM (>30 µg/m^3)
= 1.5 for PM_{10}
= 0.15 for $PM_{2.5}$
a = empirical constant
= 0.7 for PM (>30 µg/m^3)
= 0.9 for PM_{10} and $PM_{2.5}$
b= 0.45 for all PM
s = 4.8 surface material silt content, per AP42-Table 13.2.2-1, mean for sand and gravel processing plant road
W = 57.5 tons, mean vehicle weight
P= 88 number of days in year with at least 0.01 inches of precipitation per on-site met station - year 2013 data used as it showed the fewest days with sufficient precipitation

Table 13.2.2-4 Emission Factor for 1980's Vehicle Fleet Exhaust, Brake Wear and Tire Wear

PM	0.00047	lb/vmt
PM_{10}	0.00047	lb/vmt
$PM_{2.5}$	0.00036	lb/vmt

Emission Factor Calculations:	Road dust:		Equipment wear:		Total Particulate EF:	
PM Emission factor =	7.39	lb/vmt +	0.00047	lb/vmt =	7.39	lb/vmt
PM_{10} Emission factor =	1.88	lb/vmt +	0.00047	lb/vmt =	1.89	lb/vmt
$PM_{2.5}$ Emission factor =	0.19	lb/vmt +	0.00036	lb/vmt =	0.19	lb/vmt

Uncontrolled Emissions Calculations:
PM= (7.39 lb/VMT)(226.3 VMT/day)(365 day/year)(1 ton/2000 lb) =305.4 tpy
PM_{10}= (1.89 lb/VMT)(226.3 VMT/day)(365 day/year)(1 ton/2000 lb) =77.8 tpy
$PM_{2.5}$= (0.19 lb/VMT)(226.3 VMT/day)(365 day/year)(1 ton/2000 lb) =7.8 tpy

Controlled Emissions Calculations:

PM= (7.39 lb/VMT)(226.3 VMT/day)(1 ton/2000 lb)(365 day/year)(1-0.50) =152.7 tpy

PM_{10}= (1.89 lb/VMT)(226.3 VMT/day)(1 ton/2000 lb)(365 day/year)(1-0.50) =38.9 tpy

$PM_{2.5}$= (0.19 lb/VMT)(226.3 VMT/day)(1 ton/2000 lb)(365 day/year)(1-0.50) =3.9 tpy

Modeling Emissions (Controlled)

Model ID

Emission Source	**Activity ID**	**Total Round-trip Miles/Day VMT All trucks**	**TOTAL PM10**		**TOTAL PM2.5**		**# of Vol Srcs**	**PM10 Per Vol Src**	**PM2.5 Per Vol Src**	**Notes**
			lb/hr	**tpy**	**lb/hr**	**tpy**		**tpy**	**tpy**	
Development - Construction of Facilities Phase										
Soil and Subsoil Stripping and Hauling all Facilities										
Portal Pad	DA2	3.37	0.13	0.58	0.01	0.06	268	0.002162	0.000217	
CWP	DAC	8.32	0.33	1.43	0.03	0.14	277	0.005166	0.000517	
Cu-Enriched Ore Stockpile	DAO	0.86	0.03	0.15	0.00	0.01	231	0.000639	0.000064	
WRS Pad	DAW	5.38	0.21	0.93	0.02	0.09	227	0.004079	0.000409	
Mill Pad	DAM	3.02	0.12	0.52	0.01	0.05	175	0.002968	0.000297	
PWP	DAP	21.39	0.84	3.68	0.08	0.37	185	0.019887	0.001992	
CTF	DAT	68.82	2.70	11.84	0.27	1.19	246	0.048120	0.004820	
Embankment Construction										
Portal Pad	DB2	2.39	0.09	0.41	0.01	0.04	61	0.006745	0.000676	
PWP	DBP	11.83	0.46	2.04	0.05	0.20	112	0.018171	0.001820	
NCWR	DBN	49.76	1.95	8.56	0.20	0.86	303	0.028249	0.002830	a
Excavated Material to North Reclamation Stockpile										
CWP	DCC	4.37	0.17	0.75	0.02	0.08	71	0.010588	0.001061	
Cu-Enriched Ore Stockpile	DCO	1.56	0.06	0.27	0.01	0.03	49	0.005474	0.000548	
WRS Pad	DCW	3.45	0.14	0.59	0.01	0.06	53	0.011194	0.001121	
Mill Pad	DCM	1.11	0.04	0.19	0.00	0.02	43	0.004427	0.000443	
Excavated Material to South Reclamation Stockpile										
CTF	DDT	36.53	1.43	6.28	0.14	0.63	246	0.025544	0.002559	a
Waste Rock Removal										
Waste Rock: Portal to WRS	DF2	4.13	0.16	0.71	0.02	0.07	61	0.011653	0.001167	

[a] Source also occurs from year 1-1.5. Year 1-1.5 VMT scaled to an annualized amount are less than Year 0-1 therefore Year 0-1 VMT will be used to model conservatively larger emissions.

F2
Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project
Road Dust Fugitive Emissions

Road Dust, Mine Operating Year 1 to 2

Non-Criteria Pollutant Emission Limits

opacity	<20%

Process Information

Silt content of road:	4.8	% (sand & gravel plant road)	
Days with ppt>0.01" *	88	days	
	57.5	tons, mean vehicle wt.	See "Road dust design values" worksheet
	83.6	VMT/day	See "Road dust design values" worksheet
Dust suppression control efficiency:	50%	% control	
	24	hr/d	
	365	day/year	VMT calculations are based on 365 days per year in "Road dust design values" worksheet
	2000	lb/ton	

				Uncontrolled Emissions				PTE Emissions					
Pollutant	**Emission Factor**	**Units**	**Source**	**Hourly (lb/hr)**	**Daily (lb/day)**	**Annual (tpy)**	**Enforceable Control Limit**	**Hourly (lb/hr)**	**Daily (lb/day)**	**Annual (tpy)**	**Control Method (Practice or Equipment)**	**Control Efficiency (percent)**	**Comments**
PM	7.39	lb/VMT	AP-42 Section 13.2.2, (11/06) Unpaved Roads	25.8	618	112.8	20% opacity	12.88	309	56.4	Water spray and/or chemical dust suppressant as necessary	50%	ARM 17.8.308
PM_{10}	1.89	lb/VMT	AP-42 Section 13.2.2, (11/06) Unpaved Roads	6.6	158	28.8	20% opacity	3.28	78.8	14.4	Water spray and/or chemical dust suppressant as necessary	50%	ARM 17.8.308
$PM_{2.5}$	0.19	lb/VMT	AP-42 Section 13.2.2, (11/06) Unpaved Roads	0.7	15.8	2.9	20% opacity	0.33	7.9	1.44	Water spray and/or chemical dust suppressant as necessary	50%	ARM 17.8.308

Emission Factor = $(k)(s/12)^a(W/3)^b(365\text{-}P)/365$ lb/vmt   AP-42 Ch 13.2.2 Eqns 1a and 2
for travel on unpaved surfaces at industrial sites
where:
k = particle size multiplier
= 4.9 for PM (>30 $\mu g/m^3$)
= 1.5 for PM_{10}
= 0.15 for $PM_{2.5}$
a = empirical constant
= 0.7 for PM (>30 $\mu g/m^3$)
= 0.9 for PM_{10} and $PM_{2.5}$
b= 0.45 for all PM
s = 4.8 surface material silt content, per AP42-Table 13.2.2-1, mean for sand and gravel processing plant road
W = 57 tons, mean vehicle weight
P= 88 number of days in year with at least 0.01 inches of precipitation per on-site met station - year 2013 data used as it showed the fewest days with sufficient precipitation

Table 13.2.2-4 Emission Factor for 1980's Vehicle Fleet Exhaust, Brake Wear and Tire Wear

PM	0.00047 lb/vmt
PM_{10}	0.00047 lb/vmt
$PM_{2.5}$	0.00036 lb/vmt

Emission Factor Calculations:	Road dust:	Equipment wear:	Total Particulate EF:
PM Emission factor =	7.39 lb/vmt +	0.00047 lb/vmt =	7.39 lb/vmt
PM_{10} Emission factor =	1.88 lb/vmt +	0.00047 lb/vmt =	1.89 lb/vmt
$PM_{2.5}$ Emission factor =	0.19 lb/vmt +	0.00036 lb/vmt =	0.19 lb/vmt

Uncontrolled Emissions Calculations:
PM= (7.39 lb/VMT)(83.6 VMT/day)(365 day/year)(1 ton/2000 lb) =112.8 tpy
PM_{10}= (1.89 lb/VMT)(83.6 VMT/day)(365 day/year)(1 ton/2000 lb) =28.8 tpy

$PM_{2.5}$= (0.19 lb/VMT)(83.6 VMT/day)(365 day/year)(1 ton/2000 lb) =2.9 tpy

Controlled Emissions Calculations:

PM= (7.39 lb/VMT)(83.6 VMT/day)(1 ton/2000 lb)(365 day/year)(1-0.50) =56.4 tpy

PM_{10}= (1.89 lb/VMT)(83.6 VMT/day)(1 ton/2000 lb)(365 day/year)(1-0.50) =14.4 tpy

$PM_{2.5}$= (0.19 lb/VMT)(83.6 VMT/day)(1 ton/2000 lb)(365 day/year)(1-0.50) =1.4 tpy

Modeling Emissions (Controlled)

Modeling

Emission Source	Activity ID	Total Round-trip Miles/Day VMT All trucks	PM10		PM2.5		# of Vol Srcs	PM10 per Vol Src	PM2.5 per Vol Src	Notes
			lb/hr	tpy	lb/hr	tpy		tpy	tpy	
Development - Construction of Facilities Phase										
Embankment Construction										
NCWR	DBN	24.86	0.98	4.28	0.10	0.43	Year 0-1 used for modeling			a
Excavated Material to South Reclamation Stockpile										
CTF	DDT	18.25	0.72	3.14	0.07	0.31	Year 0-1 used for modeling			a
Waste Rock Removal										
Waste Rock: WRS to CTF	DFT	36.44	1.43	6.27	0.14	0.63	139	0.045089	0.0045164	b
Production Phase - Operational										
Waste Rock Removal										
Waste Rock: Portal to CTF	PIT	44.57	1.75	7.67	0.18	0.77	176	0.043555	0.0043627	c

[a] Source also occurs from year 0 to 1 with more VMT. Year 0-1 VMT will be used to model conservatively larger emissions. See 'Road Dust-yr 0-1' Tab for modeled emissions.

[b] Source occurs from years 1.5 to 2 and 2 to 3. Annualized VMT for year 1.5 to 2 is greater than annual VMT for year 2 to 3. Annualized VMT for year 1.5 to 2 (doubled for 12 months) will be used to calculate emissions.

[c] Source occurs from years 1.5 to 2, year 3, year 4, and year 8. Annualized VMT for year 1.5 to 2 is greater than annual VMT for years 3 or 4 so annualized VMT for year 1.5 to 2 (doubled for 12 months) will be used to calculate emissions.

F3
Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project
Road Dust Fugitive Emissions

Road Dust, Mine Operating Year 2 to 15, annual average

Non-Criteria Pollutant Emission Limits

opacity	<20%

Process Information

Silt content of road:	4.8	% (sand & gravel plant road)	
Days with ppt>0.01" *	88	days	
	57.5	tons, mean vehicle wt.	See "Road dust design values" worksheet
	421.8	VMT/day/years 2 thru 15, inclusive	See "Road dust design values" worksheet
	16	number of years	
	26.4	VMT/day, annual average	
Dust suppression control efficiency:	50%	% control	
	24	hr/d	
	365	day/year	VMT calculations are based on 365 days per year in "Road dust design values" worksheet
	2000	lb/ton	

Pollutant	Emission Factor	Units	Source	Uncontrolled Emissions Hourly (lb/hr)	Uncontrolled Emissions Daily (lb/day)	Uncontrolled Emissions Annual (tpy)	Enforceable Control Limit	PTE Emissions Hourly (lb/hr)	PTE Emissions Daily (lb/day)	PTE Emissions Annual (tpy)	Control Method (Practice or Equipment)	Control Efficiency (percent)	Comments
PM	7.39	lb/VMT	AP-42 Section 13.2.2, (11/06) Unpaved Roads	8.1	195	35.6	20% opacity	4.06	97.5	17.8	Water spray and/or chemical dust suppressant as necessary	50%	ARM 17.8.308
PM_{10}	1.89	lb/VMT	AP-42 Section 13.2.2, (11/06) Unpaved Roads	2.1	49.7	9.1	20% opacity	1.04	24.8	4.5	Water spray and/or chemical dust suppressant as necessary	50%	ARM 17.8.308
$PM_{2.5}$	0.19	lb/VMT	AP-42 Section 13.2.2, (11/06) Unpaved Roads	0.21	5.0	0.91	20% opacity	0.10	2.5	0.45	Water spray and/or chemical dust suppressant as necessary	50%	ARM 17.8.308

Emission Factor = $(k)(s/12)^a(W/3)^b(365-P)/365$ lb/vmt   AP-42 Ch 13.2.2 Eqns 1a and 2
for travel on unpaved surfaces at industrial sites
where:
k = particle size multiplier
= 4.9 for PM (>30 $\mu g/m^3$)
= 1.5 for PM_{10}
= 0.15 for $PM_{2.5}$
a = empirical constant
= 0.7 for PM (>30 $\mu g/m^3$)
= 0.9 for PM_{10} and $PM_{2.5}$
b= 0.45 for all PM
s = 4.8 surface material silt content, per AP42-Table 13.2.2-1, mean for sand and gravel processing plant road
W = 57 tons, mean vehicle weight
P= 88 number of days in year with at least 0.01 inches of precipitation per on-site met station - year 2013 data used as it showed the fewest days with sufficient precipitation

Table 13.2.2-4 Emission Factor for 1980's Vehicle Fleet Exhaust, Brake Wear and Tire Wear

PM	0.00047	lb/vmt
PM_{10}	0.00047	lb/vmt
$PM_{2.5}$	0.00036	lb/vmt

Emission Factor Calculations:	Road dust:		Equipment wear:		Total Particulate EF:	
PM Emission factor =	7.39	lb/vmt +	0.00047	lb/vmt =	7.39	lb/vmt
PM_{10} Emission factor =	1.88	lb/vmt +	0.00047	lb/vmt =	1.89	lb/vmt
$PM_{2.5}$ Emission factor =	0.19	lb/vmt +	0.00036	lb/vmt =	0.19	lb/vmt

Uncontrolled Emissions Calculations:

PM= (7.39 lb/VMT)(421.8 VMT/day/years 2 thru 15, inclusive)(365 day/year)(1 ton/2000 lb) =35.6 tpy

PM_{10}= (1.89 lb/VMT)(421.8 VMT/day/years 2 thru 15, inclusive)(365 day/year)(1 ton/2000 lb) =9.1 tpy

$PM_{2.5}$= (0.19 lb/VMT)(421.8 VMT/day/years 2 thru 15, inclusive)(365 day/year)(1 ton/2000 lb) =0.9 tpy

Controlled Emissions Calculations:

PM= (7.39 lb/VMT)(421.8 VMT/day/years 2 thru 15, inclusive)(1 ton/2000 lb)(365 day/year)(1-0.50) =17.8 tpy

PM_{10}= (1.89 lb/VMT)(421.8 VMT/day/years 2 thru 15, inclusive)(1 ton/2000 lb)(365 day/year)(1-0.50) =4.5 tpy

$PM_{2.5}$= (0.19 lb/VMT)(421.8 VMT/day/years 2 thru 15, inclusive)(1 ton/2000 lb)(365 day/year)(1-0.50) =0.5 tpy

Modeling Emissions (Controlled)

Emission Source		Activity ID	Total Round-trip Miles/Day VMT All trucks	PM10		PM2.5		# of Vol Srcs	PM10 per Vol Src	PM2.5 per Vol Src	Notes
				lb/hr	tpy	lb/hr	tpy		tpy	tpy	
Development - Construction of Facilities Phase											
Waste Rock Removal											
Waste Rock: WRS to CTF		DFT	29.01	1.14	4.99	0.11	0.50	Year 1-1.5 x2 used for modeling			a
WRS Pad Reclamation											
North Reclamation stockpile to WRS Pad		DGW	6.83	0.27	1.18	0.03	0.12	53	0.02217	0.00222	
Soils Replaced from Soil Stockpiles to WRS Pad		DHW	5.38	0.21	0.93	0.02	0.09	227	0.00408	0.00041	
Production Phase - Operational											
Ore Hauling											
Portal to Cu-Enriched Ore Stockpile	Year 2	PJO	0.30	0.01	0.05	0.00	0.01	Year 3 used for modeling			b
	Year 3		1.65	0.06	0.28	0.01	0.03	50	0.00569	0.00057	b
Portal to Crusher	Year 3	PKX	8.35	0.33	1.44	0.03	0.14	33	0.16375	0.01640	c
	Year 4		23.72	0.93	4.08	0.09	0.41				c
	Year 5		30.14	1.18	5.18	0.12	0.52				c
	Year 6		29.74	1.17	5.11	0.12	0.51				c
	Year 7		30.46	1.20	5.24	0.12	0.52				c
	Year 8		29.75	1.17	5.12	0.12	0.51				c
	Year 9		30.55	1.20	5.25	0.12	0.53				c
	Year 10		30.24	1.19	5.20	0.12	0.52				c
	Year 11		31.42	1.23	5.40	0.12	0.54				c
	Year 12		30.70	1.21	5.28	0.12	0.53				c
	Year 13		30.21	1.19	5.20	0.12	0.52				c
	Year 14		24.20	0.95	4.16	0.10	0.42				c
	Year 15		8.12	0.32	1.40	0.03	0.14				c
Waste Rock Removal											
Waste Rock: Portal to CTF	Year 3		27.32	1.07	4.70	0.11	0.47	Year 1-1.5 x2 used for modeling			d
	Year 4		11.94	0.47	2.05	0.05	0.21	Year 1-1.5 x2 used for modeling			d
	Year 8		1.76	0.07	0.30	0.01	0.03	Year 1-1.5 x2 used for modeling			d

[a] Source occurs from years 1.5 to 2 and 2 to 3. Annualized VMT for year 1.5 to 2 is greater than annual VMT for year 2 to 3. Annualized VMT for year 1.5 to 2 (doubled for 12 months) will be used to calculate emissions.

[b] Source occurs during years 2 and 3. Year 3 utilizes a greater VMT and will be used to calculate conservatively larger emissions.

[c] Source occurs during years 2 through 15. Year 11 utilizes the greater VMT and will be used to calculate conservatively larger emissions.

[d] Source occurs from years 1.5 to 2, year 3, year 4, and year 8. Annualized VMT for year 1.5 to 2 is greater than annual VMT for years 3 or 4 so annualized VMT for year 1.5 to 2 (doubled for 12 months) will be used to calculate emissions.

F4
Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project
Road Dust Fugitive Emissions

Road Dust, Mine Operating Years 16 and 17, annual average

Non-Criteria Pollutant Emission Limits

opacity	<20%

Process Information

Silt content of road:	4.8	% (sand & gravel plant road)	
Days with ppt>0.01" *	88	days	
	57.5	tons, mean vehicle wt.	See "Road dust design values" worksheet
	218.8	VMT/day/years 16 thru 17, inclusive	See "Road dust design values" worksheet
	2	number of years	
	109.4	VMT/day, annual average	
Dust suppression control efficiency:	50%	% control	
	24	hr/d	
	365	day/year	VMT calculations are based on 365 days per year in "Road dust design values" worksheet
	2000	lb/ton	

				Uncontrolled Emissions				PTE Emissions					
Pollutant	**Emission Factor**	**Units**	**Source**	**Hourly (lb/hr)**	**Daily (lb/day)**	**Annual (tpy)**	**Enforceable Control Limit**	**Hourly (lb/hr)**	**Daily (lb/day)**	**Annual (tpy)**	**Control Method (Practice or Equipment)**	**Control Efficiency (percent)**	**Comments**
PM	7.39	lb/VMT	AP-42 Section 13.2.2, (11/06) Unpaved Roads	33.7	809	147.6	20% opacity	16.85	404.4	73.8	Water spray and/or chemical dust suppressant as necessary	50%	ARM 17.8.308
PM_{10}	1.89	lb/VMT	AP-42 Section 13.2.2, (11/06) Unpaved Roads	8.6	206.2	37.6	20% opacity	4.30	103.1	18.8	Water spray and/or chemical dust suppressant as necessary	50%	ARM 17.8.308
$PM_{2.5}$	0.19	lb/VMT	AP-42 Section 13.2.2, (11/06) Unpaved Roads	0.86	20.7	3.77	20% opacity	0.43	10.3	1.88	Water spray and/or chemical dust suppressant as necessary	50%	ARM 17.8.308

Emission Factor = $(k)(s/12)^a(W/3)^b(365\text{-}P)/365$ lb/vmt AP-42 Ch 13.2.2 Eqns 1a and 2
for travel on unpaved surfaces at industrial sites
where:
k = particle size multiplier
= 4.9 for PM (>30 μg/m^3)
= 1.5 for PM_{10}
= 0.15 for $PM_{2.5}$
a = empirical constant
= 0.7 for PM (>30 μg/m^3)
= 0.9 for PM_{10} and $PM_{2.5}$
b= 0.45 for all PM
s = 4.8 surface material silt content, per AP42-Table 13.2.2-1, mean for sand and gravel processing plant road
W = 57 tons, mean vehicle weight
P= 88 number of days in year with at least 0.01 inches of precipitation per on-site met station - year 2013 data used as it showed the fewest days with sufficient precipitation

Table 13.2.2-4 Emission Factor for 1980's Vehicle Fleet Exhaust, Brake Wear and Tire Wear

PM	0.00047 lb/vmt
PM_{10}	0.00047 lb/vmt
$PM_{2.5}$	0.00036 lb/vmt

Emission Factor Calculations:	Road dust:	Equipment wear:	Total Particulate EF:
PM Emission factor =	7.39 lb/vmt +	0.00047 lb/vmt =	7.39 lb/vmt
PM_{10} Emission factor =	1.88 lb/vmt +	0.00047 lb/vmt =	1.89 lb/vmt
$PM_{2.5}$ Emission factor =	0.19 lb/vmt +	0.00036 lb/vmt =	0.19 lb/vmt

Uncontrolled Emissions Calculations:
PM= (7.39 lb/VMT)(218.8 VMT/day/years 16 thru 17, inclusive)(365 day/year)(1 ton/2000 lb) =147.6 tpy
PM_{10}= (1.89 lb/VMT)(218.8 VMT/day/years 16 thru 17, inclusive)(365 day/year)(1 ton/2000 lb) =37.6 tpy
$PM_{2.5}$= (0.19 lb/VMT)(218.8 VMT/day/years 16 thru 17, inclusive)(365 day/year)(1 ton/2000 lb) =3.8 tpy

Controlled Emissions Calculations:
PM= (7.39 lb/VMT)(218.8 VMT/day/years 16 thru 17, inclusive)(1 ton/2000 lb)(365 day/year)(1-0.50) =73.8 tpy
PM_{10}= (1.89 lb/VMT)(218.8 VMT/day/years 16 thru 17, inclusive)(1 ton/2000 lb)(365 day/year)(1-0.50) =18.8 tpy
$PM_{2.5}$= (0.19 lb/VMT)(218.8 VMT/day/years 16 thru 17, inclusive)(1 ton/2000 lb)(365 day/year)(1-0.50) =1.9 tpy

Modeling Emissions (Controlled)

Only assessing emissions from Development and Production Phases

F5
Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project
Road Dust Fugitive Emissions

Road Dust, Mine Operating Year 18

Non-Criteria Pollutant Emission Limits

opacity	<20%

Process Information

Silt content of road:	4.8	% (sand & gravel plant road)	
Days with ppt>0.01" *	88	days	
	57.5	tons, mean vehicle wt.	See "Road dust design values" worksheet
	17.3	VMT/day	See "Road dust design values" worksheet
Dust suppression control efficiency:	50%	% control	
	24	hr/d	
	365	day/year	VMT calculations are based on 365 days per year in "Road dust design values" worksheet
	2000	lb/ton	

Pollutant	Emission Factor	Units	Source	Uncontrolled Emissions Hourly (lb/hr)	Uncontrolled Emissions Daily (lb/day)	Uncontrolled Emissions Annual (tpy)	Enforceable Control Limit	PTE Emissions Hourly (lb/hr)	PTE Emissions Daily (lb/day)	PTE Emissions Annual (tpy)	Control Method (Practice or Equipment)	Control Efficiency (percent)	Comments
PM	7.39	lb/VMT	AP-42 Section 13.2.2, (11/06) Unpaved Roads	5.3	128	23.4	20% opacity	2.67	64.0	11.7	Water spray and/or chemical dust suppressant as necessary	50%	ARM 17.8.308
PM$_{10}$	1.89	lb/VMT	AP-42 Section 13.2.2, (11/06) Unpaved Roads	1.4	32.6	6.0	20% opacity	0.68	16.3	3.0	Water spray and/or chemical dust suppressant as necessary	50%	ARM 17.8.308
PM$_{2.5}$	0.19	lb/VMT	AP-42 Section 13.2.2, (11/06) Unpaved Roads	0.14	3.3	0.60	20% opacity	0.07	1.6	0.30	Water spray and/or chemical dust suppressant as necessary	50%	ARM 17.8.308

Emission Factor = $(k)(s/12)^a(W/3)^b(365-P)/365$ lb/vmt   AP-42 Ch 13.2.2 Eqns 1a and 2
for travel on unpaved surfaces at industrial sites
where:
k = particle size multiplier
= 4.9 for PM (>30 µg/m^3)
= 1.5 for PM$_{10}$
= 0.15 for PM$_{2.5}$
a = empirical constant
= 0.7 for PM (>30 µg/m^3)
= 0.9 for PM$_{10}$ and PM$_{2.5}$
b= 0.45 for all PM
s = 4.8 surface material silt content, per AP42-Table 13.2.2-1, mean for sand and gravel processing plant road
W = 57 tons, mean vehicle weight
P= 88 number of days in year with at least 0.01 inches of precipitation per on-site met station - year 2013 data used as it showed the fewest days with sufficient precipitation

Table 13.2.2-4 Emission Factor for 1980's Vehicle Fleet Exhaust, Brake Wear and Tire Wear

PM	0.00047	lb/vmt
PM$_{10}$	0.00047	lb/vmt
PM$_{2.5}$	0.00036	lb/vmt

Emission Factor Calculations:

	Road dust:		Equipment wear:		Total Particulate EF:	
PM Emission factor =	7.39	lb/vmt +	0.00047	lb/vmt =	7.39	lb/vmt
PM$_{10}$ Emission factor =	1.88	lb/vmt +	0.00047	lb/vmt =	1.89	lb/vmt
PM$_{2.5}$ Emission factor =	0.19	lb/vmt +	0.00036	lb/vmt =	0.19	lb/vmt

Uncontrolled Emissions Calculations:
PM= (7.39 lb/VMT)(17.3 VMT/day)(365 day/year)(1 ton/2000 lb) =23.4 tpy
PM$_{10}$= (1.89 lb/VMT)(17.3 VMT/day)(365 day/year)(1 ton/2000 lb) =6.0 tpy
PM$_{2.5}$= (0.19 lb/VMT)(17.3 VMT/day)(365 day/year)(1 ton/2000 lb) =0.6 tpy

Controlled Emissions Calculations:
PM= (7.39 lb/VMT)(17.3 VMT/day)(1 ton/2000 lb)(365 day/year)(1-0.50) =11.7 tpy
PM$_{10}$= (1.89 lb/VMT)(17.3 VMT/day)(1 ton/2000 lb)(365 day/year)(1-0.50) =3.0 tpy
PM$_{2.5}$= (0.19 lb/VMT)(17.3 VMT/day)(1 ton/2000 lb)(365 day/year)(1-0.50) =0.3 tpy

Modeling Emissions (Controlled)
Only assessing emissions from Development and Production Phases

F6

Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project

Material to Temporary Construction Stockpile

Material handling and transfer to the Temporary Construction Stockpile. Material will be used to construct embankments around the Portal Pad, Process Water Pond, and Non-Contact Water Pond.
This activity occurs in year 0 - 1.5, and includes material scraping, loading, and dumping.

Process Information

Process Rate:	497,799	tons/ 1.5 yr	
Process Rate:	387,466	tons/yr	*Note (1)*
Operating Time:	365	days/yr	
Operating Time:	12	hr/day	
Process Rate:	88.46	tons/hr	
Number of Transfers:	2	load + dump	per hour -- 12 total/day

(1) Adjusted annual rate: Material from CTF -- Year 1-1.5 is half the process rate of Year 0-1. See Model Emission Calcs at bottom of page

Non-Criteria Pollutant Emission Limits

opacity	<20%

Pollutant	Emission Factor	Units	Source	Uncontrolled Emissions			Enforceable Control Limit	PTE Emissions			Control Method (Practice or Equipment)	Control Efficiency (percent)	Comments
				Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)		Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)			
PM	see below - 11.792 lb/hr and 0.00252 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	1.43	17.15	3.13	20% opacity	1.43	17.15	3.13	None		ARM 17.8.308
PM_{10}	see below - 2.451 lb/hr and 0.00119 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.42	4.99	0.91	20% opacity	0.42	4.99	0.91	None		ARM 17.8.308
$PM_{2.5}$	see below - 1.238 lb/hr and 0.00018 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.14	1.62	0.30	20% opacity	0.14	1.62	0.30	None		ARM 17.8.308

Assume: Topsoil and subsoil stripping is equivalent to bulldozing overburden in Table 11.9-1 per Table 13.2.3-1
Assume: PM = TSP where no other PM data are available
Assume: Each ton of material moved goes through two drops - one into a truck, and one into a pile.

Uncontrolled Emissions Calculations:

PM= (3.13 tons/yr) * [2,000 lb/ton] / (4380 hrs/yr) + (0.00252 lb/ton) * (88 tons/hr) * (2 drops) = 1.43 lb/hr
PM= (1.43 lb/hr) * (12 hr/day) =17.15 lb/day
PM= (0.011 lb PM / ton) * (387466 tons/yr) / [2,000 lb/ton] + (0.00252 lb/ton) * (387,466 tons/yr) * (2 drops)] / [2,000 lb/ton] = 3.13 tpy

PM$_{10}$= (0.91 tons/yr) * [2,000 lb/ton] / (4380 hrs/yr) + (0.00119 lb/ton) * (88 tons/hr) * (2 drops) = 0.42 lb/hr
PM$_{10}$= (0.42 lb/hr) * (12 hr/day) =4.99 lb/day
PM$_{10}$= (0.002 lb PM10 / ton) * (387466 tons/yr) / [2,000 lb/ton] + (0.00119 lb/ton) * (387,466 tons/yr) * (2 drops)] / [2,000 lb/ton] = 0.91 tpy
PM$_{2.5}$= (0.30 tons/yr) * [2,000 lb/ton] / (4380 hrs/yr) + (0.00018 lb/ton) * (88 tons/hr) * (2 drops) = 0.14 lb/hr
PM$_{2.5}$= (0.14 lb/hr) * (12 hr/day) =1.62 lb/day
PM$_{2.5}$= (0.001 lb PM2.5 / ton) * (387466 tons/yr) / [2,000 lb/ton] + (0.00018 lb/ton) * (387,466 tons/yr) * (2 drops)] / [2,000 lb/ton] = 0.30 tpy

PM Emission Factor Calculations:

EF$_{PM/PM10/PM2.5}$ = EF for topsoil removal (bulldozing of overburden, Table 11.9-1) + 2* EF for truck load and dump of material (Section 13.2.4)

silt %, s = 6.9 (Table 11.9-3, bulldozing overburden) - this value was used instead of the road silt value for a more conservative estimate
Moisture %, M = 3.4 (Table 13.2.4-1, Western surface coal mining exposed ground mean moisture content)

Emission factor calculations for topsoil removal:

Table 11.9-1 provides equations to calculate EF in terms of lb/hr for TSP and PM$_{15}$, with a scaling factor for PM$_{10}$ as a function of PM$_{15}$.

Topsoil removal EF$_{PM}$ = EF$_{TSP}$ for topsoil removal by bulldozing (Table 11.9-1 for overburden bulldozing) = 5.7*(s)^1.2 / (M)^1.3 lb/hr
Topsoil removal EF$_{PM}$ = 11.792 lb/hr

Topsoil removal EF$_{PM10}$ = 0.75 * EF$_{PM15}$ (Table 11.9-1 for overburden bulldozing) = 0.75 * 1.0*(s)^1.5 / (M)^1.4 lb/hr
Topsoil removal EF$_{PM10}$ = 2.451 lb/hr

Topsoil removal EF$_{PM2.5}$ = 0.105 * EF$_{TSP}$ (Table 11.9-1 for overburden bulldozing) = 0.105 * 5.7*(s)^1.2 / (M)^1.3 lb/hr
Topsoil removal EF$_{PM2.5}$ = 1.238 lb/hr

Dozer clearing rate
Klanfar et al. 2014
535 m3/hr (Avg.)

Conversions
907.185 kg/ton
12 hrs/day
4380 hrs/yr

Bulk Density
Engineering Toolbox

Soil, High	1600	kg/m3
Soil, Low	1200	kg/m3
Clay, High	2600	kg/m3
Clay, Low	1800	kg/m3
Average	**1800**	**kg/m3**

Topsoil removal EF$_{PM}$ = EF$_{PM\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 11.792 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)
Topsoil removal EF$_{PM}$ = 0.01111 lb PM / ton

Topsoil removal EF$_{PM10}$ = EF$_{PM10\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 2.451 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)
Topsoil removal EF$_{PM10}$ = 0.00231 lb PM10 / ton

Topsoil removal EF$_{PM2.5}$ = EF$_{PM2.5\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 1.238 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)
Topsoil removal EF$_{PM2.5}$ = 0.00117 lb PM2.5 / ton

Emission factor calculations for truck loading and dumping (section 13.2.4)

E = k * (0.0032) * (U/5)^1.3 / (M/2)^1.4 lb/ton Equation (1), section 13.2.4, emission factor for drop operations

k = 0.74 < 30 um PM
0.35 < 10 um PM
0.053 < 2.5 um PM
U = 9.3 mean windspeed, mph (standard windspeed for MT per MDEQ)
M = 3.4 material moisture content, %

Truck load and dump EF$_{PM}$ = 0.00252 lb/ton
Truck load and dump EF$_{PM10}$ = 0.00119 lb/ton
Truck load and dump EF$_{PM2.5}$ = 0.00018 lb/ton

Modeling Emissions

To Pile	Material Origin	Origin Amount[a] (Tons/Year)	Origin Amount (Tons/Hr)	Dozing Area	Topsoil removal (PM10)			Topsoil removal (PM2.5)			Truck Load and Dump (PM10)			Truck Load and Dump (PM2.5)		
					Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)
Temp Construction	From WRS	60000	13.70	WRS	0.032	0.38	0.069	0.016	0.19	0.035	0.0327	0.39	0.0716	0.005	0.06	0.0108
Temp Construction	From CTF	106800	24.38	CTF	0.056	0.68	0.12	0.028	0.34	0.062	0.0582	0.70	0.1275	0.009	0.11	0.0193
Temp Construction	From CTF	220666	50.38	CTF	0.116	1.40	0.25	0.059	0.71	0.129	0.12	1.44	0.2634	0.018	0.22	0.0399
Temp Cons. (Year 1-1.5)[b]	From CTF	110333	25.19	--	0.058	0.70	0.13	0.029	0.35	0.064	0.06	0.72	0.1317	0.009	0.11	0.0199

[a] Assumes embankment construction material is 50% in-situ and 50% hauled from other location.

[b] Year 1-1.5 is half the process rate of Year 0-1. Year 0-1 will be used to calculate annual modeling emissions.

[c] Assumes 2 transfers per hour

Emissions Per Model Activity

Material Transfers	PM10	PM25		Activity ID
WRS to Truck	0.0164	0.00248	lb/hr	F6_WRS_T
CTF to Truck	0.0893	0.0135	lb/hr	F6_CTF_T
Truck to TCS	0.1056	0.0160	lb/hr	F6_T_TEMP

Dozer	Transfer
CTF	F6_CTF_T
CTF	F6_WRS_T
WRS	F6_T_TEMP

F7
Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project
Temporary construction stockpile (Table 3-13, 3.4.1)

Operations

365	days/year
27	disturbances/day (max number of truck trips, year 0 to 1)
36	m^2, disturbance area
0.01	acre, disturbance area
20	ft, max pile height
unknown	ft, length
unknown	ft, width
50%	dust control efficiency by water spray as needed

Conversions

43,560	ft^2 / acre
0.3048	m / ft
453.593	g / lb
2000	lb / ton

Data Sets Used to Estimate Emissions

Meteorological data was collected near the proposed minesite from mid-2012 through 4th quarter 2017.
Year 2013 maximum 1-hour average windspeed recorded per day was used for these calculations because the highest hourly windspeed was recorded that year (Table 1 below).
Year 2016 maximum 1-hour average windspeed recorded per day was used for these calculations because it is the most recent complete year of data available for the site (Table 2 below).
Table 3 below compares the daily erosion potential (P) between the 2013 and 2016 calculated erosion potential and lists the highest of the two values as an estimate of wind erosion for that day.

Assumptions:

Assumes flat pile, such that the height to base ratio is less than 0.2:
height to base (shortest length) ratio:

Fastest mile of wind, u^+_{10} = 1.35 * annual maximum 1-hour average wind speed (assumption based on industry convention and a conservative approach - see Wind Conv. (2) worksheet)
Friction velocity, u* = 0.053 * u^+_{10} (Eqn. 4 from AP-42 Ch. 13.2.5)

Threshold friction velocity, u_t* = 1.02 m/s excess reclamation storage (assume surface simliar to overburden from Table 13.2.5-2)

N = 80 number of disturbances over the 3 day(s) that showed emissions during one year
36 m^2/disturbance
A = 2,866 m^2/year

Emissions Potential Calculations:

P = [58 (u* - u_t*)^2 + 25 (u* - u_t*)] Eq. 3 from AP-42 Ch. 13.2.5-5
Where:
P = erosion potential, g/m^2/disturbance event - P is calculated for each calendar day (as P_daily) in year 2013 (Table 1) and year 2016 (Table 2). Table 3 lists the largest P_daily calculated for that calendar day between Tables 1 and 2.
u* = friction velocity, m/s - maximum daily 1-hour average wind speeds for year 2013 and year 2016 were used to determine u* for each day of the year according to assumptions listed above
u_t* = 1.02 threshold friction velocity for pile, m/s (overburden, Table 13.2.5-2)

$$P\_annual\ [g / (m^2*year)] = \sum_{n = day\ 1}^{day\ 365} P\_daily\ [g / (m^2*event)] * 27\ events/day = 230.27\ g / (m^2*year)$$
(from the bottom of Table 3 below)

Emissions Calculations:

ER = P_annual * A * c * k
Where:
ER = emission rate for each pollutant, ton/yr
P_annual = 230.27 g / (m^2*year) - emission potential for a conservatively worst case year (see above)
0.508 lb / (m^2*year)
2.54E-04 ton / (m^2*year)
A = 2,866 m^2 - area disturbed during days with above-threshold wind events for the year
c = 50% control efficiency (assumed)
k = 1.0 PM particle size multiplier, pg. 13.2.5-3: PM = 1.0, PM10 = 0.5, PM2.5 = 0.075
0.5 PM10
0.075 PM2.5

Results:

TSP, tpy	**0.364**
PM10, tpy	**0.182**
PM2.5, tpy	**0.027**

F7 **Wind**
Temp Const Pile

F8

Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project

Embankment Construction - Material Handling Emissions

Material handling and transfer to construct embankments around the Portal Pad, Process Water Pond, and Non-Contact Water Pond as part of mine development
This activity occurs in year 0 - 1.5, and includes material scraping, loading, and dumping.

Process Information

Process Rate:	497,799	tons/ 1.5 yr	
Process Rate:	387,466	tons/yr	*Note (1)*
Operating Time:	365	days/yr	
Operating Time:	12	hr/day	
Process Rate:	88.46	tons/hr	
Number of Transfers:	2	load + dump	

(1) Adjusted annual rate: Material from CTF -- Year 1-1.5 is half the process rate of Year 0-1. See Model Emission Calcs at bottom of page

Non-Criteria Pollutant Emission Limits

opacity	<20%

Pollutant	Emission Factor	Units	Source	Uncontrolled Emissions			Enforceable Control Limit	PTE Emissions			Control Method (Practice or Equipment)	Control Efficiency (percent)	Comments
				Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)		Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)			
PM	see below - 11.792 lb/hr and 0.00252 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	1.43	17.15	3.13	20% opacity	1.43	17.15	3.13	None		ARM 17.8.308
PM$_{10}$	see below - 2.451 lb/hr and 0.00119 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.42	4.99	0.91	20% opacity	0.42	4.99	0.91	None		ARM 17.8.308
PM$_{2.5}$	see below - 1.238 lb/hr and 0.00018 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.14	1.62	0.30	20% opacity	0.14	1.62	0.30	None		ARM 17.8.308

Assume: Topsoil and subsoil stripping is equivalent to bulldozing overburden in Table 11.9-1 per Table 13.2.3-1
Assume: PM = TSP where no other PM data are available
Assume: Each ton of material moved goes through two drops - one into a truck, and one into a pile.

Uncontrolled Emissions Calculations:

PM= (3.13 tons/yr) * [2,000 lb/ton] / (4380 hrs/yr) + (0.00252 lb/ton) * (88 tons/hr) * (2 drops) = 1.43 lb/hr
PM= (1.43 lb/hr) * (12 hr/day) =17.15 lb/day
PM= (0.011 lb PM / ton) * (387466 tons/yr) / [2,000 lb/ton] + (0.00252 lb/ton) * (387,466 tons/yr) * (2 drops)] / [2,000 lb/ton] = 3.13 tpy
PM$_{10}$= (0.91 tons/yr) * [2,000 lb/ton] / (4380 hrs/yr) + (0.00119 lb/ton) * (88 tons/hr) * (2 drops) = 0.42 lb/hr
PM$_{10}$= (0.42 lb/hr) * (12 hr/day) =4.99 lb/day
PM$_{10}$= (0.002 lb PM10 / ton) * (387466 tons/yr) / [2,000 lb/ton] + (0.00119 lb/ton) * (387,466 tons/yr) * (2 drops)] / [2,000 lb/ton] = 0.91 tpy

$PM_{2.5}$= (0.30 tons/yr) * [2,000 lb/ton] / (4380 hrs/yr) + (0.00018 lb/ton) * (88 tons/hr) * (2 drops) = 0.14 lb/hr
$PM_{2.5}$= (0.14 lb/hr) * (12 hr/day) =1.62 lb/day
$PM_{2.5}$= (0.001 lb PM2.5 / ton) * (387466 tons/yr) / [2,000 lb/ton] + (0.00018 lb/ton) * (387,466 tons/yr) * (2 drops)] / [2,000 lb/ton] = 0.30 tpy

PM Emission Factor Calculations:

$EF_{PM/PM10/PM2.5}$ = EF for topsoil removal (bulldozing of overburden, Table 11.9-1) + 2* EF for truck load and dump of material (Section 13.2.4)

silt %, s = 6.9 (Table 11.9-3, bulldozing overburden) - this value was used instead of the road silt value for a more conservative estimate
Moisture %, M = 3.4 (Table 13.2.4-1, Western surface coal mining exposed ground mean moisture content)

Emission factor calculations for topsoil removal:

Table 11.9-1 provides equations to calculate EF in terms of lb/hr for TSP and PM_{15}, with a scaling factor for PM_{10} as a function of PM_{15}.

Topsoil removal EF_{PM} = EF_{TSP} for topsoil removal by bulldozing (Table 11.9-1 for overburden bulldozing) = 5.7*(s)^1.2 / (M)^1.3 lb/hr
Topsoil removal EF_{PM} = 11.792 lb/hr

Topsoil removal EF_{PM10} = 0.75 * EF_{PM15} (Table 11.9-1 for overburden bulldozing) = 0.75 * 1.0*(s)^1.5 / (M)^1.4 lb/hr
Topsoil removal EF_{PM10} = 2.451 lb/hr

Topsoil removal $EF_{PM2.5}$ = 0.105 * EF_{TSP} (Table 11.9-1 for overburden bulldozing) = 0.105 * 5.7*(s)^1.2 / (M)^1.3 lb/hr
Topsoil removal $EF_{PM2.5}$ = 1.238 lb/hr

Dozer clearing rate
Klanfar et al. 2014
535 m3/hr (Avg.)

Conversions
907.185 kg/ton
12 hrs/day
4380 hrs/yr

Bulk Density		
Engineering Toolbox		
Soil, High	1600	kg/m3
Soil, Low	1200	kg/m3
Clay, High	2600	kg/m3
Clay, Low	1800	kg/m3
Average	**1800**	**kg/m3**

Topsoil removal EF_{PM} = $EF_{PM\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 11.792 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)
Topsoil removal EF_{PM} = 0.01111 lb PM / ton

Topsoil removal EF_{PM10} = $EF_{PM10\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 2.451 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)
Topsoil removal EF_{PM10} = 0.00231 lb PM10 / ton

Topsoil removal $EF_{PM2.5}$ = $EF_{PM2.5\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 1.238 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)
Topsoil removal $EF_{PM2.5}$ = 0.00117 lb PM2.5 / ton

Emission factor calculations for truck loading and dumping (section 13.2.4)

E = k * (0.0032) * (U/5)^1.3 / (M/2)^1.4 lb/ton Equation (1), section 13.2.4, emission factor for drop operations

k = 0.74 < 30 um PM
0.35 < 10 um PM
0.053 < 2.5 um PM
U = 9.3 mean windspeed, mph (standard windspeed for MT per MDEQ)
M = 3.4 material moisture content, %

Truck load and dump EF_{PM} = 0.00252 lb/ton
Truck load and dump EF_{PM10} = 0.00119 lb/ton
Truck load and dump $EF_{PM2.5}$ = 0.00018 lb/ton

Modeling Emissions

Embankment	Material From	Origin Amount[a] (Tons/Year)	Origin Amount (Tons/Hr)	Dozing Area	Topsoil removal (PM10)			Topsoil removal (PM2.5)			Truck Load and Dump (PM10)			Truck Load and Dump (PM2.5)		
					Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)
Portal Pad	In-Situ and Temp Construction Pile	60000	13.70	Portal Pad	0.032	0.38	0.069	0.016	0.19	0.035	0.033	0.39	0.0716	0.005	0.06	0.0108
PWP		106800	24.38	PWP	0.056	0.68	0.123	0.028	0.34	0.062	0.058	0.70	0.1275	0.009	0.11	0.0193
NCWR (Year 0-1)		220666	50.38	NCWR	0.116	1.40	0.255	0.059	0.71	0.129	0.120	1.44	0.2634	0.018	0.22	0.0399
NCWR (Year 1-1.5)[b]		110333	25.19	--	0.058	0.70	0.13	0.029	0.35	0.06	0.060	0.72	0.1317	0.009	0.11	0.0199

[a] Assumes embankment construction material is 50% in-situ and 50% hauled from other location.

[b] Year 1-1.5 is half the process rate of Year 0-1. Year 0-1 will be used to calculate annual modeling emissions.

[c] Assumes 2 loads and dumps per hours equating to 24 per day

Material Transfers *Conservative assumption that all material moves through trucks from Temp Const pile - including in-situ material*

	PM10	PM25		**Activity ID**
Truck to PP	0.0164	0.0025	lb/hr	**F8_T_PP**
Truck to PWP	0.0291	0.0044	lb/hr	**F8_T_PWP**
Truck to NCWR	0.0601	0.0091	lb/hr	**F8_T_NCWR**
TCS to truck	0.1056	0.0160	lb/hr	**F8_TEMP_T**

Dozer
Portal Pad
PWP
NCWR

Transfer
F8_T_NCWR
F8_T_PP
F8_T_PWP
F8_TEMP_T

F9

Air Emissions Calculations

Tintina Montana Inc. Black Butte Copper Project

NWCR Embankment Material Return to CTF Area

Material handling and transfer to construct embankments around the Portal Pad, Process Water Pond, and Non-Contact Water Pond as part of mine development
This activity occurs in years 16-18, and includes material scraping, loading, and dumping.

Process Information

Process Rate:	220,666	tons/yr-year 16, maximum annual rate
Operating Time:	365	days/yr
Operating Time:	12	hr/day
Process Rate:	50.38	tons/hr
Number of Transfers:	2	load + dump

Non-Criteria Pollutant Emission Limits

opacity	<20%

Pollutant	Emission Factor	Units	Source	Uncontrolled Emissions Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Enforceable Control Limit	PTE Emissions Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Control Method (Practice or Equipment)	Control Efficiency (percent)	Comments
PM	see below - 11.792 lb/hr and 0.00252 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.81	9.77	1.78	20% opacity	0.81	9.77	1.78	None		ARM 17.8.308
PM_{10}	see below - 2.451 lb/hr and 0.00119 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.24	2.84	0.52	20% opacity	0.24	2.84	0.52	None		ARM 17.8.308

PM$_{2.5}$	see below - 1.238 lb/hr and 0.00018 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.08	0.92	0.17	20% opacity	0.08	0.92	0.17	None		ARM 17.8.308

Assume: Material working is equivalent to bulldozing overburden in Table 11.9-1 per Table 13.2.3-1
Assume: PM = TSP where no other PM data are available
Assume: Each ton of material moved goes through two drops - one into a truck, and one into a pile.

Uncontrolled Emissions Calculations:

PM= (1.78 tons/yr-year 16, maximum annual rate) * [2,000 lb/ton] / (4380 hrs/yr) + (0.00252 lb/ton) * (50 tons/hr) * (2 drops) = 0.81 lb/hr
PM= (0.81 lb/hr) * (12 hr/day) =9.77 lb/day
PM= (0.011 lb PM / ton) * (220666 tons/yr-year 16, maximum annual rate) / [2,000 lb/ton] + (0.00252 lb/ton) * (220,666 tons/yr-year 16, maximum annual rate) * (2 drops)] / [2,000 lb/ton] = 1.78 tpy
PM$_{10}$= (0.52 tons/yr-year 16, maximum annual rate) * [2,000 lb/ton] / (4380 hrs/yr) + (0.00000) * (50 tons/hr) * (2 drops) = 0.24 lb/hr
PM$_{10}$= (0.24 lb/hr) * (12 hr/day) =2.84 lb/day
PM$_{10}$= (0.002 lb PM10 / ton) * (220666 tons/yr-year 16, maximum annual rate) / [2,000 lb/ton] + (0.00000) * (220,666 tons/yr-year 16, maximum annual rate) * (2 drops)] / [2,000 lb/ton] = 0.52 tpy
PM$_{2.5}$= (0.17 tons/yr-year 16, maximum annual rate) * [2,000 lb/ton] / (4380 hrs/yr) + (0.00000) * (50 tons/hr) * (2 drops) = 0.08 lb/hr
PM$_{2.5}$= (0.08 lb/hr) * (12 hr/day) =0.92 lb/day
PM$_{2.5}$= (0.001 lb PM2.5 / ton) * (220666 tons/yr-year 16, maximum annual rate) / [2,000 lb/ton] + (0.00000) * (220,666 tons/yr-year 16, maximum annual rate) * (2 drops)] / [2,000 lb/ton] = 0.17 tpy

PM Emission Factor Calculations:

EF$_{PM/PM10/PM2.5}$ = EF for topsoil removal (bulldozing of overburden, Table 11.9-1) + 2* EF for truck load and dump of material (Section 13.2.4)

silt %, s = 6.9 (Table 11.9-3, bulldozing overburden) - this value was used instead of the road silt value for a more conservative estimate
Moisture %, M = 3.4 (Table 13.2.4-1, Western surface coal mining exposed ground mean moisture content)

Emission factor calculations for topsoil removal:

Table 11.9-1 provides equations to calculate EF in terms of lb/hr for TSP and PM$_{15}$, with a scaling factor for PM$_{10}$ as a function of PM$_{15}$.

Topsoil removal EF$_{PM}$ = EF$_{TSP}$ for topsoil removal by bulldozing (Table 11.9-1 for overburden bulldozing) = 5.7*(s)^1.2 / (M)^1.3 lb/hr
Topsoil removal EF$_{PM}$ = 11.792 lb/hr

Topsoil removal EF$_{PM10}$ = 0.75 * EF$_{PM15}$ (Table 11.9-1 for overburden bulldozing) = 0.75 * 1.0*(s)^1.5 / (M)^1.4
Topsoil removal EF$_{PM10}$ = 2.451 lb/hr

Topsoil removal EF$_{PM2.5}$ = 0.105 * EF$_{TSP}$ (Table 11.9-1 for overburden bulldozing) = 0.105 * 5.7*(s)^1.2 / (M)^1.3
Topsoil removal EF$_{PM2.5}$ = 1.238 lb/hr

Dozer clearing rate
Klanfar et al. 2014
535 m3/hr (Avg.)

Conversions
907.185 kg/ton
12 hrs/day
4380 hrs/yr

Bulk Density
Engineering Toolbox

Soil, High	1600	kg/m3
Soil, Low	1200	kg/m3
Clay, High	2600	kg/m3
Clay, Low	1800	kg/m3
Average	**1800**	**kg/m3**

Topsoil removal EF_{PM} = $EF_{PM\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 11.792 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)

Topsoil removal EF_{PM} = 0.01111 lb PM / ton

Topsoil removal EF_{PM10} = $EF_{PM10\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 2.451 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)

Topsoil removal EF_{PM10} = 0.00231 lb PM10 / ton

Topsoil removal $EF_{PM2.5}$ = $EF_{PM2.5\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 1.238 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)

Topsoil removal $EF_{PM2.5}$ = 0.00117 lb PM2.5 / ton

Emission factor calculations for truck loading and dumping (section 13.2.4)

E = k * (0.0032) * (U/5)^1.3 / (M/2)^1.4 lb/ton   Equation (1), section 13.2.4, emission factor for drop operations

k =	0.74	< 30 um PM
	0.35	< 10 um PM
	0.053	< 2.5 um PM
U =	9.3	mean windspeed, mph (standard windspeed for MT per MDEQ)
M =	3.4	material moisture content, %

Truck load and dump EF_{PM} = 0.00252 lb/ton

Truck load and dump EF_{PM10} = 0.00119 lb/ton

Truck load and dump $EF_{PM2.5}$ = 0.00018 lb/ton

F10

Air Emissions Calculations

Tintina Montana Inc. Black Butte Copper Project

Material transfer from CTF to the S reclamation stockpile

Excess material from the cement tailings facility (CTF) transferred to the south reclamation stockpile

This activity occurs in year 0 - 1.5.

Process Information

Process Rate:	185,024	tons/yr
Operating Time:	365	days/yr
Operating Time:	12	hr/day
Process Rate:	42.24	tons/hr
Number of Transfers:	2	load + dump

Non-Criteria Pollutant Emission Limits

opacity	<20%

				Uncontrolled Emissions				PTE Emissions					
Pollutant	**Emission Factor**	**Units**	**Source**	**Hourly (lb/hr)**	**Daily (lb/day)**	**Annual (tpy)**	**Enforceable Control Limit**	**Hourly (lb/hr)**	**Daily (lb/day)**	**Annual (tpy)**	**Control Method (Practice or Equipment)**	**Control Efficiency (percent)**	**Comments**
PM	see below - 11.792 lb/hr and 0.00252 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.68	8.19	1.49	20% opacity	0.68	8.19	1.49	None		ARM 17.8.308
PM_{10}	see below - 2.451 lb/hr and 0.00119 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.20	2.38	0.43	20% opacity	0.20	2.38	0.43	None		ARM 17.8.308
$PM_{2.5}$	see below - 1.238 lb/hr and 0.00018 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.06	0.77	0.14	20% opacity	0.06	0.77	0.14	None		ARM 17.8.308

Assume: Topsoil and subsoil stripping is equivalent to bulldozing overburden in Table 11.9-1 per Table 13.2.3-1

Assume: PM = TSP where no other PM data are available

Assume: Each ton of material moved goes through two drops - one into a truck, and one into a pile.

Uncontrolled Emissions Calculations:

PM= (1.49 tons/yr) * [2,000 lb/ton] / (4380 hrs/yr) + (0.00252 lb/ton) * (42 tons/hr) * (2 drops) = 0.68 lb/hr
PM= (0.68 lb/hr) * (12 hr/day) =8.19 lb/day
PM= (0.011 lb PM / ton) * (185024 tons/yr) / [2,000 lb/ton] + (0.00252 lb/ton) * (185,024 tons/yr) * (2 drops)] / [2,000 lb/ton] = 1.49 tpy
PM_{10}= #REF!
PM_{10}= (0.20 lb/hr) * (12 hr/day) =2.38 lb/day
PM_{10}= #REF!
$PM_{2.5}$= #REF!
$PM_{2.5}$= (0.06 lb/hr) * (12 hr/day) =0.77 lb/day
$PM_{2.5}$= #REF!

PM Emission Factor Calculations:

$EF_{PM/PM10/PM2.5}$ = [EF for topsoil removal (bulldozing of overburden, Table 11.9-1) lb/hr * hr/year operating schedule] + [2* EF for truck load and dump of material (Section 13.2.4) lb/ton * ton/year process rate] silt %, s = 6.9 (Table 11.9-3, bulldozing overburden) - this value was used instead of the road silt value for a more conservative estimate

Moisture %, M = 3.4 (Table 13.2.4-1, Western surface coal mining exposed ground mean moisture content)

Emission factor calculations for topsoil removal:

Table 11.9-1 provides equations to calculate EF in terms of lb/hr for TSP and PM_{15}, with a scaling factor for PM_{10} as a function of PM_{15}.

Topsoil removal EF_{PM} = EF_{TSP} for topsoil removal by bulldozing (Table 11.9-1 for overburden bulldozing) = 5.7*(s)^1.2 / (M)^1.3 lb/hr

Topsoil removal EF_{PM} = 11.792 lb/hr

Topsoil removal EF_{PM10} = 0.75 * EF_{PM15} (Table 11.9-1 for overburden bulldozing) = 0.75 * 1.0*(s)^1.5 / (M)^1.4 lb/hr

Topsoil removal EF_{PM10} = 2.451 lb/hr

Topsoil removal $EF_{PM2.5}$ = 0.105 * EF_{TSP} (Table 11.9-1 for overburden bulldozing) = 0.105 * 5.7*(s)^1.2 / (M)^1.3 lb/hr

Topsoil removal $EF_{PM2.5}$ = 1.238 lb/hr

Dozer clearing rate

Klanfar et al. 2014

535 m3/hr (Avg.)

Conversions

907.185 kg/ton

12 hrs/day

4380 hrs/yr

Bulk Density

Engineering Toolbox

Soil, High	1600	kg/m3
Soil, Low	1200	kg/m3
Clay, High	2600	kg/m3
Clay, Low	1800	kg/m3
Average	**1800**	**kg/m3**

Topsoil removal EF_{PM} = $EF_{PM\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 11.792 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)

Topsoil removal EF_{PM} = 0.01111 lb PM / ton

Topsoil removal EF_{PM10} = $EF_{PM10\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 2.451 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)

Topsoil removal EF_{PM10} = 0.00231 lb PM10 / ton

Topsoil removal $EF_{PM2.5}$ = $EF_{PM2.5\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 1.238 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)

Topsoil removal $EF_{PM2.5}$ = 0.00117 lb PM2.5 / ton

Emission factor calculations for truck loading and dumping (section 13.2.4)

E = k * (0.0032) * (U/5)^1.3 / (M/2)^1.4 lb/ton Equation (1), section 13.2.4, emission factor for drop operations

k = 0.74 < 30 um PM
0.35 < 10 um PM
0.053 < 2.5 um PM

U = 9.3 mean windspeed, mph (standard windspeed for MT per MDEQ)

M = 3.4 material moisture content, %

Truck load and dump EF_{PM} = 0.00252 lb/ton

Truck load and dump EF_{PM10} = 0.00119 lb/ton

Truck load and dump $EF_{PM2.5}$ = 0.00018 lb/ton

Modeling Emissions

To Pile	Material Origin	Total Amount (Tons/Yr)	Origin Amount (Tons/Hr)	Dozing Area	Topsoil removal (PM10)			Topsoil removal (PM2.5)			Truck Load and Dump (PM10)			Truck Load and Dump (PM2.5)		
					Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)
South Reclaim	CTF	185,024	42.24	CTF	0.098	1.17	0.21	0.049	0.59	0.11	0.10	1.21	0.2209	0.015	0.18	0.0334

Material Transfers

	PM10	PM25		Activity ID
CTF to Truck	0.05	0.0076	lb/hr	**F10_CTF_T**
Truck to South Reclaim	0.05	0.0076	lb/hr	**F10_T_SS**

Transfers	**Dozer**
F10_CTF_T	**CTF**
F10_T_SS	

F11
Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project

Excess reclamation stockpile (South) (Table 3-13, 3.4.1)
Material from CTF excavation; trapezoid shape, 30 ft max height (3.6.10).

Operations

365	days/year
13	disturbances/day (year 0 to 1)
36	m^2, disturbance area
0.01	acre, disturbance area
30	ft, max pile height
623	ft, length
492	ft, width
50%	dust control efficiency by water spray as needed

Conversions

43,560	ft^2 / acre
0.3048	m / ft
453.593	g / lb
2000	lb / ton

Data Sets Used to Estimate Emissions

Meteorological data was collected near the proposed minesite from mid-2012 through 4th quarter 2017.
Year 2013 maximum 1-hour average windspeed recorded per day was used for these calculations because the highest hourly windspeed was recorded that year (Table 1 below).
Year 2016 maximum 1-hour average windspeed recorded per day was used for these calculations because it is the most recent complete year of data available for the site (Table 2 below).
Table 3 below compares the daily erosion potential (P) between the 2013 and 2016 calculated erosion potential and lists the highest of the two values as an estimate of wind erosion for that day.

Assumptions:

Assumes flat pile, such that the height to base ratio is less than 0.2:
height to base (shortest length) ratio: 0.06

Fastest mile of wind, u^+_{10} = 1.35 * annual maximum 1-hour average wind speed (assumption based on industry convention and a conservative approach - see Wind Conv. (2) worksheet)
Friction velocity, u* = 0.053 * u^+_{10} (Eqn. 4 from AP-42 Ch. 13.2.5)

Threshold friction velocity, u_t* = 1.02 m/s excess reclamation storage (assume surface simliar to overburden from Table 13.2.5-2)

N = 38 number of disturbances over the 3 day(s) that showed emissions during one year
36 m^2/disturbance
A = 1,369 m^2/year

Emissions Potential Calculations:

$P = [58 (u^* - u_t^*)^2 + 25 (u^* - u_t^*)]$ Eq. 3 from AP-42 Ch. 13.2.5-5
Where:
P = erosion potential, g/m^2/disturbance event - P is calculated for each calendar day (as P_daily) in year 2013 (Table 1) and year 2016 (Table 2). Table 3 lists the largest P_daily calculated for that calendar day between Tables 1 and 2.
u* = friction velocity, m/s - maximum daily 1-hour average wind speeds for year 2013 and year 2016 were used to determine u* for each day of the year according to assumptions listed above
u_t* = 1.02 threshold friction velocity for pile, m/s (overburden, Table 13.2.5-2)

$$\text{P\_annual [g / (m^2*year)]} = \sum_{n = \text{day } 1}^{\text{day } 365} \text{P\_daily [g / (m^2*event)]} * 13 \text{ events/day} = 109.96 \text{ g / (m^2*year) (from the bottom of Table 3 below)}$$

Emissions Calculations:

ER = P_annual * A * c * k
Where:
ER = emission rate for each pollutant, ton/yr
P_annual = 109.96 g / (m^2*year) - emission potential for a conservatively worst case year (see above)
0.242 lb / (m^2*year)
1.21E-04 ton / (m^2*year)
A = 1,369 m^2 - area disturbed during days with above-threshold wind events for the year
c = 50% control efficiency (assumed)
k = 1.0 PM particle size multiplier, pg. 13.2.5-3: PM = 1.0, PM10 = 0.5, PM2.5 = 0.075
0.5 PM10
0.075 PM2.5

Results:

TSP, tpy	**0.0829**
PM10, tpy	**0.0415**
PM2.5, tpy	**0.0062**

F11 **Wind**

F12

Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project

Material transfer from the S reclamation stockpile to the CTF

Material transferred from the south reclamation stockpile to the cement tailings facility (CTF) for reclamation

This activity occurs in years 16 - 17.

Process Information

Process Rate:	185,024	tons/yr - year 16, maximum annual rate
Operating Time:	365	days/yr
Operating Time:	12	hr/day
Process Rate:	42.24	tons/hr
Number of Transfers:	2	load + dump

Non-Criteria Pollutant Emission Limits

opacity	<20%

Pollutant	Emission Factor	Units	Source	Uncontrolled Emissions Hourly (lb/hr)	Uncontrolled Emissions Daily (lb/day)	Uncontrolled Emissions Annual (tpy)	Enforceable Control Limit	PTE Emissions Hourly (lb/hr)	PTE Emissions Daily (lb/day)	PTE Emissions Annual (tpy)	Control Method (Practice or Equipment)	Control Efficiency (percent)	Comments
PM	see below - 11.792 lb/hr and 0.00252 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.68	8.19	1.49	20% opacity	0.68	8.19	1.49	None		ARM 17.8.308
PM_{10}	see below - 2.451 lb/hr and 0.00119 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.20	2.38	0.43	20% opacity	0.20	2.38	0.43	None		ARM 17.8.308
$PM_{2.5}$	see below - 1.238 lb/hr and 0.00018 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.06	0.77	0.14	20% opacity	0.06	0.77	0.14	None		ARM 17.8.308

Assume: Returning material to the CTF is equivalent to bulldozing overburden in Table 11.9-1 per Table 13.2.3-1

Assume: PM = TSP where no other PM data are available

Assume: Each ton of material moved goes through two drops - one into a truck, and one into a pile.

Uncontrolled Emissions Calculations:

PM= (1.49 tons/yr - year 16, maximum annual rate) * [2,000 lb/ton] / (4380 hrs/yr) + (0.00252 lb/ton) * (42 tons/hr) * (2 drops) = 0.68 lb/hr

PM= (0.68 lb/hr) * (12 hr/day) =8.19 lb/day

PM= (0.011 lb PM / ton) * (185024 tons/yr - year 16, maximum annual rate) / [2,000 lb/ton] + (0.00252 lb/ton) * (185,024 tons/yr - year 16, maximum annual rate) * (2 drops)] / [2,000 lb/ton] = 1.49 t

PM_{10}= (0.43 tons/yr - year 16, maximum annual rate) * [2,000 lb/ton] / (4380 hrs/yr) + (0.00000) * (42 tons/hr) * (2 drops) = 0.20 lb/hr

PM_{10}= (0.20 lb/hr) * (12 hr/day) =2.38 lb/day

PM_{10}= (0.002 lb PM10 / ton) * (185024 tons/yr - year 16, maximum annual rate) / [2,000 lb/ton] + (0.00000) * (185,024 tons/yr - year 16, maximum annual rate) * (2 drops)] / [2,000 lb/ton] = 0.43 tpy

$PM_{2.5}$= (0.14 tons/yr - year 16, maximum annual rate) * [2,000 lb/ton] / (4380 hrs/yr) + (0.00000) * (42 tons/hr) * (2 drops) = 0.06 lb/hr

$PM_{2.5}$= (0.06 lb/hr) * (12 hr/day) =0.77 lb/day

$PM_{2.5}$= (0.001 lb PM2.5 / ton) * (185024 tons/yr - year 16, maximum annual rate) / [2,000 lb/ton] + (0.00000) * (185,024 tons/yr - year 16, maximum annual rate) * (2 drops)] / [2,000 lb/ton] = 0.14 tpy

PM Emission Factor Calculations:

$EF_{PM/PM10/PM2.5}$ = [EF for topsoil removal (bulldozing of overburden, Table 11.9-1) lb/hr * hr/year operating schedule] + [2* EF for truck load and dump of material (Section 13.2.4) lb/ton * ton/year process rate]

silt %, s = 6.9 (Table 11.9-3, bulldozing overburden) - this value was used instead of the road silt value for a more conservative estimate

Moisture %, M = 3.4 (Table 13.2.4-1, Western surface coal mining exposed ground mean moisture content)

Emission factor calculations for topsoil removal:

Table 11.9-1 provides equations to calculate EF in terms of lb/hr for TSP and PM_{15}, with a scaling factor for PM_{10} as a function of PM_{15}.

Topsoil removal EF_{PM} = EF_{TSP} for topsoil removal by bulldozing (Table 11.9-1 for overburden bulldozing) = 5.7*(s)^1.2 / (M)^1.3 lb/hr

Topsoil removal EF_{PM} = 11.792 lb/hr

Topsoil removal EF_{PM10} = 0.75 * EF_{PM15} (Table 11.9-1 for overburden bulldozing) = 0.75 * 1.0*(s)^1.5 / (M)^1.4

Topsoil removal EF_{PM10} = 2.451 lb/hr

Topsoil removal $EF_{PM2.5}$ = 0.105 * EF_{TSP} (Table 11.9-1 for overburden bulldozing) = 0.105 * 5.7*(s)^1.2 / (M)^1.3

Topsoil removal $EF_{PM2.5}$ = 1.238 lb/hr

Dozer clearing rate

Klanfar et al. 2014

535 m3/hr (Avg.)

Conversions

907.185 kg/ton

12 hrs/day

4380 hrs/yr

Bulk Density

Engineering Toolbox

Soil, High	1600	kg/m3
Soil, Low	1200	kg/m3
Clay, High	2600	kg/m3
Clay, Low	1800	kg/m3
Average	**1800**	**kg/m3**

Topsoil removal EF_{PM} = $EF_{PM\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 11.792 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)

Topsoil removal EF_{PM} = 0.01111 lb PM / ton

Topsoil removal EF_{PM10} = $EF_{PM10\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 2.451 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)

Topsoil removal EF_{PM10} = 0.00231 lb PM10 / ton

Topsoil removal $EF_{PM2.5}$ = $EF_{PM2.5\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 1.238 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)

Topsoil removal $EF_{PM2.5}$ = 0.00117 lb PM2.5 / ton

Emission factor calculations for truck loading and dumping (section 13.2.4)

E = k * (0.0032) * (U/5)^1.3 / (M/2)^1.4 lb/ton Equation (1), section 13.2.4, emission factor for drop operations

k = 0.74 < 30 um PM
0.35 < 10 um PM
0.053 < 2.5 um PM
U = 9.3 mean windspeed, mph (standard windspeed for MT per MDEQ)
M = 3.4 material moisture content, %

Truck load and dump EF$_{PM}$ = 0.00252 lb/ton

Truck load and dump EF$_{PM10}$ = 0.00119 lb/ton

Truck load and dump EF$_{PM2.5}$ = 0.00018 lb/ton

F13

Air Emissions Calculations

Tintina Montana Inc. Black Butte Copper Project

Material transfer from CWP and mill pad area to N reclamation stockpile

Excess material from the CWP, Cu-enriched ore stockpile, WRS stockpile, and mill pad, is transferred to the north reclamation stockpile

This activity occurs in year 0 - 1.

Excavated matieral from each area is transferred to North Reclamation Stockpile

Process Information

Process Rate:	263,360	tons/yr
Operating Time:	365	days/yr
Operating Time:	12	hr/day
Process Rate:	60.13	tons/hr
Number of Transfers:	2	load + dump

Non-Criteria Pollutant Emission Limits

opacity	<20%

Pollutant	Emission Factor	Units	Source	Uncontrolled Emissions Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Enforceable Control Limit	PTE Emissions Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Control Method (Practice or Equipment)	Control Efficiency (percent)	Comments
PM	see below - 11.792 lb/hr and 0.00252 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.97	11.66	2.13	20% opacity	0.97	11.66	2.13	None		ARM 17.8.308
PM_{10}	see below - 2.451 lb/hr and 0.00119 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.28	3.39	0.62	20% opacity	0.28	3.39	0.62	None		ARM 17.8.308
$PM_{2.5}$	see below - 1.238 lb/hr and 0.00018 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.09	1.10	0.20	20% opacity	0.09	1.10	0.20	None		ARM 17.8.308

Assume: Removing excess material from pond areas and storage pads is equivalent to bulldozing overburden in Table 11.9-1 per Table 13.2.3-1

Assume: PM = TSP where no other PM data are available

Assume: Each ton of material moved goes through two drops - one into a truck, and one into a pile.

Uncontrolled Emissions Calculations:

PM= (2.13 tons/yr) * [2,000 lb/ton] / (4380 hrs/yr) + (0.00252 lb/ton) * (60 tons/hr) * (2 drops) = 0.97 lb/hr

PM= (0.97 lb/hr) * (12 hr/day) =11.66 lb/day

PM= (0.011 lb PM / ton) * (263360 tons/yr) / [2,000 lb/ton] + (0.00252 lb/ton) * (263,360 tons/yr) * (2 drops)] / [2,000 lb/ton] = 2.13 tpy

PM_{10}= (0.62 tons/yr) * [2,000 lb/ton] / (4380 hrs/yr) + (0.00119 lb/ton) * (60 tons/hr) * (2 drops) = 0.28 lb/hr

PM_{10}= (0.28 lb/hr) * (12 hr/day) =3.39 lb/day

PM_{10}= (0.002 lb PM10 / ton) * (263360 tons/yr) / [2,000 lb/ton] + (0.00119 lb/ton) * (263,360 tons/yr) * (2 drops)] / [2,000 lb/ton] = 0.62 tpy

$PM_{2.5}$= (0.20 tons/yr) * [2,000 lb/ton] / (4380 hrs/yr) + (0.00018 lb/ton) * (60 tons/hr) * (2 drops) = 0.09 lb/hr

$PM_{2.5}$= (0.09 lb/hr) * (12 hr/day) =1.10 lb/day

$PM_{2.5}$= (0.001 lb PM2.5 / ton) * (263360 tons/yr) / [2,000 lb/ton] + (0.00018 lb/ton) * (263,360 tons/yr) * (2 drops)] / [2,000 lb/ton] = 0.20 tpy

PM Emission Factor Calculations:

$EF_{PM/PM10/PM2.5}$ = [EF for topsoil removal (bulldozing of overburden, Table 11.9-1) lb/hr * hr/year operating schedule] + [2* EF for truck load and dump of material (Section 13.2.4) lb/ton * ton/year process rate]

silt %, s = 6.9 (Table 11.9-3, bulldozing overburden) - this value was used instead of the road silt value for a more conservative estimate

Moisture %, M = 3.4 (Table 13.2.4-1, Western surface coal mining exposed ground mean moisture content)

Emission factor calculations for topsoil removal:

Table 11.9-1 provides equations to calculate EF in terms of lb/hr for TSP and PM_{15}, with a scaling factor for PM_{10} as a function of PM_{15}.

Topsoil removal EF_{PM} = EF_{TSP} for topsoil removal by bulldozing (Table 11.9-1 for overburden bulldozing) = 5.7*(s)^1.2 / (M)^1.3 lb/hr

Topsoil removal EF_{PM} = 11.792 lb/hr

Topsoil removal EF_{PM10} = 0.75 * EF_{PM15} (Table 11.9-1 for overburden bulldozing) = 0.75 * 1.0*(s)^1.5 / (M)^1.4 lb/hr

Topsoil removal EF_{PM10} = 2.451 lb/hr

Topsoil removal $EF_{PM2.5}$ = 0.105 * EF_{TSP} (Table 11.9-1 for overburden bulldozing) = 0.105 * 5.7*(s)^1.2 / (M)^1.3 lb/hr

Topsoil removal $EF_{PM2.5}$ = 1.238 lb/hr

Dozer clearing rate

Klanfar et al. 2014

535 m3/hr (Avg.)

Conversions

907.185 kg/ton

12 hrs/day

4380 hrs/yr

Bulk Density

Engineering Toolbox

Soil, High	1600	kg/m3
Soil, Low	1200	kg/m3
Clay, High	2600	kg/m3
Clay, Low	1800	kg/m3
Average	**1800**	**kg/m3**

Topsoil removal EF_{PM} = $EF_{PM\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 11.792 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)

Topsoil removal EF_{PM} = 0.01111 lb PM / ton

Topsoil removal EF_{PM10} = $EF_{PM10\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 2.451 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)

Topsoil removal EF_{PM10} = 0.00231 lb PM10 / ton

Topsoil removal $EF_{PM2.5}$ = $EF_{PM2.5\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 1.238 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)

Topsoil removal $EF_{PM2.5}$ = 0.00117 lb PM2.5 / ton

Emission factor calculations for truck loading and dumping (section 13.2.4)

E = k * (0.0032) * (U/5)^1.3 / (M/2)^1.4 lb/ton Equation (1), section 13.2.4, emission factor for drop operations

k = 0.74 < 30 um PM
0.35 < 10 um PM
0.053 < 2.5 um PM
U = 9.3 mean windspeed, mph (standard windspeed for MT per MDEQ)
M = 3.4 material moisture content, %

Truck load and dump EF_{PM} = 0.00252 lb/ton
Truck load and dump EF_{PM10} = 0.00119 lb/ton
Truck load and dump $EF_{PM2.5}$ = 0.00018 lb/ton

Modeling Emissions

To Pile	Material From	Total Amount (Tons)	Origin Amount (Tons/Hr)	Dozing Area	Topsoil removal (PM10)			Topsoil removal (PM2.5)			Truck Load and Dump (PM10)			Truck Load and Dump (PM2.5)		
					Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)
North Stockpile	CWP	101360	23.14	CWP	0.053	0.64	0.12	0.027	0.32	0.059	5.5E-02	0.66	0.1210	0.008	0.10	0.0183
North Stockpile	Cu-Enriched O	38000	8.68	Cu Pile	0.020	0.24	0.04	0.010	0.12	0.022	2.1E-02	0.25	0.0454	0.003	0.04	0.0069
North Stockpile	WRS Pad	88000	20.09	WRS	0.046	0.56	0.10	0.023	0.28	0.051	4.8E-02	0.58	0.1051	0.007	0.09	0.0159
North Stockpile	Mill Pad	36000	8.22	Mill	0.019	0.23	0.04	0.010	0.12	0.021	2.0E-02	0.24	0.0430	0.003	0.04	0.0065

0.282

Material Transfers

	PM10	PM25		Activity ID
CWP to Truck	0.0276	4.2E-03	lb/hr	F13_CWP_T
Cu to Truck	0.010	1.6E-03	lb/hr	F13_CU_T
WRS to Truck	0.024	3.6E-03	lb/hr	F13_WRS_T
Mill to Truck	9.81E-03	1.49E-03	lb/hr	F13_MILL_T
Truck to North	7.2E-02	1.1E-02	lb/hr	F13_T_NS

Dozer
WRS
Cu
CWP
Mill

Transfer
F13_CU_T
F13_CWP_T
F13_MILL_T
F13_T_NS
F13_WRS_T

F14
Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project

Excess reclamation stockpile (North) (Table 3-13, 3.4.1)

Material from WRS excavation; trapezoid shape, 30 ft max height (3.6.10).

Operations

365	days/year
18	disturbances/day, year 0-1
36	m^2, disturbance area
0.01	acre, disturbance area
30	ft, max pile height
623	ft, length
492	ft, width
50%	dust control efficiency by water spray as needed

Conversions

43,560	ft^2 / acre
0.3048	m / ft
453.593	g / lb
2000	lb / ton

Data Sets Used to Estimate Emissions

Meteorological data was collected near the proposed minesite from mid-2012 through 4th quarter 2017.
Year 2013 maximum 1-hour average windspeed recorded per day was used for these calculations because the highest hourly windspeed was recorded that year (Table 1 below).
Year 2016 maximum 1-hour average windspeed recorded per day was used for these calculations because it is the most recent complete year of data available for the site (Table 2 below).
Table 3 below compares the daily erosion potential (P) between the 2013 and 2016 calculated erosion potential and lists the highest of the two values as an estimate of wind erosion for that day.

Assumptions:

Assumes flat pile, such that the height to base ratio is less than 0.2:
height to base (shortest length) ratio: 0.06

Fastest mile of wind, u^{+}_{10} = 1.35 * annual maximum 1-hour average wind speed (assumption based on industry convention and a conservative approach - see Wind Conv. (2) worksheet)
Friction velocity, u* = 0.053 * u^{+}_{10} (Eqn. 4 from AP-42 Ch. 13.2.5)

Threshold friction velocity, u_t* = 1.02 m/s excess reclamation storage (assume surface simliar to overburden from Table 13.2.5-2)

N = 54 number of disturbances over the 3 day(s) that showed emissions during one year
36 m^2/disturbance
A = 1,948 m^2/year

Emissions Potential Calculations:

$P = [58 (u^* - u_t^*)^2 + 25 (u^* - u_t^*)]$ Eq. 3 from AP-42 Ch. 13.2.5-5
Where:

P = erosion potential, g/m^2/disturbance event - P is calculated for each calendar day (as P_daily) in year 2013 (Table 1) and year 2016 (Table 2). Table 3 lists the largest P_daily calculated for that calendar day between Tables 1 and 2.
u* = friction velocity, m/s - maximum daily 1-hour average wind speeds for year 2013 and year 2016 were used to determine u* for each day of the year according to assumptions listed above
u_t* = 1.02 threshold friction velocity for pile, m/s (overburden, Table 13.2.5-2)

$$\text{P\_annual [g / (m\^{}2*year)]} = \sum_{n = \text{day } 1}^{\text{day } 365} \text{P\_daily [g / (m\^{}2*event)]} * 18 \text{ events/day} = 156.52$$

g / (m^2*year) (from the bottom of Table 3 below)

Emissions Calculations:

ER = P_annual * A * c * k
Where:

ER = emission rate for each pollutant, ton/yr

P_annual =	156.52	g / (m^2*year) - emission potential for a conservatively worst case year (see above)
	0.345	lb / (m^2*year)
	1.73E-04	ton / (m^2*year)
A =	1,948	m^2 - area disturbed during days with above-threshold wind events for the year
c =	50%	control efficiency (assumed)
k =	1.0	PM particle size multiplier, pg. 13.2.5-3: PM = 1.0, PM10 = 0.5, PM2.5 = 0.075
	0.5	PM10
	0.075	PM2.5

Results:

TSP, tpy	**0.1681**
PM10, tpy	**0.0840**
PM2.5, tpy	**0.0126**

F14 **Wind**

F15

Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project

Material transfer from N reclamation stockpile to CWP and mill pad area

Material is transferred from the north reclamation stockpile back to the CWP, Cu-enriched ore stockpile, and mill pad for reclamation

This activity occurs in years 16-18.

Process Information

Process Rate:	101,360	tons/yr - year 18, maximum annual rate
Operating Time:	365	days/yr
Operating Time:	12	hr/day
Process Rate:	23.14	tons/hr
Number of Transfers:	2	load + dump

Non-Criteria Pollutant Emission Limits

opacity	<20%

Pollutant	Emission Factor	Units	Source	Uncontrolled Emissions			Enforceable Control Limit	PTE Emissions			Control Method (Practice or Equipment)	Control Efficiency (percent)	Comments
				Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)		Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)			
PM	see below - 11.792 lb/hr and 0.00252 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.37	4.49	0.82	20% opacity	0.37	4.49	0.82	None		ARM 17.8.308
PM_{10}	see below - 2.451 lb/hr and 0.00119 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.11	1.30	0.24	20% opacity	0.11	1.30	0.24	None		ARM 17.8.308
$PM_{2.5}$	see below - 1.238 lb/hr and 0.00018 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.04	0.42	0.08	20% opacity	0.04	0.42	0.08	None		ARM 17.8.308

Assume: Returning material to pond areas and storage pads is equivalent to bulldozing overburden in Table 11.9-1 per Table 13.2.3-1

Assume: PM = TSP where no other PM data are available

Assume: Each ton of material moved goes through two drops - one into a truck, and one into a pile.

Uncontrolled Emissions Calculations:

PM= (0.82 tons/yr - year 18, maximum annual rate) * [2,000 lb/ton] / (4380 hrs/yr) + (0.00252 lb/ton) * (23 tons/hr) * (2 drops) = 0.37 lb/hr

PM= (0.37 lb/hr) * (12 hr/day) =4.49 lb/day

PM= (0.011 lb PM / ton) * (101360 tons/yr - year 18, maximum annual rate) / [2,000 lb/ton] + (0.00252 lb/ton) * (101,360 tons/yr - year 18, maximum annual rate) * (2 drops)] / [2,000 lb/ton] = 0.82 tpy

PM_{10}= #REF!

PM_{10}= (0.11 lb/hr) * (12 hr/day) =1.30 lb/day

PM_{10}= #REF!

$PM_{2.5}$= #REF!

$PM_{2.5}$= (0.04 lb/hr) * (12 hr/day) =0.42 lb/day

$PM_{2.5}$= #REF!

PM Emission Factor Calculations:

$EF_{PM/PM10/PM2.5}$ = [EF for topsoil removal (bulldozing of overburden, Table 11.9-1) lb/hr * hr/year operating schedule] + [2* EF for truck load and dump of material (Section 13.2.4) lb/ton * ton/year process rate]

silt %, s = 6.9 (Table 11.9-3, bulldozing overburden) - this value was used instead of the road silt value for a more conservative estimate

Moisture %, M = 3.4 (Table 13.2.4-1, Western surface coal mining exposed ground mean moisture content)

Emission factor calculations for topsoil removal:

Table 11.9-1 provides equations to calculate EF in terms of lb/hr for TSP and PM_{15}, with a scaling factor for PM_{10} as a function of PM_{15}.

Topsoil removal EF_{PM} = EF_{TSP} for topsoil removal by bulldozing (Table 11.9-1 for overburden bulldozing) = 5.7*(s)^1.2 / (M)^1.3 lb/hr

Topsoil removal EF_{PM} = 11.792 lb/hr

Topsoil removal EF_{PM10} = 0.75 * EF_{PM15} (Table 11.9-1 for overburden bulldozing) = 0.75 * 1.0*(s)^1.5 / (M)^1.4 lb/hr

Topsoil removal EF_{PM10} = 2.451 lb/hr

Topsoil removal $EF_{PM2.5}$ = 0.105 * EF_{TSP} (Table 11.9-1 for overburden bulldozing) = 0.105 * 5.7*(s)^1.2 / (M)^1.3 lb/hr

Topsoil removal $EF_{PM2.5}$ = 1.238 lb/hr

Dozer clearing rate

Klanfar et al. 2014

535 m3/hr (Avg.)

Conversions

907.185 kg/ton

12 hrs/day

4380 hrs/yr

Bulk Density		
Engineering Toolbox		
Soil, High	1600	kg/m3
Soil, Low	1200	kg/m3
Clay, High	2600	kg/m3
Clay, Low	1800	kg/m3
Average	**1800**	**kg/m3**

Topsoil removal EF_{PM} = $EF_{PM\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 11.792 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)

Topsoil removal EF_{PM} = 0.01111 lb PM / ton

Topsoil removal EF_{PM10} = $EF_{PM10\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 2.451 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)

Topsoil removal EF_{PM10} = 0.00231 lb PM10 / ton

Topsoil removal $EF_{PM2.5}$ = $EF_{PM2.5\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 1.238 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)

Topsoil removal $EF_{PM2.5}$ = 0.00117 lb PM2.5 / ton

Emission factor calculations for truck loading and dumping (section 13.2.4)

E = k * (0.0032) * (U/5)^1.3 / (M/2)^1.4 lb/ton Equation (1), section 13.2.4, emission factor for drop operations

k = 0.74 < 30 um PM

0.35 < 10 um PM

0.053 < 2.5 um PM

U = 9.3 mean windspeed, mph (standard windspeed for MT per MDEQ)

M = 3.4 material moisture content, %

Truck load and dump EF_{PM} = 0.00252 lb/ton

Truck load and dump EF_{PM10} = 0.00119 lb/ton

Truck load and dump $EF_{PM2.5}$ = 0.00018 lb/ton

F16

Air Emissions Calculations

Tintina Montana Inc. Black Butte Copper Project

Land Clearing and Topsoil and Subsoil Transfer to Storage Piles

Topsoil and subsoil stripping (i.e., bulldozing/scraping) and stockpiling for mine development

This activity occurs in year 0 - 1.

Process Information

Dozing Process Rate:	622,332	tons/yr	
Transfer Process Rate:	609,340	tons/yr	*Note (1)*
Operating Time:	365	days/yr	
Operating Time:	12	hr/day	
Process Rate:	139.12	tons/hr	*Based on Transfer Process rate*
Number of Transfers:	2	load + dump	

(1) On-site storage at certain areas - see analysis at bottom of page

Non-Criteria Pollutant Emission Limits

opacity	<20%

Pollutant	Emission Factor	Units	Source	Uncontrolled Emissions			Enforceable Control Limit	PTE Emissions			Control Method (Practice or Equipment)	Control Efficiency (percent)	Comments
				Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)		Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)			
PM	see below - 11.792 lb/hr and 0.00252 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	2.28	27.37	4.99	20% opacity	2.28	27.37	4.99	None		ARM 17.8.308
PM$_{10}$	see below - 2.451 lb/hr and 0.00119 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.66	7.92	1.45	20% opacity	0.66	7.92	1.45	None		ARM 17.8.308
PM$_{2.5}$	see below - 1.238 lb/hr and 0.00018 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.22	2.59	0.47	20% opacity	0.22	2.59	0.47	None		ARM 17.8.308

Assume: Topsoil and subsoil stripping is equivalent to bulldozing overburden in Table 11.9-1 per Table 13.2.3-1

Assume: PM = TSP where no other PM data are available

Assume: Each ton of material moved goes through two drops - one into a truck, and one into a pile.

Uncontrolled Emissions Calculations:

PM= (4.99 tons/yr) * [2,000 lb/ton] / (4380 hrs/yr) + (0.00252 lb/ton) * (139 tons/hr) * (2 drops) = 2.28 lb/hr
PM= (2.28 lb/hr) * (12 hr/day) =27.37 lb/day
PM= (0.011 lb PM / ton) * (622332 tons/yr) / [2,000 lb/ton] + (0.00252 lb/ton) * (609,340 tons/yr) * (2 drops)] / [2,000 lb/ton] = 4.99 tpy
PM_{10}= (1.45 tons/yr) * [2,000 lb/ton] / (4380 hrs/yr) + (0.00000) * (139 tons/hr) * (2 drops) = 0.66 lb/hr
PM_{10}= (0.66 lb/hr) * (12 hr/day) =7.92 lb/day
PM_{10}= (0.002 lb PM10 / ton) * (622332 tons/yr) / [2,000 lb/ton] + (0.00000) * (609,340 tons/yr) * (2 drops)] / [2,000 lb/ton] = 1.45 tpy
$PM_{2.5}$= (0.47 tons/yr) * [2,000 lb/ton] / (4380 hrs/yr) + (0.00000) * (139 tons/hr) * (2 drops) = 0.22 lb/hr
$PM_{2.5}$= (0.22 lb/hr) * (12 hr/day) =2.59 lb/day
$PM_{2.5}$= (0.001 lb PM2.5 / ton) * (622332 tons/yr) / [2,000 lb/ton] + (0.00000) * (609,340 tons/yr) * (2 drops)] / [2,000 lb/ton] = 0.47 tpy

PM Emission Factor Calculations:

$EF_{PM/PM10/PM2.5}$ = [EF for topsoil removal (bulldozing of overburden, Table 11.9-1) lb/hr * hr/year operating schedule] + [2* EF for truck load and dump of material (Section 13.2.4) lb/ton * ton/year process rate]

silt %, s = 6.9 (Table 11.9-3, bulldozing overburden) - this value was used instead of the road silt value for a more conservative estimate
Moisture %, M = 3.4 (Table 13.2.4-1, Western surface coal mining exposed ground mean moisture content)

Emission factor calculations for topsoil removal:

Table 11.9-1 provides equations to calculate EF in terms of lb/hr for TSP and PM_{15}, with a scaling factor for PM_{10} as a function of PM_{15}.

Topsoil removal EF_{PM} = EF_{TSP} for topsoil removal by bulldozing (Table 11.9-1 for overburden bulldozing) = 5.7*(s)^1.2 / (M)^1.3 lb/hr
Topsoil removal EF_{PM} = 11.792 lb/hr

Topsoil removal EF_{PM10} = 0.75 * EF_{PM15} (Table 11.9-1 for overburden bulldozing) = 0.75 * 1.0*(s)^1.5 / (M)^1.4 lb/hr
Topsoil removal EF_{PM10} = 2.451 lb/hr

Topsoil removal $EF_{PM2.5}$ = 0.105 * EF_{TSP} (Table 11.9-1 for overburden bulldozing) = 0.105 * 5.7*(s)^1.2 / (M)^1.3 lb/hr
Topsoil removal $EF_{PM2.5}$ = 1.238 lb/hr

Dozer clearing rate
Klanfar et al. 2014
535 m3/hr (Avg.)

Conversions
907.185 kg/ton
12 hrs/day
4380 hrs/yr

Bulk Density		
Engineering Toolbox		
Soil, High	1600	kg/m3
Soil, Low	1200	kg/m3
Clay, High	2600	kg/m3
Clay, Low	1800	kg/m3
Average	**1800**	**kg/m3**

Topsoil removal EF_{PM} = $EF_{PM\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 11.792 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)
Topsoil removal EF_{PM} = 0.01111 lb PM / ton

Topsoil removal EF_{PM10} = $EF_{PM10\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 2.451 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)
Topsoil removal EF_{PM10} = 0.00231 lb PM10 / ton

Topsoil removal $EF_{PM2.5}$ = $EF_{PM2.5\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 1.238 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)
Topsoil removal $EF_{PM2.5}$ = 0.00117 lb PM2.5 / ton

Emission factor calculations for truck loading and dumping (section 13.2.4)

E = k * (0.0032) * (U/5)^1.3 / (M/2)^1.4 lb/ton Equation (1), section 13.2.4, emission factor for drop operations

k = 0.74 < 30 um PM
0.35 < 10 um PM
0.053 < 2.5 um PM
U = 9.3 mean windspeed, mph (standard windspeed for MT per MDEQ)
M = 3.4 material moisture content, %

Truck load and dump EF_{PM} = 0.00252 lb/ton

Truck load and dump EF_{PM10} = 0.00119 lb/ton

Truck load and dump $EF_{PM2.5}$ = 0.00018 lb/ton

Modeling Emissions

To Pile	Land Clearing From	Total Amount (Tons)	Origin Amount (Tons/Hr)	Dozing Area	Topsoil removal (PM10)			Topsoil removal (PM2.5)			Truck Load and Dump (PM10)			Truck Load and Dump (PM2.5)		
					Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)
Soil/Subso	Portal Pad	16751	3.82	PP	0.009	0.11	0.019	0.0045	0.05	0.010	9.1E-03	0.11	0.0200	0.00138	0.02	0.0030
Soil/Subso	CWP	40830	9.32	CWP	0.022	0.26	0.047	0.0109	0.13	0.024	2.2E-02	0.27	0.0487	0.00337	0.04	0.0074
Soil/Subso	Cu-Enriched Ore Stockpile	4613	1.05	Cu Pile	0.002	0.03	0.0053	0.0012	0.01	0.003	2.5E-03	0.03	0.0055	3.81E-04	0.00	0.0008
Soil/Subso	WRS Pad	30347	6.93	WRS	0.016	0.19	0.035	0.0081	0.10	0.018	1.7E-02	0.20	0.0362	0.00251	0.03	0.0055
Soil/Subso	Mill Pad	21850	4.99	Mill	0.012	0.14	0.025	0.0058	0.07	0.013	1.2E-02	0.14	0.0261	0.00180	0.02	0.0040
Soil/Subso	PWP	146400	33.42	PWP	0.077	0.93	0.169	0.0390	0.47	0.085	8.0E-02	0.96	0.1748	0.01209	0.15	0.0265
Soil/Subso	CTF	348549	79.58	CTF	0.184	2.20	0.402	0.0928	1.11	0.203	1.9E-01	2.28	0.4161	0.02877	0.35	0.0630
Soil/Subso	NCWR	11410	2.61	NCWR	6.01E-03	0.072	0.013	0.0030	0.036	0.007		*On-site storage*		*On-site storage*		
Soil/Subso	Temporary Powder	97	0.02	Powder	5.11E-05	6.13E-04	1.12E-04	2.58E-05	3.10E-04	5.66E-05		*On-site storage*		*On-site storage*		
Soil/Subso	Foundation Drain Pond CTF	742.5	0.17	Drain_CTF	3.91E-04	4.70E-03	8.57E-04	1.98E-04	2.37E-03	4.33E-04		*On-site storage*		*On-site storage*		
Soil/Subso	Foundation Drain Pond PWP	742.5	0.17	Drain_PWP	3.91E-04	4.70E-03	8.57E-04	1.98E-04	2.37E-03	4.33E-04		*On-site storage*		*On-site storage*		

Material Transfers

	PM10	PM25		**Activity ID**
PP to Truck	0.0046	0.00069	lb/hr	**F16_PP_T**
CWP to Truck	0.0111	0.00169	lb/hr	**F16_CWP_T**
Cu to Truck	0.0013	0.00019	lb/hr	**F16_CU_T**
WRS to Truck	0.0083	0.0013	lb/hr	**F16_WRS_T**
Mill to Truck	0.0060	0.00090	lb/hr	**F16_MILL_T**
PWP to Truck	0.0399	0.0060	lb/hr	**F16_PWP_T**
CTF to Truck	0.0950	0.0144	lb/hr	**F16_CTF_T**
Truck to Topsoil	0.0830	0.0126	lb/hr	**F16_T_TSOIL**
Truck to Subsoil	0.0830	0.0126	lb/hr	**F16_T_SSOIL**

Dozer
WRS
CTF
PP
PWP
NCWR
CWP
Cu
Mill
Powder
Drain_CTF
Drain_PWP

Transfer
F16_PP_T
F16_CWP_T
F16_CU_T
F16_WRS_T
F16_MILL_T
F16_PWP_T
F16_CTF_T
F16_T_TSOIL
F16_T_SSOIL

F17

Air Emissions Calculations

Tintina Montana Inc. Black Butte Copper Project

Topsoil pile (Table 3-13, 3.4.1, 3.6.10)

Operations

365	days/year
12	disturbances/day (topsoil+subsoil total, ratioed by pile volume; year 0 to 1)
36	m^2, disturbance area
0.01	acre, disturbance area
30	ft, max pile height
525	ft, length
492	ft, width
7,749,000	ft^3 pile volume
50%	dust control efficiency by water spray as needed

Total topsoil + subsoil volume = 25,878,420

Topsoil volume% = 30%

Conversions

43,560	ft^2 / acre
0.3048	m / ft
453.593	g / lb
2000	lb / ton

Data Sets Used to Estimate Emissions

Meteorological data was collected near the proposed minesite from mid-2012 through 4th quarter 2017.
Year 2013 maximum 1-hour average windspeed recorded per day was used for these calculations because the highest hourly windspeed was recorded that year (Table 1 below).
Year 2016 maximum 1-hour average windspeed recorded per day was used for these calculations because it is the most recent complete year of data available for the site (Table 2 below).
Table 3 below compares the daily erosion potential (P) between the 2013 and 2016 calculated erosion potential and lists the highest of the two values as an estimate of wind erosion for that day.

Assumptions:

Assumes flat pile, such that the height to base ratio is less than 0.2:
height to base (shortest length) ratio: 0.06

Fastest mile of wind, u^+_{10} = 1.35 * annual maximum 1-hour average wind speed (assumption based on industry convention and a conservative approach - see Wind Conv. (2) worksheet)

Friction velocity, u* = 0.053 * u^+_{10} (Eqn. 4 from AP-42 Ch. 13.2.5)

Threshold friction velocity, u_t* = 1.02 m/s topsoil storage (assume surface simliar to overburden from Table 13.2.5-2)

N = 37 number of disturbances over the 3 day(s) that showed emissions during one year
36 m^2/disturbance
A = 1,350 m^2/year

Emissions Potential Calculations:

$P = [58 (u^* - u_t^*)^2 + 25 (u^* - u_t^*)]$ Eq. 3 from AP-42 Ch. 13.2.5-5

Where:

P = erosion potential, g/m^2/disturbance event - P is calculated for each calendar day (as P_daily) in year 2013 (Table 1) and year 2016 (Table 2). Table 3 lists the largest P_daily calculated for that calendar day between Tables 1 and 2.
u* = friction velocity, m/s - maximum daily 1-hour average wind speeds for year 2013 and year 2016 were used to determine u* for each day of the year according to assumptions listed above
u_t* = 1.02 threshold friction velocity for pile, m/s (overburden, Table 13.2.5-2)

$$P\_annual\ [g / (m^2*year)] = \sum_{n = day\ 1}^{day\ 365} P\_daily\ [g / (m^2*event)] * 12\ events/day =$$ 108.44 g / (m^2*year) (from the bottom of Table 3 below)

Emissions Calculations:

ER = P_annual * A * c * k

Where:

ER = emission rate for each pollutant, ton/yr
P_annual = 108.44 g / (m^2*year) - emission potential for a conservatively worst case year (see above)
0.239 lb / (m^2*year)
1.20E-04 ton / (m^2*year)
A = 1,350 m^2 - area disturbed during days with above-threshold wind events for the year
c = 50% control efficiency (assumed)
k = 1.0 PM particle size multiplier, pg. 13.2.5-3: PM = 1.0, PM10 = 0.5, PM2.5 = 0.075
0.5 PM10
0.075 PM2.5

Results:

TSP, tpy	**0.0807**
PM10, tpy	**0.0403**
PM2.5, tpy	**0.0060**

F17 Wind

F18
Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project

Subsoil pile (Table 3-13, 3.4.1, 3.6.10)

Operations

365	days/year
29	disturbances/day (topsoil+subsoil total, ratioed by pile volume; year 0 to 1)
36	m^2, disturbance area
0.01	acre, disturbance area
30	ft, max pile height
1,083	ft, length
558	ft, width
18,129,420	ft^3 pile volume
50%	dust control efficiency by water spray as needed

Total topsoil + subsoil volume = 25,878,420

Subsoil volume% = 70%

Conversions

43,560	ft^2 / acre
0.3048	m / ft
453.593	g / lb
2000	lb / ton

Data Sets Used to Estimate Emissions

Meteorological data was collected near the proposed minesite from mid-2012 through 4th quarter 2017.
Year 2013 maximum 1-hour average windspeed recorded per day was used for these calculations because the highest hourly windspeed was recorded that year (Table 1 below).
Year 2016 maximum 1-hour average windspeed recorded per day was used for these calculations because it is the most recent complete year of data available for the site (Table 2 below).
Table 3 below compares the daily erosion potential (P) between the 2013 and 2016 calculated erosion potential and lists the highest of the two values as an estimate of wind erosion for that day.

Assumptions:

Assumes flat pile, such that the height to base ratio is less than 0.2:
height to base (shortest length) ratio: 0.05

Fastest mile of wind, u^+_{10} = 1.35 * annual maximum 1-hour average wind speed (assumption based on industry convention and a conservative approach - see Wind Conv. (2) worksheet)
Friction velocity, u* = 0.053 * u^+_{10} (Eqn. 4 from AP-42 Ch. 13.2.5)

Threshold friction velocity, u_t* = 1.02 m/s subsoil storage (assume surface simliar to overburden from Table 13.2.5-2)

N = 88 number of disturbances over the 3 day(s) that showed emissions during one year
36 m^2/disturbance
A = 3,158 m^2/year

Emissions Potential Calculations:

$P = [58 (u^* - u_t^*)^2 + 25 (u^* - u_t^*)]$ Eq. 3 from AP-42 Ch. 13.2.5-5
Where:
P = erosion potential, g/m^2/disturbance event - P is calculated for each calendar day (as P_daily) in year 2013 (Table 1) and year 2016 (Table 2). Table 3 lists the largest P_daily calculated for that calendar day between Tables 1 and 2.
u* = friction velocity, m/s - maximum daily 1-hour average wind speeds for year 2013 and year 2016 were used to determine u* for each day of the year according to assumptions listed above
u_t* = 1.02 threshold friction velocity for pile, m/s (overburden, Table 13.2.5-2)

$$\text{P\_annual [g / (m^2*year)]} = \sum_{n = \text{day } 1}^{\text{day } 365} \text{P\_daily [g / (m^2*event)] * 29 events/day} = 253.70 \text{ g / (m^2*year) (from the bottom of Table 3 below)}$$

Emissions Calculations:

ER = P_annual * A * c * k
Where:
ER = emission rate for each pollutant, ton/yr
P_annual = 253.70 g / (m^2*year) - emission potential for a conservatively worst case year (see above)
0.559 lb / (m^2*year)
2.80E-04 ton / (m^2*year)
A = 3,158 m^2 - area disturbed during days with above-threshold wind events for the year
c = 50% control efficiency (assumed)
k = 1.0 PM particle size multiplier, pg. 13.2.5-3: PM = 1.0, PM10 = 0.5, PM2.5 = 0.075
0.5 PM10
0.075 PM2.5

Results:

TSP, tpy	**0.442**
PM10, tpy	**0.221**
PM2.5, tpy	**0.033**

F18 Wind

F19

Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project

Topsoil and Subsoil Transfer for Reclamation

Topsoil and subsoil replacement for mine closure and reclamation
This activity occurs in years 16-18

Process Information

Process Rate:	516,799	tons/yr - year 17, maximum annual rate
Operating Time:	365	days/yr
Operating Time:	12	hr/day
Process Rate:	117.99	tons/hr
Number of Transfers:	2	load + dump

Non-Criteria Pollutant Emission Limits

opacity	<20%

Pollutant	Emission Factor	Units	Source	Uncontrolled Emissions			Enforceable Control Limit	PTE Emissions			Control Method (Practice or Equipment)	Control Efficiency (percent)	Comments
				Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)		Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)			
PM	see below - 11.792 lb/hr and 0.00252 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	1.91	22.88	4.17	20% opacity	1.91	22.88	4.17	None		ARM 17.8.308
PM_{10}	see below - 2.451 lb/hr and 0.00119 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.55	6.65	1.21	20% opacity	0.55	6.65	1.21	None		ARM 17.8.308
$PM_{2.5}$	see below - 1.238 lb/hr and 0.00018 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.18	2.16	0.39	20% opacity	0.18	2.16	0.39	None		ARM 17.8.308

Assume: Topsoil and subsoil replacement is equivalent to bulldozing overburden in Table 11.9-1 per Table 13.2.3-1
Assume: PM = TSP where no other PM data are available
Assume: Each ton of material moved goes through two drops - one into a truck, and one into a pile.

Uncontrolled Emissions Calculations:

PM= (4.17 tons/yr - year 17, maximum annual rate) * [2,000 lb/ton] / (4380 hrs/yr) + (0.00252 lb/ton) * (118 tons/hr) * (2 drops) = 1.91 lb/hr
PM= (1.91 lb/hr) * (12 hr/day) =22.88 lb/day
PM= (0.011 lb PM / ton) * (516799 tons/yr - year 17, maximum annual rate) / [2,000 lb/ton] + (0.00252 lb/ton) * (516,799 tons/yr - year 17, maximum annual rate) * (2 drops)] / [2,000 lb/ton] = 4.17 tpy
PM_{10}= (1.21 tons/yr - year 17, maximum annual rate) * [2,000 lb/ton] / (4380 hrs/yr) + (0.00119 lb/ton) * (118 tons/hr) * (2 drops) = 0.55 lb/hr
PM_{10}= (0.55 lb/hr) * (12 hr/day) =6.65 lb/day

PM_{10}= (0.002 lb PM10 / ton) * (516799 tons/yr - year 17, maximum annual rate) / [2,000 lb/ton] + (0.00119 lb/ton) * (516,799 tons/yr - year 17, maximum annual rate) * (2 drops)] / [2,000 lb/ton] = 1.21 tpy
$PM_{2.5}$= (0.39 tons/yr - year 17, maximum annual rate) * [2,000 lb/ton] / (4380 hrs/yr) + (0.00018 lb/ton) * (118 tons/hr) * (2 drops) = 0.18 lb/hr
$PM_{2.5}$= (0.18 lb/hr) * (12 hr/day) =2.16 lb/day
$PM_{2.5}$= (0.001 lb PM2.5 / ton) * (516799 tons/yr - year 17, maximum annual rate) / [2,000 lb/ton] + (0.00018 lb/ton) * (516,799 tons/yr - year 17, maximum annual rate) * (2 drops)] / [2,000 lb/ton] = 0.39 tpy

PM Emission Factor Calculations:

$EF_{PM/PM10/PM2.5}$ = [EF for topsoil removal (bulldozing of overburden, Table 11.9-1) lb/hr * hr/year operating schedule] + [2* EF for truck load and dump of material (Section 13.2.4) lb/ton * ton/year process rate]

silt %, s = 6.9 (Table 11.9-3, bulldozing overburden) - this value was used instead of the road silt value for a more conservative estimate
Moisture %, M = 3.4 (Table 13.2.4-1, Western surface coal mining exposed ground mean moisture content)

Emission factor calculations for topsoil removal:

Table 11.9-1 provides equations to calculate EF in terms of lb/hr for TSP and PM_{15}, with a scaling factor for PM_{10} as a function of PM_{15}.

Topsoil removal EF_{PM} = EF_{TSP} for topsoil removal by bulldozing (Table 11.9-1 for overburden bulldozing) = 5.7*(s)^1.2 / (M)^1.3 lb/hr
Topsoil removal EF_{PM} = 11.792 lb/hr

Topsoil removal EF_{PM10} = 0.75 * EF_{PM15} (Table 11.9-1 for overburden bulldozing) = 0.75 * 1.0*(s)^1.5 / (M)^1.4 lb/hr
Topsoil removal EF_{PM10} = 2.451 lb/hr

Topsoil removal $EF_{PM2.5}$ = 0.105 * EF_{TSP} (Table 11.9-1 for overburden bulldozing) = 0.105 * 5.7*(s)^1.2 / (M)^1.3 lb/hr
Topsoil removal $EF_{PM2.5}$ = 1.238 lb/hr

Dozer clearing rate
Klanfar et al. 2014
535 m3/hr (Avg.)

Conversions
907.185 kg/ton
12 hrs/day
4380 hrs/yr

Bulk Density
Engineering Toolbox

Soil, High	1600 kg/m3
Soil, Low	1200 kg/m3
Clay, High	2600 kg/m3
Clay, Low	1800 kg/m3
Average	**1800 kg/m3**

Topsoil removal EF_{PM} = $EF_{PM\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 11.792 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)
Topsoil removal EF_{PM} = 0.01111 lb PM / ton

Topsoil removal EF_{PM10} = $EF_{PM10\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 2.451 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)
Topsoil removal EF_{PM10} = 0.00231 lb PM10 / ton

Topsoil removal $EF_{PM2.5}$ = $EF_{PM2.5\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 1.238 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)
Topsoil removal $EF_{PM2.5}$ = 0.00117 lb PM2.5 / ton

Emission factor calculations for truck loading and dumping (section 13.2.4)

E = k * (0.0032) * (U/5)^1.3 / (M/2)^1.4 lb/ton Equation (1), section 13.2.4, emission factor for drop operations

k = 0.74 < 30 um PM
0.35 < 10 um PM
0.053 < 2.5 um PM
U = 9.3 mean windspeed, mph (standard windspeed for MT per MDEQ)
M = 3.4 material moisture content, %

Truck load and dump EF_{PM} = 0.00252 lb/ton

Truck load and dump EF_{PM10} = 0.00119 lb/ton

Truck load and dump $EF_{PM2.5}$ = 0.00018 lb/ton

F20

Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project

Coarse Ore Dumping at Cu-Enriched Rock Stockpile

Ore dumped at the copper-enriched rock stockpile, maintained at 75,000 tons (11,429 in year 2, and 63,571 in year 3)

Process Information

Operating Time:	8,760	hr/yr
Process Rate:	7.26	tons/hour
Process Rate:	174.17	tons/day
Process Rate:	63,571	tons/yr - year 3, highest annual rate
Number of Transfers:	1	Mine truck drop to stockpile

Non-Criteria Pollutant Emission Limits

opacity	10%

Pollutant	Emission Factor	Units	Source	Uncontrolled Emissions			Enforceable Control Limit	PTE Emissions			Control Method (Practice or Equipment)	Control Efficiency (percent)	Comments
				Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)		Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)			
PM	0.01	lb/ton	**AP-42 Section 11.24, (8/82) Table 11.24-2 (High Moisture Ore - Material Handeling & Transfer - All Materials Except Bauxite) Metallic Mineral Processing**	0.07	1.74	0.32	10% opacity	0.036	0.87	0.16	Water spray as needed	50%	ARM 17.8.340 40 CFR 60 Subpart LL
PM_{10}	0.004	lb/ton	AP-42 Section 11.24 (8/82) Table 11.24-2 (High Moisture Ore - Material Handeling & Transfer - All Materials Except Bauxite) Metallic Mineral Processing	0.03	0.70	0.13	10% opacity	0.0145	0.35	0.064	Water spray as needed	50%	ARM 17.8.340 40 CFR 60 Subpart LL
$PM_{2.5}$	0.004	lb/ton	AP-42 Section 11.24 (8/82) Table 11.24-2 (High Moisture Ore - Material Handeling & Transfer - All Materials Except Bauxite) Metallic Mineral Processing assume $PM_{2.5}$ = PM_{10}	0.03	0.70	0.13	10% opacity	0.0145	0.35	0.064	Water spray as needed	50%	ARM 17.8.340 40 CFR 60 Subpart LL

NO PM2.5 Ratio

Uncontrolled Emissions Calculations:

PM= (0.01 lb/ton)(63,571 tons/year)(1 transfers)(1 ton/2000 lb) =0.32 tpy

PM_{10}= (0.004 lb/ton)(63,571 tons/year)(1 transfers)(1 ton/2000 lb) =0.13 tpy

$PM_{2.5}$= (0.004 lb/ton)(63,571 tons/year)(1 transfers)(1 ton/2000 lb) =0.13 tpy

Controlled Emissions Calculations:

PM= (0.01 lb/ton)(063,571 tons/year)(1 ton/2000 lb)(1-0.50) =0.16 tpy

PM_{10}= (0.004 lb/ton)(063,571 tons/year)(1 ton/2000 lb)(1-0.50) =0.06 tpy

$PM_{2.5}$= (0.004 lb/ton)(063,571 tons/year)(1 ton/2000 lb)(1-0.50) =0.06 tpy

Emissions Per Model Activity

Material Transfers	PM10	PM25		Activity ID
Truck to Cu Ore Pile	0.015	0.015	lb/hr	**F20_T_CU**

Transfer
F20_T_CU

F21
Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project

Copper-enriched rock stockpile (mill feed) (Tables 3-5 & 3-13, 3.4.1)

Fugitive dust emissions from stockpiles of material, such as copper-enriched rock, topsoil, subsoil, waste rock from underground mine development, and excess earthen materials from construction, were estimated using the methods of EPA AP-42 Chapter 13.2.5 *Miscellaneous Sources: Industrial Wind Erosion*. Windspeed data collected very near the permitted mine boundary was used to estimate the erosion potential of each different type of stockpiled material. The equations described in AP-42 Chapter 13.2.5 utilize the "fastest mile" windspeed; however, the fastest mile windspeed was not recorded at the Tintina meteorological station. An estimated fastest mile windspeed was calculated using the measured daily maximum hourly average windspeed times the maximum ratio between fastest mile windspeed and maximum daily windspeed. This ratio was calculated as the highest fastest mile to hourly average windspeed ratio from a published windspeed conversion table (see the Wind Conv. worksheet). The daily highest hourly average windspeeds for the years 2013 and 2016 were copied from data collected at the Tintina meteorological station, and those windspeeds are listed in Tables 1 and 2 respectively. The fastest mile was estimated for each day of year 2013 and year 2016 as described. The erosion potential was then calculated for each day using Equation 3 from AP-42 Ch. 13.2.5. The calculated erosion potential for each calendar day of 2013 was compared against the corresponding erosion potential for the calendar day of 2016 and the largest erosion potential is copied into Table 3 for that day. The daily erosion potentials listed in Table 3 are then multiplied by the maximum possible daily disturbance events to provide a conservative estimate of erosion in grams per meter squared of disturbed area. The estimate is highly conservative because it assumes that the daily maximum eroding wind occurs after each material disturbance for that day.

Operations

365	days/year
4	disturbances/day, max trucks per day, yr 3
36	m^2, disturbance area
0.01	acre, disturbance area
60	ft, max pile height
295	ft, length
295	ft, width
50%	dust control efficiency by water spray as needed

Conversions

43,560	ft^2 / acre
0.3048	m / ft
453.593	g / lb
2000	lb / ton

Data Sets Used to Estimate Emissions

Meteorological data was collected near the proposed minesite from mid-2012 through 4th quarter 2017.
Year 2013 maximum 1-hour average windspeed recorded per day was used for these calculations because the highest hourly windspeed was recorded that year (Table 1 below).
Year 2016 maximum 1-hour average windspeed recorded per day was used for these calculations because it is the most recent complete year of data available for the site (Table 2 below).
Table 3 below compares the daily erosion potential (P) between the 2013 and 2016 calculated erosion potential and lists the highest of the two values as an estimate of wind erosion for that day.

Assumptions:

Assumes flat pile, such that the height to base ratio is less than 0.2:
height to base (shortest length) ratio: 0.20

Fastest mile of wind, u^+_{10} = 1.35 * annual maximum 1-hour average wind speed (assumption based on industry convention and a conservative approach - see Wind Conv. (2) worksheet)
Friction velocity, u* = 0.053 * u^+_{10} (Eqn. 4 from AP-42 Ch. 13.2.5)

Threshold friction velocity, u_t* = 1.12 m/s copper rock storage (assume surface simliar to uncrusted coal pile from Table 13.2.5-2)

N = 4 number of disturbances over the 1 day(s) that showed emissions during one year
36 m^2/disturbance
A = 157 m^2/year

Emissions Potential Calculations:

$P = [58 (u^* - u_t^*)^2 + 25 (u^* - u_t^*)]$ Eq. 3 from AP-42 Ch. 13.2.5-5
Where:
P = erosion potential, g/m^2/disturbance event - P is calculated for each calendar day (as P_daily) in year 2013 (Table 1) and year 2016 (Table 2). Table 3 lists the largest P_daily calculated for that calendar day between Tables 1 and 2.
u* = friction velocity, m/s - maximum daily 1-hour average wind speeds for year 2013 and year 2016 were used to determine u* for each day of the year according to assumptions listed above
u_t* = 1.12 threshold friction velocity for pile, m/s (uncrusted coal pile, Table 13.2.5-2)

$$P\_annual\ [g / (m^2*year)] = \sum_{n = day\ 1}^{day\ 365} P\_daily\ [g / (m^2*event)] * 4\ events/day = 7.35\ g / (m^2*year)$$ (from the bottom of Table 3 below)

Emissions Calculations:

ER = P_annual * A * c * k
Where:
ER = emission rate for each pollutant, ton/yr
P_annual = 7.35 g / (m^2*year) - emission potential for a conservatively worst case year (see above)
0.016 lb / (m^2*year)
8.11E-06 ton / (m^2*year)
A = 157 m^2 - area disturbed during days with above-threshold wind events for the year
c = 50% control efficiency (assumed)
k = 1.0 PM particle size multiplier, pg. 13.2.5-3: PM = 1.0, PM10 = 0.5, PM2.5 = 0.075
0.5 PM10
0.075 PM2.5

Results:

TSP, tpy	**6.35E-04**
PM10, tpy	**3.18E-04**
PM2.5, tpy	**4.76E-05**

F22

Air Emissions Calculations

Tintina Montana Inc. Black Butte Copper Project

Waste Rock Drop at the Waste Rock Storage Pile

Waste rock dumped at the WRS pile or CTF in year 2, which has the highest annual rate - WR moved in years 0-4 and 8 or 9
Waste rock drop -at WRS Pad in years 0 to 1.5, and at CTF in years 1.5 to 4 and 8

Process Information

Operating Time:	8,760	hr/yr
Process Rate:	349,986	tons/yr - year 2, highest annual rate
Number of Transfers:	1	Mine truck drop to WRS or CTF

Non-Criteria Pollutant Emission Limits

opacity	<20%

				Uncontrolled Emissions				PTE Emissions					
Pollutant	Emission Factor (lb/ton)	Units	Source	Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Enforceable Control Limit	Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Control Method (Practice or Equipment)	Control Efficiency (percent)	Comments
PM	0.01	lb/ton	AP-42 Section 11.24, (8/82) Table 11.24-2 (High Moisture Ore - Material Handeling & Transfer - All Materials Except Bauxite) Metallic Mineral Processing	0.40	9.59	1.75	20% opacity	0.20	4.79	0.87	Water spray as needed	50%	ARM 17.8.308
PM_{10}	0.004	lb/ton	AP-42 Section 11.24 (8/82) Table 11.24-2 (High Moisture Ore - Material Handeling & Transfer - All Materials Except Bauxite) Metallic Mineral Processing	0.16	3.84	0.70	20% opacity	0.08	1.92	0.35	Water spray as needed	50%	ARM 17.8.308
$PM_{2.5}$	0.004	lb/ton	AP-42 Section 11.24 (8/82) Table 11.24-2 (High Moisture Ore - Material Handeling & Transfer - All Materials Except Bauxite) Metallic Mineral Processing	0.16	3.84	0.70	20% opacity	0.08	1.92	0.35	Water spray as needed	50%	ARM 17.8.308

NO PM2.5 Ratio

Uncontrolled Emissions Calculations:

PM= (0.01 lb/ton)(349,986 tons/year)(1 transfers)(1 ton/2000 lb) =1.75 tpy
PM_{10}= (0.004 lb/ton)(349,986 tons/year)(1 transfers)(1 ton/2000 lb) =0.70 tpy
$PM_{2.5}$= (0.004 lb/ton)(349,986 tons/year)(1 transfers)(1 ton/2000 lb) =0.70 tpy

Controlled Emissions Calculations

PM= (0.01 lb/ton)(349,986 tons/year)(1 transfers)(1 ton/2000 lb)(1-0.50) =0.87 tpy
PM_{10}= (0.004 lb/ton)(349,986 tons/year)(1 transfers)(1 ton/2000 lb)(1-0.50) =0.35 tpy
$PM_{2.5}$= (0.004 lb/ton)(349,986 tons/year)(1 transfers)(1 ton/2000 lb)(1-0.50) =0.35 tpy

Emissions Per Model Activity

Material Transfers	PM10	PM25		Activity ID
Truck to WRS	0.080	0.080	lb/hr	F22_T_WRS

Transfer
F22_T_WRS

F23
Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project

Temporary waste rock storage (WRS) (Table 3-5, 3-13, 3.4.1)

<u>Operations</u>

365 days/year
24 disturbances/day (year 1 - 2)
36 m^2, disturbance area
0.01 acre, disturbance area
30 ft, max pile height
820 ft, length
591 ft, width
50% dust control efficiency by water spray as needed

<u>Conversions</u>

43,560 ft^2 / acre
0.3048 m / ft
453.593 g / lb
2000 lb / ton

<u>Data Sets Used to Estimate Emissions</u>

Meteorological data was collected near the proposed minesite from mid-2012 through 4th quarter 2017.
Year 2013 maximum 1-hour average windspeed recorded per day was used for these calculations because the highest hourly windspeed was recorded that year (Table 1 below).
Year 2016 maximum 1-hour average windspeed recorded per day was used for these calculations because it is the most recent complete year of data available for the site (Table 2 below).
Table 3 below compares the daily erosion potential (P) between the 2013 and 2016 calculated erosion potential and lists the highest of the two values as an estimate of wind erosion for that day.

<u>Assumptions:</u>

Assumes flat pile, such that the height to base ratio is less than 0.2:
height to base (shortest length) ratio: 0.05

Fastest mile of wind, u$^+_{10}$ = 1.35 * annual maximum 1-hour average wind speed (assumption based on industry convention and a conservative approach - see Wind Conv. (2) worksheet)
Friction velocity, u* = 0.053 * u$^+_{10}$ (Eqn. 4 from AP-42 Ch. 13.2.5)

Threshold friction velocity, u$_t$* = 1.12 m/s waste rock storage (assume surface simliar to uncrusted coal pile from Table 13.2.5-2)

N = 24 number of disturbances over the 1 day(s) that showed emissions during one year
36 m^2/disturbance
A = 863 m^2/year

<u>Emissions Potential Calculations:</u>

P = [58 (u* - u$_t$*)^2 + 25 (u* - u$_t$*)] Eq. 3 from AP-42 Ch. 13.2.5-5
Where:
P = erosion potential, g/m^2/disturbance event - P is calculated for each calendar day (as P_daily) in year 2013 (Table 1) and year 2016 (Table 2). Table 3 lists the largest P_daily calculated for that calendar day between Tables 1 and 2.
u* = friction velocity, m/s - maximum daily 1-hour average wind speeds for year 2013 and year 2016 were used to determine u* for each day of the year according to assumptions listed above
u$_t$* = 1.12 threshold friction velocity for pile, m/s (uncrusted coal pile, Table 13.2.5-2)

$$\text{P\_annual [g / (m^2*year)]} = \sum_{n = \text{day } 1}^{\text{day } 365} \text{P\_daily [g / (m^2*event)]} * 24 \text{ events/day} = 40.48 \text{ g / (m^2*year) (from the bottom of Table 3 below)}$$

<u>Emissions Calculations:</u>

ER = P_annual * A * c * k
Where:
ER = emission rate for each pollutant, ton/yr
P_annual = 40.48 g / (m^2*year) - emission potential for a conservatively worst case year (see above)
0.089 lb / (m^2*year)
4.46E-05 ton / (m^2*year)
A = 863 m^2 - area disturbed during days with above-threshold wind events for the year
c = 50% control efficiency (assumed)
k = 1.0 PM particle size multiplier, pg. 13.2.5-3: PM = 1.0, PM10 = 0.5, PM2.5 = 0.075
0.5 PM10
0.075 PM2.5

Results:

TSP, tpy	**1.93E-02**
PM10, tpy	**9.63E-03**
PM2.5, tpy	**1.44E-03**

F23 Wind

F24

Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project

Waste Rock Transfer from WRS pile to CTF

Waste rock is moved from the WRS pile to the CTF and used to build truck roads into the CTF in year 2-3

Process Information

Operating Time:	8,760	hr/yr
Process Rate:	278,649	tons/yr - year 3, highest annual rate
Number of Transfers:	2	Waste rock drop into truck, then drop into CTF

Non-Criteria Pollutant Emission Limits

opacity	<20%

Pollutant	Emission Factor (lb/ton)	Units	Source	Uncontrolled Emissions Hourly (lb/hr)	Uncontrolled Emissions Daily (lb/day)	Uncontrolled Emissions Annual (tpy)	Enforceable Control Limit	PTE Emissions Hourly (lb/hr)	PTE Emissions Daily (lb/day)	PTE Emissions Annual (tpy)	Control Method (Practice or Equipment)	Control Efficiency (percent)	Comments
PM	0.01	lb/ton	AP-42 Section 11.24, (8/82) Table 11.24-2 (High Moisture Ore - Material Handeling & Transfer - All Materials Except Bauxite) Metallic Mineral Processing	0.64	15.27	2.79	20% opacity	0.318	7.63	1.39	Water spray as needed	50%	ARM 17.8.308
PM_{10}	0.004	lb/ton	AP-42 Section 11.24 (8/82) Table 11.24-2 (High Moisture Ore - Material Handeling & Transfer - All Materials Except Bauxite) Metallic Mineral Processing	0.25	6.11	1.11	20% opacity	0.127	3.05	0.56	Water spray as needed	50%	ARM 17.8.308
$PM_{2.5}$	0.004	lb/ton	AP-42 Section 11.24 (8/82) Table 11.24-2 (High Moisture Ore - Material Handeling & Transfer - All Materials Except Bauxite) Metallic Mineral Processing	0.25	6.11	1.11	20% opacity	0.127	3.05	0.56	Water spray as needed	50%	ARM 17.8.308
			NO PM2.5 Ratio										

Uncontrolled Emissions Calculations:

PM= (0.01 lb/ton)(278,649 tons/year)(2 transfers)(1 ton/2000 lb) =2.79 tpy

PM_{10}= (0.004 lb/ton)(278,649 tons/year)(2 transfers)(1 ton/2000 lb) =1.11 tpy

$PM_{2.5}$= (0.004 lb/ton)(278,649 tons/year)(2 transfers)(1 ton/2000 lb) =1.11 tpy

Controlled Emissions Calculations

PM= (0.01 lb/ton)(278,649 tons/year)(2 transfers)(1 ton/2000 lb)(1-0.50) =1.39 tpy

PM_{10}= (0.004 lb/ton)(278,649 tons/year)(2 transfers)(1 ton/2000 lb)(1-0.50) =0.56 tpy

$PM_{2.5}$= (0.004 lb/ton)(278,649 tons/year)(2 transfers)(1 ton/2000 lb)(1-0.50) =0.56 tpy

Emissions Per Model Activity

Material Transfers	PM10	PM25		Activity ID
WRS to Truck	0.064	0.064		F24_T_CTF
Truck to CTF	0.064	0.064	lb/hr	F24_WRS_T

Transfer
F24_T_CTF
F24_WRS_T

F25

Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project

Reclamation of WRS pad with N Reclamation stockpile and Soil Stockpiles

The WRS pad is to be reclaimed in year 3

Process Information

Process Rate:	204,655	tons/yr
Operating Time:	365	days/yr
Operating Time:	12	hr/day
Process Rate:	46.72	tons/hr
Number of Transfers:	2	load + dump

Non-Criteria Pollutant Emission Limits

opacity	<20%

Pollutant	Emission Factor	Units	Source	Uncontrolled Emissions			Enforceable Control Limit	PTE Emissions			Control Method (Practice or Equipment)	Control Efficiency (percent)	Comments
				Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)		Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)			
PM	see below - 11.792 lb/hr and 0.00252 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.75	9.06	1.65	20% opacity	0.75	9.06	1.65	None		ARM 17.8.308
PM_{10}	see below - 2.451 lb/hr and 0.00119 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.22	2.63	0.48	20% opacity	0.22	2.63	0.48	None		ARM 17.8.308
$PM_{2.5}$	see below - 1.238 lb/hr and 0.00018 lb/ton	--	AP-42 Section 11.9, (10/98) Western Surface Coal Mining Table 11.9-1 & -3 and AP-42 Section 13.2.4, (11/06) Aggregate Handling and Storage Piles as referenced by AP-42 Section 13.2.3 (1/95) Heavy Construction Operations Table 13.2.3-1	0.07	0.86	0.16	20% opacity	0.07	0.86	0.16	None		ARM 17.8.308

Assume: Topsoil and subsoil stripping is equivalent to bulldozing overburden in Table 11.9-1 per Table 13.2.3-1
Assume: PM = TSP where no other PM data are available
Assume: Each ton of material moved goes through two drops - one into a truck, and one into a pile.

Uncontrolled Emissions Calculations:

PM= (11.792 lb/hr) + (0.00252 lb/ton) * (47 tons/hr) * (2 drops) = 0.75 lb/hr
PM= (0.75 lb/hr) * (12 hr/day) =9.06 lb/day
PM= [(11.792 lb/hr) * (12 hr/day) * (365 days/yr) + (0.00252 lb/ton) * (204,655 tons/yr) * (2 drops)] / [2,000 lb/ton] = 1.65 tpy
PM_{10}= (2.451 lb/hr) + (0.00119 lb/ton) * (047 tons/hr) * (2 drops) = 0.22 lb/hr
PM_{10}= (0.22 lb/hr) * (12 hr/day) =2.63 lb/day
PM_{10}= [(2.451 lb/hr) * (12 hr/day) * (365 days/yr) + (0.00119 lb/ton) * (204,655 tons/yr) * (2 drops)] / [2,000 lb/ton] = 0.48 tpy
$PM_{2.5}$= (1.238 lb/hr) + (0.00018 lb/ton) * (047 tons/hr) * (2 drops) = 0.07 lb/hr
$PM_{2.5}$= (0.07 lb/hr) * (12 hr/day) =0.86 lb/day
$PM_{2.5}$= [(1.238 lb/hr) * (12 hr/day) * (365 days/yr) + (0.00018 lb/ton) * (204,655 tons/yr) * (2 drops)] / [2,000 lb/ton] = 0.16 tpy

PM Emission Factor Calculations:

$EF_{PM/PM10/PM2.5}$ = EF for topsoil removal (bulldozing of overburden, Table 11.9-1) + 2* EF for truck load and dump of material (Section 13.2.4)

silt %, s = 6.9 (Table 11.9-3, bulldozing overburden) - this value was used instead of the road silt value for a more conservative estimate
Moisture %, M = 3.4 (Table 13.2.4-1, Western surface coal mining exposed ground mean moisture content)

Emission factor calculations for topsoil removal:

Table 11.9-1 provides equations to calculate EF in terms of lb/hr for TSP and PM_{15}, with a scaling factor for PM_{10} as a function of PM_{15}.

Topsoil removal EF_{PM} = EF_{TSP} for topsoil removal by bulldozing (Table 11.9-1 for overburden bulldozing) = 5.7*(s)^1.2 / (M)^1.3 lb/hr
Topsoil removal EF_{PM} = 11.792 lb/hr

Topsoil removal EF_{PM10} = 0.75 * EF_{PM15} (Table 11.9-1 for overburden bulldozing) = 0.75 * 1.0*(s)^1.5 / (M)^1.4 lb/hr
Topsoil removal EF_{PM10} = 2.451 lb/hr

Topsoil removal $EF_{PM2.5}$ = 0.105 * EF_{TSP} (Table 11.9-1 for overburden bulldozing) = 0.105 * 5.7*(s)^1.2 / (M)^1.3 lb/hr
Topsoil removal $EF_{PM2.5}$ = 1.238 lb/hr

Dozer clearing rate
Klanfar et al. 2014
535 m3/hr (Avg.)

Conversions
907.185 kg/ton
12 hrs/day
4380 hrs/yr

Bulk Density	
Engineering Toolbox	
Soil, High	1600 kg/m3
Soil, Low	1200 kg/m3
Clay, High	2600 kg/m3
Clay, Low	1800 kg/m3
Average	**1800 kg/m3**

Topsoil removal EF_{PM} = $EF_{PM\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 11.792 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)
Topsoil removal EF_{PM} = 0.01111 lb PM / ton

Topsoil removal EF_{PM10} = $EF_{PM10\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 2.451 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)
Topsoil removal EF_{PM10} = 0.00231 lb PM10 / ton

Topsoil removal $EF_{PM2.5}$ = $EF_{PM2.5\ (lb/hr)}$ * (1/Dozer clearing rate) * (1/Avg. Bulk Density) * (907.185 kg/ton) = 1.238 lb/hr * (hr/535 m3) * (m3/1800 kg) * (907.185 kg/ton)
Topsoil removal $EF_{PM2.5}$ = 0.00117 lb PM2.5 / ton

Emission factor calculations for truck loading and dumping (section 13.2.4)

E = k * (0.0032) * (U/5)^1.3 / (M/2)^1.4 lb/ton   Equation (1), section 13.2.4, emission factor for drop operations

k =	0.74	< 30 um PM
	0.35	< 10 um PM
	0.053	< 2.5 um PM
U =	9.3	mean windspeed, mph (standard windspeed for MT per MDEQ)
M =	3.4	material moisture content, %

Truck load and dump EF_{PM} = 0.00252 lb/ton

Truck load and dump EF_{PM10} = 0.00119 lb/ton

Truck load and dump $EF_{PM2.5}$ = 0.00018 lb/ton

F26
Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project

Light plants - emissions from each 8 kW light plant on this sheet

Process Information

Process Rate:	8760	hr/yr
Engine power output:	14	hp - ESTIMATE
Sulfur Content	0.015	percent
No. of light plants	11	

Non-Criteria Pollutant Emission Limits

opacity	<20%

AP-42, Chapter 3.3, Gasoline and Diesel Industrial Engines EF (T

PM$_{10}$	2.20E-03	lb/hp-hr
SOx	2.05E-03	lb/hp-hr
NOx	0.031	lb/hp-hr
CO	6.68E-03	lb/hp-hr
VOC	2.47E-03	lb/hp-hr (TOC exhaust)

Tier 2 Engine - 40 CFR 89.112 (no Tier 3 for engines of this size - there is a Tier 4 rating for this size)

Power Rating range: 8 < kW < 19 (10.7 < hp < 25.5)

Emission Standards

Non-methane hydrocarbon + NOx:	7.5	g/kW-hr	1.23E-02	lb/hp-hr
CO:	6.6	g/kW-hr	1.09E-02	lb/hp-hr
PM:	0.80	g/kW-hr	1.32E-03	lb/hp-hr

				Uncontrolled Emissions				PTE Emissions		
Pollutant	**Emission Factor**	**Units**	**Source**	**Hourly (lb/hr)**	**Daily (lb/day)**	**Annual (tpy)**	**Enforceable Control Limit**	**Hourly (lb/hr)**	**Daily (lb/day)**	**Annual (tpy)**
PM	2.20E-03	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.34	8.13	1.48	20% opacity	0.34	8.13	1.48
PM$_{10}$	2.20E-03	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.34	8.13	1.48	20% opacity	0.34	8.13	1.48
PM$_{2.5}$	2.20E-03	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1; all PM assumed to be < 1 um	0.34	8.13	1.48	20% opacity	0.34	8.13	1.48
Sulfur Dioxide (SO$_2$)	1.21E-05	lb/hp-hr	AP-42 Section 3.4, Table 3.4-1 (10/96) Large Stationary Diesel Industrial Engines	0.00	0.04	0.01	not applicable	0.00	0.04	0.008
Nitrogen Oxides (NO$_X$)	3.10E-02	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1 - assumes NMHC+NOx is all NOx	4.77	114.58	20.91	not applicable	4.77	114.58	20.91
Carbon Monoxide (CO)	6.68E-03	lb/hp-hr	Tier 3 engine - 40 CFR 89.112 Table 1	1.03	24.69	4.51	not applicable	1.03	24.69	4.51
VOC*	2.47E-03	lb/hp-hr	AP-42 Section 3.3, Table 3.3-1 (10/96) Gasoline and Diesel Industrial Engines	0.38	9.13	1.67	not applicable	0.38	9.13	1.67

*NOTE: Emission factor for VOC is assumed to be equal to the emission factor for Total Organic Carbon (TOC) in the exhaust. This would be a conservative estimate as not all TOC is VOC.

F27
Tintina Montana Inc. Black Butte Copper Project
500-gal Gasoline Storage Tank (double-walled)

TANKS 4.0 Report <!-- function StartUp() { var DataSource=new
TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification
User Identification:500 gal gasoline tank
City:Great Falls
State:Montana
Company:Tintina
Type of Tank:Horizontal Tank
Description:500 gal gasoline tank

Meterological Data used in Emissions Calculations: Great Falls, Montana
(Avg Atmospheric Pressure = 12.88 psia)

Tank Dimensions
Shell Length (ft):5.00
Diameter (ft):4.67
Volume (gallons):500.00
Turnovers:24.00
Net Throughput(gal/yr):12,000.00
Is Tank Heated (y/n):N
Is Tank Underground (y/n):N

Paint Characteristics
Shell Color/Shade:White/White
Shell ConditionGood

Breather Vent Settings
Vacuum Settings (psig):-0.03
Pressure Settings (psig)0.03

Daily Liquid Surf.
Temperature (deg F)Liquid
Bulk
Temp Vapor Pressure (psia)Vapor
Mol. Liquid
Mass Vapor
Mass Mol. Basis for Vapor Pressure
Mixture/ComponentMonthAvg.Min.Max.(deg F) Avg.Min.Max.Weight. Fract.
Fract. Weight Calculations

Gasoline (RVP 9)All46.4640.7452.1744.77 3.50713.11063.943467.0000
92.00 Option 4: RVP=9, ASTM Slope=3

Annual Emission Calcaulations

Standing Losses (lb):76.6805
Vapor Space Volume (cu ft):54.5499
Vapor Density (lb/cu ft):0.0433
Vapor Space Expansion Factor:0.1277
Vented Vapor Saturation Factor:0.6973

Tank Vapor Space Volume:
Vapor Space Volume (cu ft):54.5499
Tank Diameter (ft):4.6700
Effective Diameter (ft):5.4539
Vapor Space Outage (ft):2.3350
Tank Shell Length (ft):5.0000

Vapor Density
Vapor Density (lb/cu ft):0.0433
Vapor Molecular Weight (lb/lb-mole):67.0000
Vapor Pressure at Daily Average Liquid
Surface Temperature (psia):3.5071
Daily Avg. Liquid Surface Temp. (deg. R):506.1257
Daily Average Ambient Temp. (deg. F):44.7458
Ideal Gas Constant R
(psia cuft / (lb-mol-deg R)):10.731
Liquid Bulk Temperature (deg. R):504.4358
Tank Paint Solar Absorptance (Shell):0.1700
Daily Total Solar Insulation
Factor (Btu/sqft day):1,264.8497

Vapor Space Expansion Factor
Vapor Space Expansion Factor:0.1277
Daily Vapor Temperature Range (deg. R):22.8627
Daily Vapor Pressure Range (psia):0.8328
Breather Vent Press. Setting Range(psia):0.0600
Vapor Pressure at Daily Average Liquid
Surface Temperature (psia):3.5071
Vapor Pressure at Daily Minimum Liquid
Surface Temperature (psia):3.1106
Vapor Pressure at Daily Maximum Liquid
Surface Temperature (psia):3.9434
Daily Avg. Liquid Surface Temp. (deg R):506.1257
Daily Min. Liquid Surface Temp. (deg R):500.4101
Daily Max. Liquid Surface Temp. (deg R):511.8414
Daily Ambient Temp. Range (deg. R):23.3917

Vented Vapor Saturation Factor
Vented Vapor Saturation Factor:0.6973
Vapor Pressure at Daily Average Liquid:
Surface Temperature (psia):3.5071
Vapor Space Outage (ft):2.3350

Working Losses (lb):67.1351
Vapor Molecular Weight (lb/lb-mole):67.0000
Vapor Pressure at Daily Average Liquid
Surface Temperature (psia):3.5071
Annual Net Throughput (gal/yr.):12,000.0000
Annual Turnovers:24.0000
Turnover Factor:1.0000
Tank Diameter (ft):4.6700
Working Loss Product Factor:1.0000

Total Losses (lb):143.8156 = 0.07 tpy

F28
Tintina Montana Inc. Black Butte Copper Project

EMISSIONS CALCULATIONS

Temporary and Portable Propane-fired heater at Portal

Max. Fuel Combustion Rate =	37.80	MMBtu/hr
Fuel Usage =	3,625.62	10^3 gal/yr
Hours of Operation =	8,760	hr/yr
Fuel High Heating Value=	91.33	MMBtu/10^3 gal
Conversions:	454	grams/lb
	2000	lbs/ton

Criteria Pollutants (HAPs)

Pollutant	Emission Factor	Units	Emission Factor Reference	Emissions (lbs/hr)	Emissions (tons/yr)
PM/PM10/PM2.5	0.7	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	0.29	1.27
NOx	13	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	5.38	23.57
CO	7.5	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	3.10	13.60
VOC	1	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	0.41	1.81
SO_2	0.054	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	0.02	0.098
CO2	12500.0	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	5173.55	22660.13
CH4	0.2	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	0.08	0.36
N2O	0.9	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	0.37	1.63
Total CO2e	12783.2	lb/10^3 gal	AP-42 Table 1.5-1 (07/08)	5290.76	23173.52

F29
Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project
Road Dust Fugitive Emissions - Non-haul roads, incoming materials, construction phase - Construction Access Road

Road Dust, Mine Operating Year 0 to 1

Process Information

Silt content of road:	4.8	% (sand & gravel plant road)	
Days with ppt>0.01" *	88	days	
	14.2	tons, mean vehicle wt.	Materials incoming (based on maximum avg weights for Truck Vehicle Classes 2-8, NHTSA GVW for medium and heavy vehicles, 2006)
	2.5	VMT/day	Materials incoming 6.1 Trucks per day/1090 feet per trip (2180 feet per round trip)
Dust suppression control efficiency:	50%	% control	
	24	hr/d	
	365	day/year	VMT calculations are based on 365 days per year in "Road dust design values" worksheet
	2000	lb/ton	

Non-Criteria Pollutant Emission Limits

opacity	<20%

Road Criteria - Construction Access Road

Road length	1090 ft
Frequency	6.1 trucks/day
Vehicle Ft Traveled	6649 ft
VMT (1 Way)	1.26 mi
VMT (Round Trip)	2.5 mi

Pollutant	Emission Factor	Units	Source	Uncontrolled Emissions			Enforceable Control Limit	PTE Emissions			Control Method (Practice or Equipment)	Control Efficiency (percent)	Comments
				Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)		Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)			
PM	3.94	lb/VMT	AP-42 Section 13.2.2, (11/06) Unpaved Roads	0.4	10	1.8	20% opacity	0.21	4.93	0.90	Water spray and/or chemical dust suppressant as necessary	50%	ARM 17.8.308
PM_{10}	1.00	lb/VMT	AP-42 Section 13.2.2, (11/06) Unpaved Roads	0.1	3	0.5	20% opacity	0.0523	1.26	0.23	Water spray and/or chemical dust suppressant as necessary	50%	ARM 17.8.308
$PM_{2.5}$	0.10	lb/VMT	AP-42 Section 13.2.2, (11/06) Unpaved Roads	0.0	0.3	0.0	20% opacity	0.00525	0.13	0.023	Water spray and/or chemical dust suppressant as necessary	50%	ARM 17.8.308

Emission Factor = $(k)(s/12)^a(W/3)^b(365-P)/365$ lb/vmt AP-42 Ch 13.2.2 Eqns 1a and 2
for travel on unpaved surfaces at industrial sites
where:
k = particle size multiplier
= 4.9 for PM (>30 $\mu g/m^3$)
= 1.5 for PM_{10}
= 0.15 for $PM_{2.5}$
a = empirical constant
= 0.7 for PM (>30 $\mu g/m^3$)
= 0.9 for PM_{10} and $PM_{2.5}$
b= 0.45 for all PM
s = 4.8 surface material silt content, per AP42-Table 13.2.2-1, mean for sand and gravel processing plant road
W = 14.2 tons, mean vehicle weight
P= 88 number of days in year with at least 0.01 inches of precipitation per on-site met station - year 2013 data used as it showed the fewest days with sufficient precipitation

Table 13.2.2-4 Emission Factor for 1980's Vehicle Fleet Exhaust, Brake Wear and Tire Wear

PM	0.00047 lb/vmt
PM_{10}	0.00047 lb/vmt
$PM_{2.5}$	0.00036 lb/vmt

Emission Factor Calculations:	Road dust:	Equipment wear:	Total Particulate EF:
PM Emission factor =	3.94 lb/vmt +	0.00047 lb/vmt =	3.94 lb/vmt
PM_{10} Emission factor =	1.00 lb/vmt +	0.00047 lb/vmt =	1.00 lb/vmt
$PM_{2.5}$ Emission factor =	0.10 lb/vmt +	0.00036 lb/vmt =	0.10 lb/vmt

Uncontrolled Emissions Calculations:
PM= (3.94 lb/VMT)(002.5 VMT/day)(365 day/year)(1 ton/2000 lb) =1.8 tpy
PM_{10}= (1.00 lb/VMT)(002.5 VMT/day)(365 day/year)(1 ton/2000 lb) =0.5 tpy
$PM_{2.5}$= (0.10 lb/VMT)(002.5 VMT/day)(365 day/year)(1 ton/2000 lb) =0.0 tpy

Controlled Emissions Calculations:

PM= (3.94 lb/VMT)(002.5 VMT/day)(1 ton/2000 lb)(365 day/year)(1-0.50) =0.9 tpy

PM_{10}= (1.00 lb/VMT)(002.5 VMT/day)(1 ton/2000 lb)(365 day/year)(1-0.50) =0.2 tpy

$PM_{2.5}$= (0.10 lb/VMT)(002.5 VMT/day)(1 ton/2000 lb)(365 day/year)(1-0.50) =0.0 tpy

Modeling Emissions (Controlled)

Emission Source	**Model ID**	**Total Round-trip Miles/Day VMT All trucks**	**PM10**		**PM2.5**		**No. of Volume Sources**	**PM10 Per Volume Source**		**PM2.5 Per Volume Source**	
			lb/hr	**tpy**	**lb/hr**	**tpy**		**lb/hr**	**tpy**	**lb/hr**	**tpy**
Development - Construction of Facilities Phase											
Materials Incoming											
Construction Access	CON_0001	2.50	0.0523	0.23	5.25E-03	2.30E-02	43	1.22E-03	5.33E-03	1.22E-04	5.35E-04

F30
Air Emissions Calculations
Tintina Montana Inc. Black Butte Copper Project
Road Dust Fugitive Emissions - Non-haul road fugitives, operations phase - Main Access Road

Road Dust, Mine Operating Year 2 to 15, annual average

Process Information

Silt content of road:	4.8	% (sand & gravel plant road)
Days with ppt>0.01" *	88	days
	13.3	tons, mean vehicle wt.
	16	number of years
	292.6	VMT/day, annual average
Dust suppression control efficiency:	50%	% control
	24	hr/d
	365	day/year
	2000	lb/ton

VMT calculations are based on 365 days per year in "Road dust design values" worksheet

Road Criteria - Main Access Road

Road length	2342	meters
Frequency	100.6	trucks/day
Vehicle Ft Traveled	235605.2	meters
VMT (1 Way)	146.398	mi
VMT (Round Trip)	292.6	mi

Vehicle Type	Vehicles per day	Mean Vehicle Wt (tons)	Note
Concentrate Truck	18	57.5	
Cars/Misc	73	2.25	a
Materials in and out	9.6	14.2	b
Total	**100.6**		
Aggregate Veh. Wt		**13.3**	

(a) Based on "Average Vehicle Fleet Weight in Clark County, NV" - February 2006

(b) Materials in/our (based on maximum avg weights for Truck Vehicle Classes 2-8, NHTSA GVW for medium and heavy vehicles, 2006)

Non-Criteria Pollutant Emission Limits

opacity	<20%

				Uncontrolled Emissions				PTE Emissions					
Pollutant	**Emission Factor**	**Units**	**Source**	**Hourly (lb/hr)**	**Daily (lb/day)**	**Annual (tpy)**	**Enforceable Control Limit**	**Hourly (lb/hr)**	**Daily (lb/day)**	**Annual (tpy)**	**Control Method (Practice or Equipment)**	**Control Efficiency (percent)**	**Comments**
PM	3.83	lb/VMT	AP-42 Section 13.2.2, (11/06) Unpaved Roads	46.7	1,120	204.4	20% opacity	23.33	560.0	102.19	Water spray and/or chemical dust suppressant as necessary	50%	ARM 17.8.308
PM_{10}	0.98	lb/VMT	AP-42 Section 13.2.2, (11/06) Unpaved Roads	11.9	285.5	52.1	20% opacity	5.95	142.8	26.05	Water spray and/or chemical dust suppressant as necessary	50%	ARM 17.8.308
$PM_{2.5}$	0.10	lb/VMT	AP-42 Section 13.2.2, (11/06) Unpaved Roads	1.19	28.6	5.23	20% opacity	0.60	14.3	2.61	Water spray and/or chemical dust suppressant as necessary	50%	ARM 17.8.308

Emission Factor = $(k)(s/12)^a(W/3)^b(365\text{-}P)/365$ lb/vmt   AP-42 Ch 13.2.2 Eqns 1a and 2
for travel on unpaved surfaces at industrial sites
where:
k = particle size multiplier
= 4.9 for PM (>30 $\mu g/m^3$)
= 1.5 for PM_{10}
= 0.15 for $PM_{2.5}$
a = empirical constant
= 0.7 for PM (>30 $\mu g/m^3$)
= 0.9 for PM_{10} and $PM_{2.5}$
b= 0.45 for all PM
s = 4.8 surface material silt content, per AP42-Table 13.2.2-1, mean for sand and gravel processing plant road
W = 13 tons, mean vehicle weight
P= 88 number of days in year with at least 0.01 inches of precipitation per on-site met station - year 2013 data used as it showed the fewest days with sufficient precipitation

Table 13.2.2-4 Emission Factor for 1980's Vehicle Fleet Exhaust, Brake Wear and Tire Wear

PM	0.00047 lb/vmt
PM_{10}	0.00047 lb/vmt
$PM_{2.5}$	0.00036 lb/vmt

Emission Factor Calculations:	Road dust:	Equipment wear:	Total Particulate EF:
PM Emission factor =	3.83 lb/vmt +	0.00047 lb/vmt =	3.83 lb/vmt
PM_{10} Emission factor =	0.98 lb/vmt +	0.00047 lb/vmt =	0.98 lb/vmt
$PM_{2.5}$ Emission factor =	0.10 lb/vmt +	0.00036 lb/vmt =	0.10 lb/vmt

Uncontrolled Emissions Calculations:

PM= (3.83 lb/VMT)(0.0)(365 day/year)(1 ton/2000 lb) =204.4 tpy

PM_{10}= (0.98 lb/VMT)(0.0)(365 day/year)(1 ton/2000 lb) =52.1 tpy

$PM_{2.5}$= (0.10 lb/VMT)(0.0)(365 day/year)(1 ton/2000 lb) =5.2 tpy

Controlled Emissions Calculations:

PM= (3.83 lb/VMT)(0.0)(1 ton/2000 lb)(365 day/year)(1-0.50) =102.2 tpy

PM_{10}= (0.98 lb/VMT)(0.0)(1 ton/2000 lb)(365 day/year)(1-0.50) =26.1 tpy

$PM_{2.5}$= (0.10 lb/VMT)(0.0)(1 ton/2000 lb)(365 day/year)(1-0.50) =2.6 tpy

Modeling Emissions (Uncontrolled)

Emission Source	**Model ID**	**Total Round-trip Miles/Day VMT All trucks**	**PM10**		**PM2.5**		**No. of Volume Sources**	**PM10 Per Volume Source**		**PM2.5 Per Volume Source**	
			lb/hr	**tpy**	**lb/hr**	**tpy**		**lb/hr**	**tpy**	**lb/hr**	**tpy**
Production Phase - Operational											
Main Access Road (Uncontrolled)		292.60	11.90	52.11	1.19	5.23	298	0.03992	1.75E-01	4.01E-03	1.75E-02
Main Access Road (50% Control)	ACC	Model Sources: ACC_0027 - ACC_0298					272	0.01996	0.087	0.002003	0.0088
Main Access Road (80% Control)	ACC	Model Sources: ACC_0001 - ACC_0026					26	0.007984	0.035	0.000801	0.0035

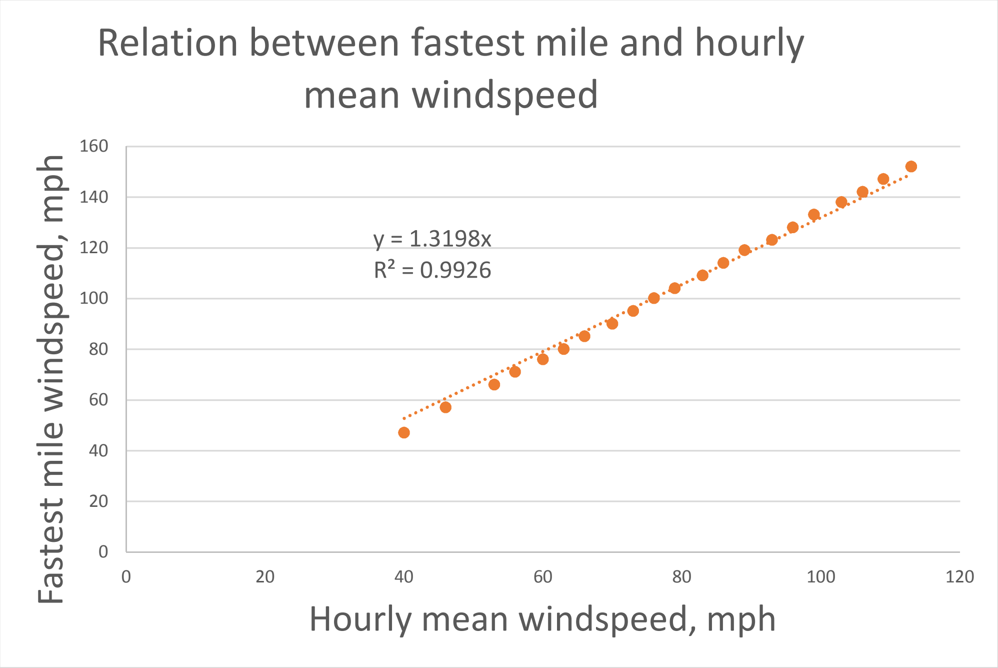
Note: Water and chemical dust suppressants will control fugitive dust on the access roads. A larger control efficiency (80%) is selected for access road volume sources ACC_0001 - ACC_0026 with close proximity to the facility fenceline. A lower control efficiency (50%) is selected for remaining access road sources. The larger control efficiency (80%) reflects the higher efficiency of chemical dust suppressant.

Wind Data for Pile Emissions Calculations

Adapted from Annex L: Wind Speed Conversions (Normative) in *TIA Standard Structural Standard for Antenna Supporting Structures and Antennas - Addendum 2* , ANSI/TIA-222-G-2-2009, December 2009

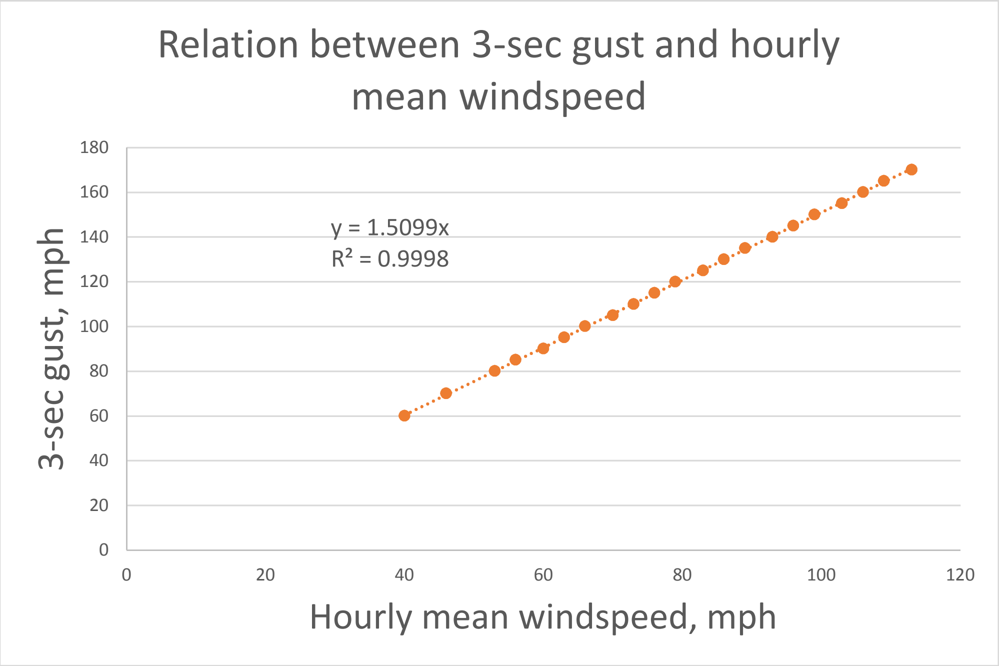
Fastest mile, mph	Hourly mean, mph	Ratio of fastest mile:hourly mean
47	40	1.18
57	46	1.24
66	53	1.25
71	56	1.27
76	60	1.27
80	63	1.27
85	66	1.29
90	70	1.29
95	73	1.30
100	76	1.32
104	79	1.32
109	83	1.31
114	86	1.33
119	89	1.34
123	93	1.32
128	96	1.33
133	99	1.34
138	103	1.34
142	106	1.34
147	109	1.35
152	113	1.35

Average ratio:	1.30
Max ratio:	1.35
Min ratio:	1.18



3-sec gust, mph	Hourly mean, mph	of fastest mile:hourly mean
60	40	1.50
70	46	1.52
80	53	1.51
85	56	1.52
90	60	1.50
95	63	1.51
100	66	1.52
105	70	1.50
110	73	1.51
115	76	1.51
120	79	1.52
125	83	1.51
130	86	1.51
135	89	1.52
140	93	1.51
145	96	1.51
150	99	1.52
155	103	1.50
160	106	1.51
165	109	1.51
170	113	1.50

Average ratio: 1.51
Max ratio: 1.52
Min ratio: 1.50



Tintina data:

	max 1-hr avg 10m WS (m/s)	u+10 (m/s) (= 1.3 * max avg WS)	u*
2012	15.6	20.28	1.07
2013	16.5	21.45	1.14
2014	15.6	20.28	1.07
2015	14.9	19.37	1.03
2016	15.4	20.02	1.06
2017	15.7	20.41	1.08
		maximum:	1.14

Assumptions: u^{+}_{10} = 1.3 * annual maximum 1-hour average wind speed (industry convention)

F7 Wind Tables for Pile Calculations - Example (other piles used similar methodology)

TABLE 1 - 2013 DAILY EROSION POTENTIAL

Date	Max Daily Hourly Avg Wind Speed $^{(b)}$ u+ *(m/s)*	Estimated Fasted Mile of Wind $^{(b)}$ u+10 *(m/s)*	Friction Velocity u* (m/s)	Erosion Potential, P_daily, g/m^2/ event
1/1/2013	7.2	9.710091743	0.51	0.00
1/2/2013	2.6	3.506422018	0.19	0.00
1/3/2013	3.4	4.585321101	0.24	0.00
1/4/2013	6.9	9.305504587	0.49	0.00
1/5/2013	3.3	4.450458716	0.24	0.00
1/6/2013	7.9	10.65412844	0.56	0.00
1/7/2013	9.3	12.54220183	0.66	0.00
1/8/2013	10.9	14.7	0.78	0.00
1/9/2013	10.3	13.89082569	0.74	0.00
1/10/2013	9.2	12.40733945	0.66	0.00
1/11/2013	5.7	7.687155963	0.41	0.00
1/12/2013	3.9	5.259633028	0.28	0.00
1/13/2013	3.9	5.259633028	0.28	0.00
1/14/2013	4.9	6.608256881	0.35	0.00
1/15/2013	6	8.091743119	0.43	0.00
1/16/2013	4.8	6.473394495	0.34	0.00
1/17/2013	6.1	8.226605505	0.44	0.00
1/18/2013	9.3	12.54220183	0.66	0.00
1/19/2013	7.2	9.710091743	0.51	0.00
1/20/2013	7	9.440366972	0.50	0.00
1/21/2013	6.1	8.226605505	0.44	0.00
1/22/2013	4.4	5.933944954	0.31	0.00
1/23/2013	2.6	3.506422018	0.19	0.00
1/24/2013	8.7	11.73302752	0.62	0.00
1/25/2013	4.2	5.664220183	0.30	0.00
1/26/2013	5.8	7.822018349	0.41	0.00
1/27/2013	2.9	3.911009174	0.21	0.00
1/28/2013	4.9	6.608256881	0.35	0.00
1/29/2013	7.9	10.65412844	0.56	0.00
1/30/2013	6.9	9.305504587	0.49	0.00
1/31/2013	6.6	8.900917431	0.47	0.00
2/1/2013	9.8	13.21651376	0.70	0.00
2/2/2013	6.1	8.226605505	0.44	0.00
2/3/2013	6.3	8.496330275	0.45	0.00
2/4/2013	10.1	13.62110092	0.72	0.00
2/5/2013	6.6	8.900917431	0.47	0.00
2/6/2013	7.4	9.979816514	0.53	0.00
2/7/2013	5.4	7.282568807	0.39	0.00
2/8/2013	4.6	6.203669725	0.33	0.00
2/9/2013	6.3	8.496330275	0.45	0.00
2/10/2013	9.8	13.21651376	0.70	0.00
2/11/2013	4.6	6.203669725	0.33	0.00
2/12/2013	8.1	10.92385321	0.58	0.00
2/13/2013	10.2	13.7559633	0.73	0.00
2/14/2013	6.9	9.305504587	0.49	0.00
2/15/2013	6	8.091743119	0.43	0.00
2/16/2013	5.7	7.687155963	0.41	0.00
2/17/2013	9.2	12.40733945	0.66	0.00
2/18/2013	4.5	6.068807339	0.32	0.00
2/19/2013	5.4	7.282568807	0.39	0.00
2/20/2013	3.1	4.180733945	0.22	0.00
2/21/2013	6.1	8.226605505	0.44	0.00
2/22/2013	8.7	11.73302752	0.62	0.00
2/23/2013	8	10.78899083	0.57	0.00
2/24/2013	7.7	10.38440367	0.55	0.00
2/25/2013	6.9	9.305504587	0.49	0.00
2/26/2013	7.1	9.575229358	0.51	0.00
2/27/2013	5.6	7.552293578	0.40	0.00
2/28/2013	7.5	10.1146789	0.54	0.00
3/1/2013	8	10.78899083	0.57	0.00

TABLE 2 - 2016 DAILY EROSION POTENTIAL

Date	Max Daily Hourly Avg Wind Speed $^{(a)}$ u+ *(m/s)*	Estimated Fasted Mile of Wind $^{(a)}$ u+10 *(m/s)*	Friction Velocity u* (m/s)	Erosion Potential, P_daily, g/m^2/ event
1/1/2016	1.4	1.88807339	0.10	0.00
1/2/2016	1.7	2.29266055	0.12	0.00
1/3/2016	4.7	6.33853211	0.34	0.00
1/4/2016	3.9	5.25963303	0.28	0.00
1/5/2016	3.9	5.25963303	0.28	0.00
1/6/2016	1.3	1.75321101	0.09	0.00
1/7/2016	3.9	5.25963303	0.28	0.00
1/8/2016	1.6	2.15779817	0.11	0.00
1/9/2016	4.4	5.93394495	0.31	0.00
1/10/2016	4.9	6.60825688	0.35	0.00
1/11/2016	4.2	5.66422018	0.30	0.00
1/12/2016	9.2	12.4073394	0.66	0.00
1/13/2016	5.6	7.55229358	0.40	0.00
1/14/2016	7.9	10.6541284	0.56	0.00
1/15/2016	3.7	4.98990826	0.26	0.00
1/16/2016	4.8	6.4733945	0.34	0.00
1/17/2016	5.4	7.28256881	0.39	0.00
1/18/2016	5.9	7.95688073	0.42	0.00
1/19/2016	4.7	6.33853211	0.34	0.00
1/20/2016	7.1	9.57522936	0.51	0.00
1/21/2016	4.7	6.33853211	0.34	0.00
1/22/2016	7.3	9.84495413	0.52	0.00
1/23/2016	3.7	4.98990826	0.26	0.00
1/24/2016	6.1	8.2266055	0.44	0.00
1/25/2016	5.7	7.68715596	0.41	0.00
1/26/2016	4.8	6.4733945	0.34	0.00
1/27/2016	6.2	8.36146789	0.44	0.00
1/28/2016	6.5	8.76605505	0.46	0.00
1/29/2016	10.7	14.4302752	0.76	0.00
1/30/2016	9.8	13.2165138	0.70	0.00
1/31/2016	7.3	9.84495413	0.52	0.00
2/1/2016	4.5	6.06880734	0.32	0.00
2/2/2016	4.8	6.4733945	0.34	0.00
2/3/2016	7.3	9.84495413	0.52	0.00
2/4/2016	9.9	13.3513761	0.71	0.00
2/5/2016	6.6	8.90091743	0.47	0.00
2/6/2016	14.7	19.8247706	1.05	**0.82**
2/7/2016	7.3	9.84495413	0.52	0.00
2/8/2016	5.7	7.68715596	0.41	0.00
2/9/2016	2.8	3.77614679	0.20	0.00
2/10/2016	4.8	6.4733945	0.34	0.00
2/11/2016	7.6	10.2495413	0.54	0.00
2/12/2016	2	2.69724771	0.14	0.00
2/13/2016	10.5	14.1605505	0.75	0.00
2/14/2016	10.5	14.1605505	0.75	0.00
2/15/2016	11.7	15.7788991	0.84	0.00
2/16/2016	9	12.1376147	0.64	0.00
2/17/2016	4.8	6.4733945	0.34	0.00
2/18/2016	9.5	12.8119266	0.68	0.00
2/19/2016	9.8	13.2165138	0.70	0.00
2/20/2016	9	12.1376147	0.64	0.00
2/21/2016	5.4	7.28256881	0.39	0.00
2/22/2016	8.4	11.3284404	0.60	0.00
2/23/2016	5.6	7.55229358	0.40	0.00
2/24/2016	3.8	5.12477064	0.27	0.00
2/25/2016	5.9	7.95688073	0.42	0.00
2/26/2016	4.6	6.20366972	0.33	0.00
2/27/2016	9.3	12.5422018	0.66	0.00
2/28/2016	8.9	12.0027523	0.64	0.00
2/29/2016	11.3	15.2394495	0.81	0.00
3/1/2016	5.2	7.01284404	0.37	0.00

TABLE 3 - MAX DAILY EROSION POTENTIAL FROM 2013 & 2016 AND

Worst case daily erosion potential, P_daily, from years 2013 and 2016, g/m^2/event	*Daily emissions, g/m^2 = P * # of daily disturbance events*
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.82	**21.83**
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

3/2/2013	3.6	4.855045872	0.26	0.00
3/3/2013	13.2	17.80183486	0.94	0.00
3/4/2013	9.5	12.81192661	0.68	0.00
3/5/2013	4.7	6.33853211	0.34	0.00
3/6/2013	7.1	9.575229358	0.51	0.00
3/7/2013	7	9.440366972	0.50	0.00
3/8/2013	4.8	6.473394495	0.34	0.00
3/9/2013	7.6	10.24954128	0.54	0.00
3/10/2013	11.2	15.10458716	0.80	0.00
3/11/2013	10	13.48623853	0.71	0.00
3/12/2013	5.5	7.417431193	0.39	0.00
3/13/2013	6	8.091743119	0.43	0.00
3/14/2013	3.4	4.585321101	0.24	0.00
3/15/2013	9.6	12.94678899	0.69	0.00
3/16/2013	5.9	7.956880734	0.42	0.00
3/17/2013	10.4	14.02568807	0.74	0.00
3/18/2013	10.3	13.89082569	0.74	0.00
3/19/2013	7.4	9.979816514	0.53	0.00
3/20/2013	8.4	11.32844037	0.60	0.00
3/21/2013	10.8	14.56513761	0.77	0.00
3/22/2013	7.6	10.24954128	0.54	0.00
3/23/2013	7.1	9.575229358	0.51	0.00
3/24/2013	6.9	9.305504587	0.49	0.00
3/25/2013	4.1	5.529357798	0.29	0.00
3/26/2013	3.5	4.720183486	0.25	0.00
3/27/2013	4	5.394495413	0.29	0.00
3/28/2013	4.1	5.529357798	0.29	0.00
3/29/2013	7.2	9.710091743	0.51	0.00
3/30/2013	6.5	8.766055046	0.46	0.00
3/31/2013	5	6.743119266	0.36	0.00
4/1/2013	7.2	9.710091743	0.51	0.00
4/2/2013	4.7	6.33853211	0.34	0.00
4/3/2013	5.6	7.552293578	0.40	0.00
4/4/2013	5.8	7.822018349	0.41	0.00
4/5/2013	8	10.78899083	0.57	0.00
4/6/2013	6.2	8.36146789	0.44	0.00
4/7/2013	5.4	7.282568807	0.39	0.00
4/8/2013	6.4	8.631192661	0.46	0.00
4/9/2013	4.4	5.933944954	0.31	0.00
4/10/2013	8.5	11.46330275	0.61	0.00
4/11/2013	7.7	10.38440367	0.55	0.00
4/12/2013	7.7	10.38440367	0.55	0.00
4/13/2013	10.5	14.16055046	0.75	0.00
4/14/2013	9.2	12.40733945	0.66	0.00
4/15/2013	7.5	10.1146789	0.54	0.00
4/16/2013	7.4	9.979816514	0.53	0.00
4/17/2013	4.9	6.608256881	0.35	0.00
4/18/2013	8.6	11.59816514	0.61	0.00
4/19/2013	3.9	5.259633028	0.28	0.00
4/20/2013	10.8	14.56513761	0.77	0.00
4/21/2013	4.6	6.203669725	0.33	0.00
4/22/2013	4.4	5.933944954	0.31	0.00
4/23/2013	6.8	9.170642202	0.49	0.00
4/24/2013	9	12.13761468	0.64	0.00
4/25/2013	9.1	12.27247706	0.65	0.00
4/26/2013	8.2	11.0587156	0.59	0.00
4/27/2013	12.6	16.99266055	0.90	0.00
4/28/2013	8.5	11.46330275	0.61	0.00
4/29/2013	16.5	22.25229358	1.18	**5.46**
4/30/2013	7.1	9.575229358	0.51	0.00
5/1/2013	5.8	7.822018349	0.41	0.00
5/2/2013	6.9	9.305504587	0.49	0.00
5/3/2013	5.1	6.877981651	0.36	0.00
5/4/2013	6	8.091743119	0.43	0.00
5/5/2013	8	10.78899083	0.57	0.00
5/6/2013	4.5	6.068807339	0.32	0.00
5/7/2013	9.3	12.54220183	0.66	0.00
5/8/2013	7.4	9.979816514	0.53	0.00
5/9/2013	5.9	7.956880734	0.42	0.00
5/10/2013	8.6	11.59816514	0.61	0.00
5/11/2013	5.9	7.956880734	0.42	0.00

3/2/2016	10.6	14.2954128	0.76	0.00
3/3/2016	9.2	12.4073394	0.66	0.00
3/4/2016	4	5.39449541	0.29	0.00
3/5/2016	6.8	9.1706422	0.49	0.00
3/6/2016	8.2	11.0587156	0.59	0.00
3/7/2016	4.3	5.79908257	0.31	0.00
3/8/2016	5.4	7.28256881	0.39	0.00
3/9/2016	5.4	7.28256881	0.39	0.00
3/10/2016	9.9	13.3513761	0.71	0.00
3/11/2016	7.5	10.1146789	0.54	0.00
3/12/2016	6.3	8.49633028	0.45	0.00
3/13/2016	6.5	8.76605505	0.46	0.00
3/14/2016	7.7	10.3844037	0.55	0.00
3/15/2016	9.7	13.0816514	0.69	0.00
3/16/2016	8.8	11.8678899	0.63	0.00
3/17/2016	6.3	8.49633028	0.45	0.00
3/18/2016	5.2	7.01284404	0.37	0.00
3/19/2016	4.8	6.4733945	0.34	0.00
3/20/2016	4.3	5.79908257	0.31	0.00
3/21/2016	7.3	9.84495413	0.52	0.00
3/22/2016	5.5	7.41743119	0.39	0.00
3/23/2016	7.3	9.84495413	0.52	0.00
3/24/2016	9.3	12.5422018	0.66	0.00
3/25/2016	6.6	8.90091743	0.47	0.00
3/26/2016	7.9	10.6541284	0.56	0.00
3/27/2016	5	6.74311927	0.36	0.00
3/28/2016	5.3	7.14770642	0.38	0.00
3/29/2016	7.5	10.1146789	0.54	0.00
3/30/2016	6.7	9.03577982	0.48	0.00
3/31/2016	8	10.7889908	0.57	0.00
4/1/2016	6	8.09174312	0.43	0.00
4/2/2016	10.1	13.6211009	0.72	0.00
4/3/2016	10.2	13.7559633	0.73	0.00
4/4/2016	9.3	12.5422018	0.66	0.00
4/5/2016	10.3	13.8908257	0.74	0.00
4/6/2016	10.7	14.4302752	0.76	0.00
4/7/2016	5.8	7.82201835	0.41	0.00
4/8/2016	4.9	6.60825688	0.35	0.00
4/9/2016	6.5	8.76605505	0.46	0.00
4/10/2016	5	6.74311927	0.36	0.00
4/11/2016	5.8	7.82201835	0.41	0.00
4/12/2016	6.9	9.30550459	0.49	0.00
4/13/2016	6.9	9.30550459	0.49	0.00
4/14/2016	6.2	8.36146789	0.44	0.00
4/15/2016	7.6	10.2495413	0.54	0.00
4/16/2016	5.5	7.41743119	0.39	0.00
4/17/2016	4.8	6.4733945	0.34	0.00
4/18/2016	4.6	6.20366972	0.33	0.00
4/19/2016	5.2	7.01284404	0.37	0.00
4/20/2016	6.9	9.30550459	0.49	0.00
4/21/2016	5.8	7.82201835	0.41	0.00
4/22/2016	7.2	9.71009174	0.51	0.00
4/23/2016	6.2	8.36146789	0.44	0.00
4/24/2016	6.2	8.36146789	0.44	0.00
4/25/2016	7.3	9.84495413	0.52	0.00
4/26/2016	8	10.7889908	0.57	0.00
4/27/2016	6.2	8.36146789	0.44	0.00
4/28/2016	7.5	10.1146789	0.54	0.00
4/29/2016	8.3	11.193578	0.59	0.00
4/30/2016	6.1	8.2266055	0.44	0.00
5/1/2016	7.2	9.71009174	0.51	0.00
5/2/2016	5.2	7.01284404	0.37	0.00
5/3/2016	4.4	5.93394495	0.31	0.00
5/4/2016	6.7	9.03577982	0.48	0.00
5/5/2016	5.5	7.41743119	0.39	0.00
5/6/2016	6.9	9.30550459	0.49	0.00
5/7/2016	8.9	12.0027523	0.64	0.00
5/8/2016	5.8	7.82201835	0.41	0.00
5/9/2016	6.8	9.1706422	0.49	0.00
5/10/2016	8.7	11.7330275	0.62	0.00
5/11/2016	6	8.09174312	0.43	0.00

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5.46	**144.83**
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5/12/2013	7.8	10.51926606	0.56	0.00
5/13/2013	8	10.78899083	0.57	0.00
5/14/2013	9.2	12.40733945	0.66	0.00
5/15/2013	4.3	5.799082569	0.31	0.00
5/16/2013	3.9	5.259633028	0.28	0.00
5/17/2013	5.4	7.282568807	0.39	0.00
5/18/2013	6.1	8.226605505	0.44	0.00
5/19/2013	5.6	7.552293578	0.40	0.00
5/20/2013	5.2	7.012844037	0.37	0.00
5/21/2013	8.4	11.32844037	0.60	0.00
5/22/2013	9.4	12.67706422	0.67	0.00
5/23/2013	10.1	13.62110092	0.72	0.00
5/24/2013	9.2	12.40733945	0.66	0.00
5/25/2013	5.6	7.552293578	0.40	0.00
5/26/2013	7.4	9.979816514	0.53	0.00
5/27/2013	5.5	7.417431193	0.39	0.00
5/28/2013	4.6	6.203669725	0.33	0.00
5/29/2013	3.1	4.180733945	0.22	0.00
5/30/2013	8.2	11.0587156	0.59	0.00
5/31/2013	8.8	11.86788991	0.63	0.00
6/1/2013	4.4	5.933944954	0.31	0.00
6/2/2013	4.9	6.608256881	0.35	0.00
6/3/2013	9.3	12.54220183	0.66	0.00
6/4/2013	5.1	6.877981651	0.36	0.00
6/5/2013	4.3	5.799082569	0.31	0.00
6/6/2013	4.3	5.799082569	0.31	0.00
6/7/2013	9.6	12.94678899	0.69	0.00
6/8/2013	6.8	9.170642202	0.49	0.00
6/9/2013	9	12.13761468	0.64	0.00
6/10/2013	7.5	10.1146789	0.54	0.00
6/11/2013	5.8	7.822018349	0.41	0.00
6/12/2013	8.8	11.86788991	0.63	0.00
6/13/2013	7.2	9.710091743	0.51	0.00
6/14/2013	9.9	13.35137615	0.71	0.00
6/15/2013	7	9.440366972	0.50	0.00
6/16/2013	4.2	5.664220183	0.30	0.00
6/17/2013	7	9.440366972	0.50	0.00
6/18/2013	8.1	10.92385321	0.58	0.00
6/19/2013	9.3	12.54220183	0.66	0.00
6/20/2013	8.9	12.00275229	0.64	0.00
6/21/2013	4.8	6.473394495	0.34	0.00
6/22/2013	5.7	7.687155963	0.41	0.00
6/23/2013	5.1	6.877981651	0.36	0.00
6/24/2013	8.6	11.59816514	0.61	0.00
6/25/2013	7.4	9.979816514	0.53	0.00
6/26/2013	7.5	10.1146789	0.54	0.00
6/27/2013	8.6	11.59816514	0.61	0.00
6/28/2013	4.8	6.473394495	0.34	0.00
6/29/2013	5	6.743119266	0.36	0.00
6/30/2013	5.4	7.282568807	0.39	0.00
7/1/2013	3.8	5.124770642	0.27	0.00
7/2/2013	5.8	7.822018349	0.41	0.00
7/3/2013	6.7	9.035779817	0.48	0.00
7/4/2013	4.9	6.608256881	0.35	0.00
7/5/2013	6	8.091743119	0.43	0.00
7/6/2013	4.4	5.933944954	0.31	0.00
7/7/2013	5.4	7.282568807	0.39	0.00
7/8/2013	5.7	7.687155963	0.41	0.00
7/9/2013	4.8	6.473394495	0.34	0.00
7/10/2013	4.5	6.068807339	0.32	0.00
7/11/2013	8.8	11.86788991	0.63	0.00
7/12/2013	5.6	7.552293578	0.40	0.00
7/13/2013	5.9	7.956880734	0.42	0.00
7/14/2013	7.3	9.844954128	0.52	0.00
7/15/2013	5.3	7.147706422	0.38	0.00
7/16/2013	9.3	12.54220183	0.66	0.00
7/17/2013	6.3	8.496330275	0.45	0.00
7/18/2013	5.5	7.417431193	0.39	0.00
7/19/2013	7.8	10.51926606	0.56	0.00
7/20/2013	4	5.394495413	0.29	0.00
7/21/2013	4.3	5.799082569	0.31	0.00

5/12/2016	6.1	8.2266055	0.44	0.00
5/13/2016	6.2	8.36146789	0.44	0.00
5/14/2016	11.1	14.9697248	0.79	0.00
5/15/2016	6.3	8.49633028	0.45	0.00
5/16/2016	8.2	11.0587156	0.59	0.00
5/17/2016	3.9	5.25963303	0.28	0.00
5/18/2016	5.6	7.55229358	0.40	0.00
5/19/2016	9.2	12.4073394	0.66	0.00
5/20/2016	6.5	8.76605505	0.46	0.00
5/21/2016	5.5	7.41743119	0.39	0.00
5/22/2016	9	12.1376147	0.64	0.00
5/23/2016	8.6	11.5981651	0.61	0.00
5/24/2016	5.6	7.55229358	0.40	0.00
5/25/2016	6	8.09174312	0.43	0.00
5/26/2016	8	10.7889908	0.57	0.00
5/27/2016	5.7	7.68715596	0.41	0.00
5/28/2016	6.4	8.63119266	0.46	0.00
5/29/2016	5.6	7.55229358	0.40	0.00
5/30/2016	8.9	12.0027523	0.64	0.00
5/31/2016	7.9	10.6541284	0.56	0.00
6/1/2016	4.2	5.66422018	0.30	0.00
6/2/2016	8.2	11.0587156	0.59	0.00
6/3/2016	7.7	10.3844037	0.55	0.00
6/4/2016	4	5.39449541	0.29	0.00
6/5/2016	5.7	7.68715596	0.41	0.00
6/6/2016	7	9.44036697	0.50	0.00
6/7/2016	10.5	14.1605505	0.75	0.00
6/8/2016	4.1	5.5293578	0.29	0.00
6/9/2016	5.5	7.41743119	0.39	0.00
6/10/2016	8.6	11.5981651	0.61	0.00
6/11/2016	5.3	7.14770642	0.38	0.00
6/12/2016	5.2	7.01284404	0.37	0.00
6/13/2016	8.7	11.7330275	0.62	0.00
6/14/2016	9.5	12.8119266	0.68	0.00
6/15/2016	6.8	9.1706422	0.49	0.00
6/16/2016	9.6	12.946789	0.69	0.00
6/17/2016	3	4.04587156	0.21	0.00
6/18/2016	10.9	14.7	0.78	0.00
6/19/2016	9.5	12.8119266	0.68	0.00
6/20/2016	7	9.44036697	0.50	0.00
6/21/2016	11.2	15.1045872	0.80	0.00
6/22/2016	4.7	6.33853211	0.34	0.00
6/23/2016	9.2	12.4073394	0.66	0.00
6/24/2016	8.8	11.8678899	0.63	0.00
6/25/2016	10.7	14.4302752	0.76	0.00
6/26/2016	4.9	6.60825688	0.35	0.00
6/27/2016	4.6	6.20366972	0.33	0.00
6/28/2016	3.6	4.85504587	0.26	0.00
6/29/2016	5.4	7.28256881	0.39	0.00
6/30/2016	7.3	9.84495413	0.52	0.00
7/1/2016	4.6	6.20366972	0.33	0.00
7/2/2016	7.3	9.84495413	0.52	0.00
7/3/2016	8.7	11.7330275	0.62	0.00
7/4/2016	8.2	11.0587156	0.59	0.00
7/5/2016	6.1	8.2266055	0.44	0.00
7/6/2016	8.9	12.0027523	0.64	0.00
7/7/2016	4.5	6.06880734	0.32	0.00
7/8/2016	5.9	7.95688073	0.42	0.00
7/9/2016	5.7	7.68715596	0.41	0.00
7/10/2016	6.3	8.49633028	0.45	0.00
7/11/2016	8.7	11.7330275	0.62	0.00
7/12/2016	5.7	7.68715596	0.41	0.00
7/13/2016	5	6.74311927	0.36	0.00
7/14/2016	5	6.74311927	0.36	0.00
7/15/2016	7	9.44036697	0.50	0.00
7/16/2016	5.7	7.68715596	0.41	0.00
7/17/2016	6.1	8.2266055	0.44	0.00
7/18/2016	8.6	11.5981651	0.61	0.00
7/19/2016	5.8	7.82201835	0.41	0.00
7/20/2016	7.2	9.71009174	0.51	0.00
7/21/2016	5.5	7.41743119	0.39	0.00

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7/22/2013	0	0	0.00	0.00
7/23/2013	0	0	0.00	0.00
7/24/2013	0	0	0.00	0.00
7/25/2013	0	0	0.00	0.00
7/26/2013	0	0	0.00	0.00
7/27/2013	0	0	0.00	0.00
7/28/2013	0	0	0.00	0.00
7/29/2013	0	0	0.00	0.00
7/30/2013	0	0	0.00	0.00
7/31/2013	0	0	0.00	0.00
8/1/2013	0	0	0.00	0.00
8/2/2013	0	0	0.00	0.00
8/3/2013	0	0	0.00	0.00
8/4/2013	0	0	0.00	0.00
8/5/2013	0	0	0.00	0.00
8/6/2013	0	0	0.00	0.00
8/7/2013	0	0	0.00	0.00
8/8/2013	0	0	0.00	0.00
8/9/2013	0	0	0.00	0.00
8/10/2013	0	0	0.00	0.00
8/11/2013	0	0	0.00	0.00
8/12/2013	0	0	0.00	0.00
8/13/2013	0	0	0.00	0.00
8/14/2013	0	0	0.00	0.00
8/15/2013	0	0	0.00	0.00
8/16/2013	0	0	0.00	0.00
8/17/2013	0	0	0.00	0.00
8/18/2013	0	0	0.00	0.00
8/19/2013	0	0	0.00	0.00
8/20/2013	0	0	0.00	0.00
8/21/2013	0	0	0.00	0.00
8/22/2013	0	0	0.00	0.00
8/23/2013	0	0	0.00	0.00
8/24/2013	0	0	0.00	0.00
8/25/2013	0	0	0.00	0.00
8/26/2013	0	0	0.00	0.00
8/27/2013	0	0	0.00	0.00
8/28/2013	0	0	0.00	0.00
8/29/2013	4.6	6.203669725	0.33	0.00
8/30/2013	7.4	9.979816514	0.53	0.00
8/31/2013	4.2	5.664220183	0.30	0.00
9/1/2013	3.5	4.720183486	0.25	0.00
9/2/2013	7.1	9.575229358	0.51	0.00
9/3/2013	5.2	7.012844037	0.37	0.00
9/4/2013	4.3	5.799082569	0.31	0.00
9/5/2013	8.4	11.32844037	0.60	0.00
9/6/2013	6.1	8.226605505	0.44	0.00
9/7/2013	5.7	7.687155963	0.41	0.00
9/8/2013	7.3	9.844954128	0.52	0.00
9/9/2013	5.9	7.956880734	0.42	0.00
9/10/2013	3.4	4.585321101	0.24	0.00
9/11/2013	4.8	6.473394495	0.34	0.00
9/12/2013	7.8	10.51926606	0.56	0.00
9/13/2013	3.6	4.855045872	0.26	0.00
9/14/2013	8.1	10.92385321	0.58	0.00
9/15/2013	9.8	13.21651376	0.70	0.00
9/16/2013	10.7	14.43027523	0.76	0.00
9/17/2013	6.8	9.170642202	0.49	0.00
9/18/2013	7.8	10.51926606	0.56	0.00
9/19/2013	5.2	7.012844037	0.37	0.00
9/20/2013	5.6	7.552293578	0.40	0.00
9/21/2013	6.8	9.170642202	0.49	0.00
9/22/2013	7	9.440366972	0.50	0.00
9/23/2013	9.8	13.21651376	0.70	0.00
9/24/2013	5	6.743119266	0.36	0.00
9/25/2013	3.9	5.259633028	0.28	0.00
9/26/2013	6.9	9.305504587	0.49	0.00
9/27/2013	6.7	9.035779817	0.48	0.00
9/28/2013	6.6	8.900917431	0.47	0.00
9/29/2013	0	0	0.00	0.00
9/30/2013	0	0	0.00	0.00

7/22/2016	7.5	10.1146789	0.54	0.00
7/23/2016	7.7	10.3844037	0.55	0.00
7/24/2016	5	6.74311927	0.36	0.00
7/25/2016	6.3	8.49633028	0.45	0.00
7/26/2016	5.9	7.95688073	0.42	0.00
7/27/2016	5.3	7.14770642	0.38	0.00
7/28/2016	5.2	7.01284404	0.37	0.00
7/29/2016	5.1	6.87798165	0.36	0.00
7/30/2016	6.5	8.76605505	0.46	0.00
7/31/2016	7.1	9.57522936	0.51	0.00
8/1/2016	4.7	6.33853211	0.34	0.00
8/2/2016	5.5	7.41743119	0.39	0.00
8/3/2016	10.1	13.6211009	0.72	0.00
8/4/2016	3.6	4.85504587	0.26	0.00
8/5/2016	7.8	10.5192661	0.56	0.00
8/6/2016	8.3	11.193578	0.59	0.00
8/7/2016	8	10.7889908	0.57	0.00
8/8/2016	5.2	7.01284404	0.37	0.00
8/9/2016	6.6	8.90091743	0.47	0.00
8/10/2016	8.3	11.193578	0.59	0.00
8/11/2016	5.7	7.68715596	0.41	0.00
8/12/2016	7.6	10.2495413	0.54	0.00
8/13/2016	3.9	5.25963303	0.28	0.00
8/14/2016	4.5	6.06880734	0.32	0.00
8/15/2016	5.1	6.87798165	0.36	0.00
8/16/2016	3.8	5.12477064	0.27	0.00
8/17/2016	6.3	8.49633028	0.45	0.00
8/18/2016	5.8	7.82201835	0.41	0.00
8/19/2016	5	6.74311927	0.36	0.00
8/20/2016	3.8	5.12477064	0.27	0.00
8/21/2016	7.9	10.6541284	0.56	0.00
8/22/2016	9.2	12.4073394	0.66	0.00
8/23/2016	7.6	10.2495413	0.54	0.00
8/24/2016	6.3	8.49633028	0.45	0.00
8/25/2016	4.1	5.5293578	0.29	0.00
8/26/2016	4.2	5.66422018	0.30	0.00
8/27/2016	7.9	10.6541284	0.56	0.00
8/28/2016	6.6	8.90091743	0.47	0.00
8/29/2016	6.2	8.36146789	0.44	0.00
8/30/2016	4.2	5.66422018	0.30	0.00
8/31/2016	6	8.09174312	0.43	0.00
9/1/2016	7.1	9.57522936	0.51	0.00
9/2/2016	7.2	9.71009174	0.51	0.00
9/3/2016	3.3	4.45045872	0.24	0.00
9/4/2016	4.6	6.20366972	0.33	0.00
9/5/2016	5.5	7.41743119	0.39	0.00
9/6/2016	6.2	8.36146789	0.44	0.00
9/7/2016	7.4	9.97981651	0.53	0.00
9/8/2016	11	14.8348624	0.79	0.00
9/9/2016	5.6	7.55229358	0.40	0.00
9/10/2016	8.9	12.0027523	0.64	0.00
9/11/2016	8.4	11.3284404	0.60	0.00
9/12/2016	6.4	8.63119266	0.46	0.00
9/13/2016	7.4	9.97981651	0.53	0.00
9/14/2016	4.9	6.60825688	0.35	0.00
9/15/2016	5.7	7.68715596	0.41	0.00
9/16/2016	5.9	7.95688073	0.42	0.00
9/17/2016	9	12.1376147	0.64	0.00
9/18/2016	11.3	15.2394495	0.81	0.00
9/19/2016	5.6	7.55229358	0.40	0.00
9/20/2016	7.1	9.57522936	0.51	0.00
9/21/2016	6.4	8.63119266	0.46	0.00
9/22/2016	4.6	6.20366972	0.33	0.00
9/23/2016	5.5	7.41743119	0.39	0.00
9/24/2016	9.5	12.8119266	0.68	0.00
9/25/2016	6.9	9.30550459	0.49	0.00
9/26/2016	4.4	5.93394495	0.31	0.00
9/27/2016	7.4	9.97981651	0.53	0.00
9/28/2016	7	9.44036697	0.50	0.00
9/29/2016	4.4	5.93394495	0.31	0.00
9/30/2016	3.5	4.72018349	0.25	0.00

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10/1/2013	0	0	0.00	0.00
10/2/2013	0	0	0.00	0.00
10/3/2013	0	0	0.00	0.00
10/4/2013	0	0	0.00	0.00
10/5/2013	0	0	0.00	0.00
10/6/2013	0	0	0.00	0.00
10/7/2013	0	0	0.00	0.00
10/8/2013	6.8	9.170642202	0.49	0.00
10/9/2013	9.2	12.40733945	0.66	0.00
10/10/2013	6.2	8.36146789	0.44	0.00
10/11/2013	7	9.440366972	0.50	0.00
10/12/2013	5.6	7.552293578	0.40	0.00
10/13/2013	4.6	6.203669725	0.33	0.00
10/14/2013	3.7	4.989908257	0.26	0.00
10/15/2013	3.8	5.124770642	0.27	0.00
10/16/2013	5.7	7.687155963	0.41	0.00
10/17/2013	7.4	9.979816514	0.53	0.00
10/18/2013	5.2	7.012844037	0.37	0.00
10/19/2013	7.6	10.24954128	0.54	0.00
10/20/2013	5.1	6.877981651	0.36	0.00
10/21/2013	6.7	9.035779817	0.48	0.00
10/22/2013	4.9	6.608256881	0.35	0.00
10/23/2013	4	5.394495413	0.29	0.00
10/24/2013	4.1	5.529357798	0.29	0.00
10/25/2013	6.4	8.631192661	0.46	0.00
10/26/2013	7.1	9.575229358	0.51	0.00
10/27/2013	8.4	11.32844037	0.60	0.00
10/28/2013	6.2	8.36146789	0.44	0.00
10/29/2013	4.4	5.933944954	0.31	0.00
10/30/2013	5.2	7.012844037	0.37	0.00
10/31/2013	9.3	12.54220183	0.66	0.00
11/1/2013	8.9	12.00275229	0.64	0.00
11/2/2013	6.6	8.900917431	0.47	0.00
11/3/2013	8.8	11.86788991	0.63	0.00
11/4/2013	4	5.394495413	0.29	0.00
11/5/2013	7.6	10.24954128	0.54	0.00
11/6/2013	9.4	12.67706422	0.67	0.00
11/7/2013	7.2	9.710091743	0.51	0.00
11/8/2013	7.1	9.575229358	0.51	0.00
11/9/2013	4.4	5.933944954	0.31	0.00
11/10/2013	2.8	3.776146789	0.20	0.00
11/11/2013	2.7	3.641284404	0.19	0.00
11/12/2013	4.7	6.33853211	0.34	0.00
11/13/2013	12.1	16.31834862	0.86	0.00
11/14/2013	6.7	9.035779817	0.48	0.00
11/15/2013	8.4	11.32844037	0.60	0.00
11/16/2013	6.5	8.766055046	0.46	0.00
11/17/2013	9.2	12.40733945	0.66	0.00
11/18/2013	4.7	6.33853211	0.34	0.00
11/19/2013	8.5	11.46330275	0.61	0.00
11/20/2013	5.2	7.012844037	0.37	0.00
11/21/2013	3.7	4.989908257	0.26	0.00
11/22/2013	4	5.394495413	0.29	0.00
11/23/2013	2.5	3.371559633	0.18	0.00
11/24/2013	3.4	4.585321101	0.24	0.00
11/25/2013	5.3	7.147706422	0.38	0.00
11/26/2013	4	5.394495413	0.29	0.00
11/27/2013	4.8	6.473394495	0.34	0.00
11/28/2013	3.7	4.989908257	0.26	0.00
11/29/2013	6.9	9.305504587	0.49	0.00
11/30/2013	7	9.440366972	0.50	0.00
12/1/2013	7.2	9.710091743	0.51	0.00
12/2/2013	6.8	9.170642202	0.49	0.00
12/3/2013	7.5	10.1146789	0.54	0.00
12/4/2013	6.7	9.035779817	0.48	0.00
12/5/2013	3.3	4.450458716	0.24	0.00
12/6/2013	3.5	4.720183486	0.25	0.00
12/7/2013	2.6	3.506422018	0.19	0.00
12/8/2013	4.1	5.529357798	0.29	0.00
12/9/2013	7.1	9.575229358	0.51	0.00
12/10/2013	7	9.440366972	0.50	0.00

10/1/2016	5.7	7.68715596	0.41	0.00
10/2/2016	7.7	10.3844037	0.55	0.00
10/3/2016	7.2	9.71009174	0.51	0.00
10/4/2016	9.8	13.2165138	0.70	0.00
10/5/2016	6.1	8.2266055	0.44	0.00
10/6/2016	5.8	7.82201835	0.41	0.00
10/7/2016	5.8	7.82201835	0.41	0.00
10/8/2016	4.6	6.20366972	0.33	0.00
10/9/2016	10	13.4862385	0.71	0.00
10/10/2016	7.3	9.84495413	0.52	0.00
10/11/2016	5.5	7.41743119	0.39	0.00
10/12/2016	4.3	5.79908257	0.31	0.00
10/13/2016	7.1	9.57522936	0.51	0.00
10/14/2016	9.8	13.2165138	0.70	0.00
10/15/2016	6.1	8.2266055	0.44	0.00
10/16/2016	9	12.1376147	0.64	0.00
10/17/2016	7.8	10.5192661	0.56	0.00
10/18/2016	8.1	10.9238532	0.58	0.00
10/19/2016	7.7	10.3844037	0.55	0.00
10/20/2016	5.3	7.14770642	0.38	0.00
10/21/2016	6.4	8.63119266	0.46	0.00
10/22/2016	8.4	11.3284404	0.60	0.00
10/23/2016	4.4	5.93394495	0.31	0.00
10/24/2016	5	6.74311927	0.36	0.00
10/25/2016	6.7	9.03577982	0.48	0.00
10/26/2016	4.6	6.20366972	0.33	0.00
10/27/2016	6.9	9.30550459	0.49	0.00
10/28/2016	5.5	7.41743119	0.39	0.00
10/29/2016	5.8	7.82201835	0.41	0.00
10/30/2016	4.5	6.06880734	0.32	0.00
10/31/2016	9.9	13.3513761	0.71	0.00
11/1/2016	6.5	8.76605505	0.46	0.00
11/2/2016	5.6	7.55229358	0.40	0.00
11/3/2016	3.7	4.98990826	0.26	0.00
11/4/2016	4.7	6.33853211	0.34	0.00
11/5/2016	4.1	5.5293578	0.29	0.00
11/6/2016	9.1	12.2724771	0.65	0.00
11/7/2016	4.6	6.20366972	0.33	0.00
11/8/2016	4.2	5.66422018	0.30	0.00
11/9/2016	4.6	6.20366972	0.33	0.00
11/10/2016	7.1	9.57522936	0.51	0.00
11/11/2016	3.7	4.98990826	0.26	0.00
11/12/2016	7.2	9.71009174	0.51	0.00
11/13/2016	7.6	10.2495413	0.54	0.00
11/14/2016	9.8	13.2165138	0.70	0.00
11/15/2016	8.7	11.7330275	0.62	0.00
11/16/2016	5.3	7.14770642	0.38	0.00
11/17/2016	4.6	6.20366972	0.33	0.00
11/18/2016	3.4	4.5853211	0.24	0.00
11/19/2016	4.7	6.33853211	0.34	0.00
11/20/2016	5.8	7.82201835	0.41	0.00
11/21/2016	4.5	6.06880734	0.32	0.00
11/22/2016	6.3	8.49633028	0.45	0.00
11/23/2016	5.9	7.95688073	0.42	0.00
11/24/2016	6.7	9.03577982	0.48	0.00
11/25/2016	5.9	7.95688073	0.42	0.00
11/26/2016	6.8	9.1706422	0.49	0.00
11/27/2016	7.7	10.3844037	0.55	0.00
11/28/2016	8.7	11.7330275	0.62	0.00
11/29/2016	5.6	7.55229358	0.40	0.00
11/30/2016	3.3	4.45045872	0.24	0.00
12/1/2016	4.3	5.79908257	0.31	0.00
12/2/2016	5.1	6.87798165	0.36	0.00
12/3/2016	9.2	12.4073394	0.66	0.00
12/4/2016	7.8	10.5192661	0.56	0.00
12/5/2016	5	6.74311927	0.36	0.00
12/6/2016	4.1	5.5293578	0.29	0.00
12/7/2016	2.7	3.6412844	0.19	0.00
12/8/2016	6.4	8.63119266	0.46	0.00
12/9/2016	4.8	6.4733945	0.34	0.00
12/10/2016	11.3	15.2394495	0.81	0.00

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12/11/2013	6	8.091743119	0.43	0.00
12/12/2013	4.3	5.799082569	0.31	0.00
12/13/2013	7.6	10.24954128	0.54	0.00
12/14/2013	7.6	10.24954128	0.54	0.00
12/15/2013	10.3	13.89082569	0.74	0.00
12/16/2013	8.2	11.0587156	0.59	0.00
12/17/2013	8.6	11.59816514	0.61	0.00
12/18/2013	7.7	10.38440367	0.55	0.00
12/19/2013	6.1	8.226605505	0.44	0.00
12/20/2013	4.9	6.608256881	0.35	0.00
12/21/2013	4.8	6.473394495	0.34	0.00
12/22/2013	2	2.697247706	0.14	0.00
12/23/2013	8.7	11.73302752	0.62	0.00
12/24/2013	10.5	14.16055046	0.75	0.00
12/25/2013	5.1	6.877981651	0.36	0.00
12/26/2013	6.9	9.305504587	0.49	0.00
12/27/2013	4.9	6.608256881	0.35	0.00
12/28/2013	10.5	14.16055046	0.75	0.00
12/29/2013	6.7	9.035779817	0.48	0.00
12/30/2013	5.6	7.552293578	0.40	0.00
12/31/2013	8.5	11.46330275	0.61	0.00

12/11/2016	5.6	7.55229358	0.40	0.00
12/12/2016	5.7	7.68715596	0.41	0.00
12/13/2016	7.3	9.84495413	0.52	0.00
12/14/2016	1.6	2.15779817	0.11	0.00
12/15/2016	3.9	5.25963303	0.28	0.00
12/16/2016	5.2	7.01284404	0.37	0.00
12/17/2016	2.8	3.77614679	0.20	0.00
12/18/2016	5.9	7.95688073	0.42	0.00
12/19/2016	10.1	13.6211009	0.72	0.00
12/20/2016	15.4	20.7688073	1.10	**2.40**
12/21/2016	7.8	10.5192661	0.56	0.00
12/22/2016	4	5.39449541	0.29	0.00
12/23/2016	3.1	4.18073394	0.22	0.00
12/24/2016	4.8	6.4733945	0.34	0.00
12/25/2016	6.9	9.30550459	0.49	0.00
12/26/2016	7	9.44036697	0.50	0.00
12/27/2016	8.6	11.5981651	0.61	0.00
12/28/2016	10.8	14.5651376	0.77	0.00
12/29/2016	3.5	4.72018349	0.25	0.00
12/30/2016	12.6	16.9926606	0.90	0.00
12/31/2016	6.1	8.2266055	0.44	0.00

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g/m^2/event:
5.46

Totals:

g/m^2/event:
3.22

g/m^2/event:
8.68

230.27 g/m^2/year
3 days with emissions

Notes:

General	Calculations are based on AP-42, Chapter 13.2.5-3, Industrial Wind Erosion (11/06)
General	These calculations assume piles are disturbed 27 times per day. They also assume 36 square meters of the pile is disturbed each time. Finally, they assume the maximum daily wind speed occurs between each disturbance. On the whole, these assumptions are very conservative and likely overestimate wind erosion emission significantly.

APPENDIX D: RACT/BACT/LAER DATABASE SEARCH RESULTS

Process Type Code: 90.021 - Lime/Limestone Handling/Kilns/Storage/Manufacturing
01/01/2007 - 12/31/2017
Only Mineral Process or Storage results included in table (in addition to state actions)

			Standardized Emission Limits					
RBLC-ID	**Facility Name**	**Process**	**FPM**	**FPM-10**	**Controls**	**% Efficiency**	**Date**	**PSD?**
IN-0167	MAGNETATION LLC	MIXING AREA MATERIAL HANDLING SYSTEM	0.002 gr/dscf	0.002 gr/dscf	BAGHOUSE	---	4/16/2013	PSD
	GRAYMONT INDIAN CREEK	HYDRATOR	0.01 GR/ACF	0.01 GR/ACF	FABRIC FILTER DUST COLLECTOR	---	6/21/2013	non PSD
	GRAYMONT INDIAN CREEK	HYDRATE PRODUCT HANDLING AND STORAGE	0.01 GR/DSCF	0.01 GR/DSCF	FABRIC FILTER DUST COLLECTOR	---	6/21/2013	non PSD
IN-0185	MAG PELLET LLC	MIXING AREA MATERIAL HANDLING SYSTEM	0.002 gr/dscf	---	FABRIC FILTER	---	4/24/2014	PSD
	GRAYMONT INDIAN CREEK	LIME LOADOUT SPOUTS	0.01 GR/DSCF	0.01 GR/DSCF	FABRIC FILTER DUST COLLECTOR	---	8/15/2017	non PSD
	GRAYMONT INDIAN CREEK	LIME KILN DUST SILO	0.01 GR/DSCF	0.01 GR/DSCF	FABRIC FILTER DUST COLLECTOR	---	8/15/2017	non PSD

APPENDIX E: MODELING FILES

Non-Road Fugitive Source Key

Source Directory

This indicates the individual Emission Inventory source associated with each modeled source.

Model Source ID	Associated Emissions Inventory		
	Wind Source	Dozer Source	Transfer Source
CTF_T_1 to CTF_T_4		F6 F10 F16	F6_CTF_T F10_CTF_T F16_CTF_T F24_T_CTF
CUPILE_1	F21		F20_T_CU
CUPILE_T_1		F13 F16	F13_CU_T F16_CU_T
CWP_T_1 to CWP_T_3		F13 F16	F13_CWP_T F16_CWP_T
DRAIN_CTF		F16	
DRAIN_PWP		F16	
MILL_T_1 to MILL_T_4		F13 F16	F13_MILL_T F16_MILL_T
NCWR_T_1 to NCWR_T_4		F8 F16	F8_T_NCWR
NPILE	F14		F13_T_NS

Model Source ID	Associated Emissions Inventory		
	Wind Source	Dozer Source	Transfer Source
POWDER		F16	
PORTAL_T_1 to PORTAL_T_4		F8 F16	F8_T_PP F16_PP_T
PWP_T_1 to PWP_T_4		F8 F16	F8_T_PWP F16_PWP_T
SPILE	F11		F10_T_SS
SUBS	F18		F16_T_SSOIL
TEMP	F7		F6_T_TEMP F8_TEMP_T
TOPS	F17		F16_T_TSOIL
WRS_1 to WRS_3	F23		F22_T_WRS
WRS_T_1 to WRS_T_3		F6 F13 F16	F6_WRS_T F13_WRS_T F16_WRS_T F24_WRS_T

Non-Road Fugitive Source Key

Expanded Source Directory

Model Source ID:	The volume source ID in the model containing all of the associated individual emission sources
EI Section:	Section for each associated emission calculation in the Emissions Inventory
EI Activity ID:	Inidividual emission calculation ID listed in the EI section or in the "Emission by Activity" page of the EI
Source Description:	Description of the individual emissions calculation or the modeled source

Model Source ID	**Emissions Inventory Section**	**EI Activity ID**	**Source Description**
CTF_T_1 **to** **CTF_T_4**			CTF Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to and from haul trucks
	F6	**F6_CTF_T**	Material transfer to Temporary Stockpile - CTF to Truck
	F10	**F10_CTF_T**	Material transfer to South Stockpile - CTF to Truck
	F16	**F16_CTF_T**	Soil and topsoil removal - CTF to Truck
	F24	**F24_T_CTF**	Waste Rock Transfer from WRS to CTF - Truck to CTF
	F6, F10, F16	**CTF_1**	Fugitive excavation, soil removal, and ground disturbance emissions for sources
	F6, F10, F16	**CTF_2**	Fugitive excavation, soil removal, and ground disturbance emissions for sources
	F6, F10, F16	**CTF_3**	Fugitive excavation, soil removal, and ground disturbance emissions for sources
	F6, F10, F16	**CTF_4**	Fugitive excavation, soil removal, and ground disturbance emissions for sources
CUPILE_1			Cu Ore Pile Activities - Wind erosion and pile disturbance; Truck transfer to pile
	F21	**F21**	Copper-enriched rock stockpile (mill feed) Wind Erosion
	F20	**F20_T_CU**	Copper-enriched rock drop to stockpile, MOY 2 to 3
CUPILE_T_1			Cu Ore Pile Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to haul trucks
	F13	**F13_CU_T**	Material transfer to North Stockpile - Cu-Enriched Ore Stockpile to Truck
	F16	**F16_CU_T**	Soil and topsoil removal - Cu-Enriched Ore Stockpile to Truck
	F13, F16	**CUPILE_1**	Excavation and topsoil/subsoil removal
CWP_T_1 **to** **CWP_T_3**			CWP Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to haul trucks
	F_13	**F13_CWP_T**	Material transfer to North Stockpile - CWP to Truck
	F_16	**F16_CWP_T**	Soil and topsoil removal - CWP to Truck
	F13, F16	**CWP_1**	Fugitive excavation, soil removal, and ground disturbance emissions for sources
	F13, F16	**CWP_2**	Fugitive excavation, soil removal, and ground disturbance emissions for sources
	F13, F16	**CWP_3**	Fugitive excavation, soil removal, and ground disturbance emissions for sources
DRAIN_CTF	F16	DRAIN_CTF	Fugitive excavation, soil removal, and ground disturbance emissions for sources
DRAIN_PWP	F16	DRAIN_PWP	Fugitive excavation, soil removal, and ground disturbance emissions for sources
MILL_T_1 **to** **MILL_T_4**			Mill Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to haul trucks
	F13	**F13_MILL_T**	Material transfer to North Stockpile - Mill Pad to Truck
	F16	**F16_MILL_T**	Soil and topsoil removal - Mill Pad to Truck
	F13, F16	**MILL_1**	Fugitive excavation, soil removal, and ground disturbance emissions for sources
	F13, F16	**MILL_2**	Fugitive excavation, soil removal, and ground disturbance emissions for sources
	F13, F16	**MILL_3**	Fugitive excavation, soil removal, and ground disturbance emissions for sources
	F13, F16	**MILL_4**	Fugitive excavation, soil removal, and ground disturbance emissions for sources
NCWR_T_1 **to** **NCWR_T_4**			NCWR Activities - excavation and ground disturbance; soil and topsoil removal; material transfers from haul trucks
	F8	**F8_T_NCWR**	Embankment Construction, Mine Operating - Truck to NCWR
	F8, F16	**NCWR_1**	Fugitive excavation, soil removal, and ground disturbance emissions for sources
	F8, F16	**NCWR_2**	Fugitive excavation, soil removal, and ground disturbance emissions for sources
	F8, F16	**NCWR_3**	Fugitive excavation, soil removal, and ground disturbance emissions for sources
	F8, F16	**NCWR_4**	Fugitive excavation, soil removal, and ground disturbance emissions for sources

Model Source ID	Emissions Inventory Section	EI Activity ID	Source Description
NPILE			North Stockpile Activies - wind erosion and pile disturbance; truck transfer to pile
	F14	**F14**	Excess reclamation stockpile (North) Wind Erosion
	F13	**F13_T_NS**	Material transfer to North Stockpile - Truck to North Stockpile
POWDER	F16	POWDER	Fugitive excavation, soil removal, and ground disturbance emissions for sources
PORTAL_T_1 to PORTAL_T_4			Portal Pad Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to and from haul trucks
	F8	**F8_T_PP**	Embankment Construction, Mine Operating - Truck to Portal Pad
	F16	**F16_PP_T**	Soil and topsoil removal - Portal Pad to Truck
	F8, F16	**PORTAL_1**	Fugitive excavation, soil removal, and ground disturbance emissions for sources
	F8, F16	**PORTAL_2**	Fugitive excavation, soil removal, and ground disturbance emissions for sources
	F8, F16	**PORTAL_3**	Fugitive excavation, soil removal, and ground disturbance emissions for sources
	F8, F16	**PORTAL_4**	Fugitive excavation, soil removal, and ground disturbance emissions for sources
PWP_T_1 to PWP_T_4			PWP Activities - excavation and ground disturbance; soil and topsoil removal; material transfers from haul trucks
	F8	**F8_T_PWP**	Embankment Construction, Mine Operating - Truck to PWP
	F16	**F16_PWP_T**	Soil and topsoil removal - PWP to Truck
	F8, F16	**PWP_1**	Fugitive excavation, soil removal, and ground disturbance emissions for sources F8, F16
	F8, F16	**PWP_2**	Fugitive excavation, soil removal, and ground disturbance emissions for sources F8, F16
	F8, F16	**PWP_3**	Fugitive excavation, soil removal, and ground disturbance emissions for sources F8, F16
	F8, F16	**PWP_4**	Fugitive excavation, soil removal, and ground disturbance emissions for sources F8, F16
SPILE			South Stockpile Activies - wind erosion and pile disturbance; truck transfer to pile
	F11	**F11**	Excess reclamation stockpile (South) Wind Erosion
	F10	**F10_T_SS**	Material transfer to South Stockpile - Truck to South Stockpile
SUBS			Subsoil Stockpile Activies - wind erosion and pile disturbance; truck transfer to pile
	F18	**F18**	Subsoil pile Wind Erosion
	F16	**F16_T_SSOIL**	Soil and topsoil removal - Truck to Subsoil Pile
TEMP			Temporary construction stockpile - wind erosion and pile distrubance; transfers to and from haul trucks
	F7	**F7**	Temporary construction stockpile Wind Erosion
	F6	**F6_T_TEMP**	Material transfer to Temporary Stockpile - Truck to Temp Const Stockpile
	F8	**F8_TEMP_T**	Embankment Construction, Mine Operating - Temp Const Stockpile to Truck
TOPS			Topsoil Stockpile Activies - wind erosion and pile disturbance; truck transfer to pile
	F17	**F17**	Topsoil pile Wind Erosion
	F16	**F16_T_TSOIL**	Soil and topsoil removal - Truck to Topsoil Pile
WRS_1 to WRS_3			WRS - Wind erosion and pile disturbance; Truck transfer to pile
	F23	**F23**	Temporary waste rock storage (WRS) Wind Erosion
	F22	**F22_T_WRS**	Waste Rock Drop -at WRS Pad, MOY 0 to 1.5, at CTF, MOY 1.5 to 4 and 8
WRS_T_1 to WRS_T_3			WRS Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to haul trucks
	F6	**F6_WRS_T**	Material transfer to Temporary Stockpile - WRS to Truck
	F13	**F13_WRS_T**	Material transfer to North Stockpile - WRS Pad to Truck
	F16	**F16_WRS_T**	Soil and topsoil removal - WRS Pad to Truck
	F24	**F24_WRS_T**	Waste Rock Transfer from WRS to CTF - WRS to Truck
	F6, F13, F16	**WRS_1**	Fugitive excavation, soil removal, and ground disturbance emissions for sources F6, F13, F16
	F6, F13, F16	**WRS_2**	Fugitive excavation, soil removal, and ground disturbance emissions for sources F6, F13, F16
	F6, F13, F16	**WRS_3**	Fugitive excavation, soil removal, and ground disturbance emissions for sources F6, F13, F16

Haul Road Source Notations

Road Activity ID Key

Create Activity ID

Mine Phase

D	Development
P	Production
C	Closure

Mine Process

Development

A	Soil and Subsoil Stripping and Hauling all Facilities
B	Embankment Construction
C	Excavated Material to North Reclamation Stockpile
D	Excavated Material to South Reclamation Stockpile
E	Waste Rock: Portal to WRS
F	Waste Rock: WRS to CTF
G	North Reclamation stockpile to WRS Pad
H	Soils Replaced from Soil Stockpiles to WRS Pad

Production

I	Waste Rock: Portal to CTF
J	Ore: Portal to Cu-Enriched Ore Stockpile
K	Ore: Portal to Crusher

Mine Area

T	CTF
O	Cu-Enriched Ore Stockpile
C	CWP
M	Mill Pad
N	NCWR
2	Portal Pad
P	PWP
W	WRS Pad

Road Activity ID Catalog

Phases, Processes, and Areas match the Emissions Inventory page "Road Dust Design Values"

Road Activity ID	Mine Phase	Mine Process	Mine Area	Phase	Process	Area
DA2	*Development*	Soil and Subsoil Stripping and Hauling all Facilities	Portal Pad	D	A	2
DAC	*Development*		CWP	D	A	C
DAO	*Development*		Cu-Enriched Ore Stockpile	D	A	O
DAW	*Development*		WRS Pad	D	A	W
DAM	*Development*		Mill Pad	D	A	M
DAP	*Development*		PWP	D	A	P
DAT	*Development*		CTF	D	A	T
DB2	*Development*	Embankment Construction	Portal Pad	D	B	2
DBP	*Development*		PWP	D	B	P
DBN	*Development*		NCWR	D	B	N
DCC	*Development*	Excavated Material to North Reclamation Stockpile	CWP	D	C	C
DCO	*Development*		Cu-Enriched Ore Stockpile	D	C	O
DCW	*Development*		WRS Pad	D	C	W
DCM	*Development*		Mill Pad	D	C	M
DDT	*Development*	Excavated Material to South Reclamation Stockpile	CTF	D	D	T
DF2	*Development*	Waste Rock: Portal to WRS	Portal Pad	D	F	2
DBN	*Development*	Embankment Construction	NCWR	D	B	N
DDT	*Development*	Excavated Material to South Reclamation Stockpile	CTF	D	D	T
PIT	**Production**	Waste Rock: Portal to CTF	*CTF*	P	I	T
DFT	*Development*	Waste Rock: WRS to CTF	CTF	D	F	T
DGW	*Development*	North Reclamation stockpile to WRS Pad		D	G	W
DHW	*Development*	Soils Replaced from Soil Stockpiles to WRS Pad	WRS Pad	D	H	W
PJO	**Production**	Ore: Portal to Cu-Enriched Ore Stockpile	Cu-Enriched Ore Stockpile	P	J	O
PKX	**Production**	Ore: Portal to Crusher	Crusher	P	K	X
PIT	**Production**	Waste Rock: Portal to CTF	CTF	P	I	T

Haul Road Segments

Road Segment ID	Road Segment Description
Rd4	Mill road (north of pad)
Rd5	Portal to west end of Portal Pad
Rd6	CTF Road: N. Mill Road to PWP Road
Rd7	CTF Road: Middle CTF to junction soil stockpile road
Rd8	CTF road
Rd9	Truck road to soil stockpiles/PWP
Rd10	CTF to NCWR
North Mill Road Segments	
Rd16	North Mill Road: WRS connector to CTF
Rd17	North Mill Road: WRS connector to Portal Pad
Rd18	North Mill Road: WRS connector to N. Reclamation connector
Rd19	North Mill Road: Cu-enriched SP connector to Portal Pad
Rd20	North Mill Road: CU-enriched SP connector road to CTF road
North Mill Road Connectors to Facilities	
Rd23	North Mill road connector to WRS Pad
Rd24	North Mill road connector to Cu-Enriched stockpile
Rd25	North Mill road connector to N. Reclamation stockpile
Ancillary Road Connectors to Facilities	
Rd_DCC	North Mill road connector to CWP
Rd_DBP	PWP Development Road
Rd_DAC	CTF Road: CTF to PWP junction
Rd_DCO	North Mill road: Cu connector to N. Reclaim connector road
Rd_DCM	Mill Pad Development
Rd_PKX	Portal to Crusher

Haul Road Volume Source Apportionment

Road Activity ID	Road Segment	Description	# of Vol Sources	
			Per Road Segment	Per Road Activity ID
DA2	Rd5	*Portal to west end of Portal Pad:*	31	
	Rd17	*North Mill Road: WRS connector to Portal Pad*	18	
	Rd4	*Mill road (north of pad)*	44	
	Rd6	*CTF Road: N. Mill Road to PWP Road*	31	
	Rd9	*Truck road to soil stockpiles/PWP*	144	268
DAC	Rd_DCC	*CWP road to N. Reclamation stockpile connector*	58	
	Rd4	*Mill road (north of pad)*	44	
	Rd6	*Portal to west end of Portal Pad:*	31	
	Rd9	*Truck road to soil stockpiles/PWP*	144	277
DAO	Rd24	*North Mill road connector to Cu-Enriched stockpile*	8	
	Rd20	*North Mill Road: CU-enriched SP connector road to CTF road*	48	
	Rd6	*CTF Road: N. Mill Road to PWP Road*	31	
	Rd9	*Truck road to soil stockpiles/PWP*	144	231
DAW	Rd23	*North Mill road connector to WRS Pad*	12	
	Rd16	*North Mill Road: WRS connector to CTF*	40	
	Rd6	*CTF Road: N. Mill Road to PWP Road*	31	
	Rd9	*Truck road to soil stockpiles/PWP*	144	227
DAM	Rd6	*CTF Road: N. Mill Road to PWP Road*	31	
	Rd9	*Truck road to soil stockpiles/PWP*	144	175
DAP	Rd9	*Truck road to soil stockpiles/PWP*	144	
	Rd_DBP	*PWP Development Road*	41	185
DAT	Rd7	*CTF Road: Middle CTF to junction soil stockpile road*	102	
	Rd9	*Truck road to soil stockpiles/PWP*	144	246
DB2	Rd5	*Portal to west end of Portal Pad:*	31	
	Rd17	*North Mill Road: WRS connector to Portal Pad*	18	
	Rd23	*North Mill road connector to WRS Pad*	12	61
DBP	Rd_DAC	*CTF Road: CTF to PWP junction*	71	
	Rd_DBP	*PWP Development Road*	41	112
DBN	Rd10	*CTF to NCWR*	303	303
DCC	Rd25	*North Mill road connector to N. Reclamation stockpile*	13	
	Rd_DCC	*CWP road to N. Reclamation stockpile connector*	58	71

Road Segment	Model Road ID	# of Srcs
Rd5	RD5	31
Rd_PKX	PKX	33
Rd24	R24	8
Rd20	R20	48
Rd17	R17	18
Rd23	R23	12
Rd4	RD4	44
Rd18	R18	28
Rd16	R16	40
Rd25	R25	13
Rd_DCO	DCO	28
Rd_DCM	DCM	30
Rd8	RD8	87
Rd6	RD6	31
Rd9	RD9	144
Rd7	RD7	102
Rd_DBP	DBP	41
Rd_DAC	DAC	71
Rd10	R10	303
Rd19	R19	11
Rd_DCC	DCC	58

Haul Road Volume Source Apportionment

Road Activity ID	Road Segment	Description	# of Vol Sources	
			Per Road Segment	Per Road Activity ID
DCO	Rd24	*North Mill road connector to Cu-Enriched stockpile*	8	49
	Rd25	*North Mill road connector to N. Reclamation stockpile*	13	
	Rd_DCO	*NMR: Cu connector to N. Reclaim connector road*	28	
DCW	Rd23	*North Mill road connector to WRS Pad*	12	53
	Rd25	*North Mill road connector to N. Reclamation stockpile*	13	
	Rd18	*North Mill Road: WRS connector to N. Reclamation connector*	28	
DCM	Rd25	*North Mill road connector to N. Reclamation stockpile*	13	43
	Rd_DCM	*Mill Pad Development*	30	
DDT	Rd7	*CTF Road: Middle CTF to junction soil stockpile road*	102	246
	Rd9	*Truck road to soil stockpiles/PWP*	144	
DF2	Rd5	*Portal to west end of Portal Pad:*	31	61
	Rd17	*North Mill Road: WRS connector to Portal Pad*	18	
	Rd23	*North Mill road connector to WRS Pad*	12	
PIT	Rd5	*Portal to west end of Portal Pad:*	31	176
	Rd17	*North Mill Road: WRS connector to Portal Pad*	18	
	Rd16	*North Mill Road: WRS connector to CTF*	40	
	Rd8	*CTF road*	87	
DFT	Rd8	*CTF road*	87	139
	Rd16	*North Mill Road: WRS connector to CTF*	40	
	Rd23	*North Mill road connector to WRS Pad*	12	
DGW	Rd18	*North Mill Road: WRS connector to N. Reclamation connector*	28	53
	Rd23	*North Mill road connector to WRS Pad*	12	
	Rd25	*North Mill road connector to N. Reclamation stockpile*	13	
DHW	Rd23	*North Mill road connector to WRS Pad*	12	227
	Rd16	*North Mill Road: WRS connector to CTF*	40	
	Rd6	*CTF Road: N. Mill Road to PWP Road*	31	
	Rd9	*Truck road to soil stockpiles/PWP*	144	
PJO	Rd5	*Portal to west end of Portal Pad:*	31	50
	Rd19	*North Mill Road: Cu-enriched SP connector to Portal Pad*	11	
	Rd24	*North Mill road connector to Cu-Enriched stockpile*	8	
PKX	Rd_PKX	*Portal to Crusher*	33	33

Road Activity ID	Total Vol Srcs: All Segments
DA2	268
DAC	277
DAO	231
DAW	227
DAM	175
DAP	185
DAT	246
DB2	61
DBP	112
DBN	303
DCC	71
DCO	49
DCW	53
DCM	43
DDT	246
DF2	61
PIT	176
DFT	139
DGW	53
DHW	227
PJO	50
PKX	33
PLT	87

Haul Road Modeling Methodolgy

Haul Road Emissions Apportionment by Volume Source

Road Segment ID	Road Description	Road Activity ID	Vol source per Road Activity ID		Vol source per Road Segment	
			PM10 (tpy)	PM2.5 (tpy)	PM10 (tpy)	PM2.5 (tpy)
Rd_DAC	CTF Road: CTF to PWP junction	DBP	0.01817	0.00182	0.01817	0.00182
Rd_DBP	PWP Development Road	DAP	0.01989	0.00199		
		DBP	0.01817	0.00182	0.03806	0.00381
Rd_DCC	CWP road to N. Reclamation stockpile connector	DAC	0.00517	0.00052		
		DCC	0.01059	0.00106	0.01575	0.00158
Rd_DCM	Mill Pad Development	DCM	0.00443	0.00044	0.00443	0.00044
Rd_DCO	NMR: Cu connector to N. Reclaim connector road	DCO	0.00547	0.00055	0.00547	0.00055
Rd_PKX	Portal to Crusher	PKX	0.16375	0.01640	0.16375	0.01640
Rd10	CTF to NCWR	DBN	0.02825	0.00283	0.02825	0.00283
Rd16	North Mill Road: WRS connector to CTF	DAW	0.00408	0.00041		
		PIT	0.04355	0.00436		
		DFT	0.04509	0.00452		
		DHW	0.00408	0.00041	0.09680	0.00970
Rd17	North Mill Road: WRS connector to Portal Pad	DA2	0.00216	0.00022		
		DB2	0.00675	0.00068		
		DF2	0.01165	0.00117		
		PIT	0.04355	0.00436	0.06412	0.00642
Rd18	North Mill Road: WRS connector to N. Reclamation connector	DCW	0.01119	0.00112		
		DGW	0.02217	0.00222	0.03337	0.00334
Rd19	North Mill Road: Cu-enriched SP connector to Portal Pad	PJO	0.00569	0.00057	0.00569	0.00057
Rd20	North Mill Road: CU-enriched SP connector road to CTF road	DAO	0.00064	0.00006	0.00064	0.00006
Rd23	North Mill road connector to WRS Pad	DAW	0.00408	0.00041		
		DB2	0.00675	0.00068		
		DCW	0.01119	0.00112		
		DF2	0.01165	0.00117		
		DFT	0.04509	0.00452		
		DGW	0.02217	0.00222		
		DHW	0.00408	0.00041	0.10501	0.01052
Rd24	North Mill road connector to Cu-Enriched stockpile	DAO	0.00064	0.00006		
		DCO	0.00547	0.00055		
		PJO	0.00569	0.00057	0.01180	0.00118
Rd25	North Mill road connector to N. Reclamation stockpile	DCC	0.01059	0.00106		
		DCO	0.00547	0.00055		
		DCW	0.01119	0.00112		
		DCM	0.00443	0.00044		
		DGW	0.02217	0.00222	0.05386	0.00539
Rd4	Mill road (north of pad)	DA2	0.00216	0.00022		
		DAC	0.00517	0.00052	0.00733	0.00073
Rd5	Portal to west end of Portal Pad:	DA2	0.00216	0.00022		
		DB2	0.00675	0.00068		
		DF2	0.01165	0.00117		
		PIT	0.04355	0.00436		
		PJO	0.00569	0.00057	0.06981	0.00699

Haul Road Emissions Apportionment by Volume Source

Road Segment ID	Road Description	Road Activity ID	Vol source per Road Activity ID		Vol source per Road Segment	
			PM10 (tpy)	PM2.5 (tpy)	PM10 (tpy)	PM2.5 (tpy)
Rd6	CTF Road: N. Mill Road to PWP Road	DA2	0.00216	0.00022	**0.01909**	**0.00191**
		DAC	0.00517	0.00052		
		DAO	0.00064	0.00006		
		DAW	0.00408	0.00041		
		DAM	0.00297	0.00030		
		DHW	0.00408	0.00041		
Rd7	CTF Road: Middle CTF to junction soil stockpile road	DAT	0.04812	0.00482	**0.07366**	**0.00738**
		DDT	0.02554	0.00256		
Rd8	CTF road	PIT	0.04355	0.00436	**0.08864**	**0.00888**
		DFT	0.04509	0.00452		

Rd 9 divides into two roadways in the SW corner of the property boundary. Road segment Rd9 connects the CTF road to the topsoil, subsoil, and south reclaim stockpiles. At the division in the road, segment Rd9 continues onward to the SE towards the subsoil and south reclaim stockpiles. Segment R9B connects the road division to the topsoil stockpile in the SW direction. Emissions are divided between Rd9 and R9B after the road divide. The emissions are split between Rd9 and R9B sources for activities DA2, DAC, DAO, DAW, DAM, DAP, DAT, and DHW. Rd9 sources (after the road split) also account for emissions from activity DDT (material hauled to the south reclaim pile). Emissions calculations are detailed below.

Road Segment ID	Road Description	Road Activity ID	PM10 (tpy)	PM2.5 (tpy)	PM10 (tpy)	PM2.5 (tpy)
Rd9 Sources: Rd9_0001 - Rd9_0101	Truck road to soil stockpiles/PWP	DA2	0.00216	0.00022	**0.11264**	**0.01128**
		DAC	0.00517	0.00052		
		DAO	0.00064	0.00006		
		DAW	0.00408	0.00041		
		DAM	0.00297	0.00030		
		DAP	0.01989	0.00199		
		DAT	0.04812	0.00482		
		DDT	0.02554	0.00256		
		DHW	0.00408	0.00041		
Rd9 Sources: Rd9_0102 - Rd9_0144	Truck road to soil stockpiles/PWP *SE road segment to Subsoil and South Reclaim piles*	DA2	0.00108	0.00011	**0.0691**	**0.0069**
		DAC	0.00258	0.00026		
		DAO	0.00032	0.00003		
		DAW	0.00204	0.00020		
		DAM	0.00148	0.00015		
		DAP	0.00994	0.00100		
		DAT	0.02406	0.00241		
		DDT	0.02554	0.00256		
		DHW	0.00204	0.00020		
R9B Sources: R9B_0001 - R9B_0019	Truck road to soil stockpiles/PWP *SW road segment to Topsoil pile*	DA2	0.00108	0.00011	**0.0436**	**0.0044**
		DAC	0.00258	0.00026		
		DAO	0.00032	0.00003		
		DAW	0.00204	0.00020		
		DAM	0.00148	0.00015		
		DAP	0.00994	0.00100		
		DAT	0.02406	0.00241		
		DDT	*Action not included for R9B*			
		DHW	0.00204	0.00020		

Road 9 divides into two roads to the Topsoil and Subsoil Piles

SW Road (R9B) = (DA2 + DAC + DAO + DAW + DAM + DAP + DAT + DHW) / 2

SE Road (Rd9) = SW Road + DDT

SE Road (South Pile | Subsoil)		SW Road (Topsoil)	
PM10	**PM2.5**	**PM10**	**PM2.5**
0.0691	**0.0069**	**0.0436**	**0.0044**

Model Source Catalog

POINT SOURCES

Source ID	Stack Release Type (Beta)	Source Description	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height[i] (ft)	(m)	Temperature (°C)	Flow Rate (acfm)	Exit Velocity (fps)	Stack Diameter (ft)	(in)	Notes
P2	Default	325-hp Portable Diesel Engine/generator	506460.34	5179758.98	1785.00	5.5		464	1937	164.42	0.50	6	a
P4	Default	131-hp Portable Diesel Engine/generator	506339.28	5179480.90	1789.79	6		482.2222222	564	107.72	0.3333	4	a
P5	Default	545-kW /914-hp Diesel Engine/generator	507009.93	5179810.14	1785.00	7		518.2	4576.8	172.66	0.75	9	a
P6	Default	320-kW /536-hp Diesel Engine/generator	507013.64	5179810.32	1785.00	8		470	2214	83.52	0.75	9	a
P7A	Default	1000-kW /1675-hp Diesel Engine/generator - Emergency	506652.88	5179737.22	1785.00	20		473.4	7583	160.92	1.00		a, b
P7B	Default	1000-kW /1675-hp Diesel Engine/generator - Emergency	506652.88	5179732.95	1785.00	20		473.4	7583	160.92	1.00		a, b
P8	Default	100-hp Diesel Engine/generator - Emergency evac hoists (IVL)	506425.03	5180910.27	1768.86	4		565.6	635	121.28	0.3333	4	a, b
P9	Default	50-hp Diesel Fire Pump - Emergency	506626.20	5179694.19	1785.00	4		537.8	311	59.40	0.3333	4	a, b
P10A	Default	23 MMBtu/hr Propane-fired heater - Intake Vent for Upper Copper Zone	506461.85	5180859.56	1767.93	3		21.1	804082	66.65	16.00		c
P10B	Default	52 MMBtu/hr Propane-fired heater - Intake Vent for Lower Copper Zone	506614.79	5180713.21	1751.89	3		21.1	288108	23.88	16.00		c
P11	Default	3 Temporary diesel heaters at Portal - Diesel (1.2 MMBtu/hr total)	507113.94	5179868.84	1785.00	4		537.8	311	59.40	0.333	4	a
P12	Default	Jaw Crusher (3640 TPD), Building/Dust Collector	506933.01	5179755.00	1785.00		10	Ambient	10997	58.34	2.0		d, j
P13A	Default	Mill Building (mill, lime storage, etc.) Dust Collector	506588.14	5179757.70	1785.00		25	Ambient	530	44.96	0.5	6	d, j
P13B	Default	Mill Building (lime area/slurry mix tank) Dust Collector	506592.47	5179757.53	1785.00		25	Ambient	4238	66.07	1.1667	14	d, j
P14	Default	Surge Bin Discharge Dust Collector	506665.46	5179761.70	1785.00		15	Ambient	6505	61.35	1.5	18	d, j
P15	Default	Water Treatment Plant Lime Area Dust Collector	506519.80	5179685.40	1785.00		10	Ambient	4238	66.07	1.1667	14	d, j
P16A	Default	Backfill Plant Cement/Fly Ash Hopper Dust Filter/Collector	506628.14	5179724.56	1785.00		15	Ambient	763	64.75	0.5	6	d, j
P16B	Default	Backfill Plant Cement/Fly Ash Silo Dust Filter/Collector	506630.25	5179724.35	1785.00		15	Ambient	1526	57.55	0.75	9	d, j
P17	Default	Portable diesel engine/generators (total of 400 hp, 4 units)	507955.54	5178556.60	1775.01	4		565.6	635	121.28	0.3333	4	a
P18	Default	Air Compressor - Diesel Engine (275 hp)	507031.25	5179804.17	1785.00	5.5		464	1683	142.86	0.5	6	a, e
EVU	Default	Mine Ventilation Exhaust Upper Copper Zone - EVU	506461.85	5180859.56	1767.93	3		21.1	804082	66.65	16		f
EVL	Default	Mine Ventilation Exhaust Lower Copper Zone - EVL	506614.79	5180713.21	1751.89	3		21.1	288108	23.88	16		f
PORTAL	Horizontal	Mine Portal	507113.94	5179868.84	1785.00	1		21.1	269773	19.81	17		f
ProA	Default	Temporary portable propane heaters (37.8 MMBtu/hr total) - 9 total - Source represents a group of 3 heaters near the Development Phase workshop	507033.60	5179805.13	1785.00	6		482.2	151	28.84	0.3333	4	g
ProB	Default	Temporary portable propane heaters (37.8 MMBtu/hr total) - 9 total - Source represents a group of 3 heaters near the Production Phase truckshop	506706.79	5179726.42	1785.00	6		482.2	151	28.84	0.3333	4	g
ProC	Default	Temporary portable propane heaters (37.8 MMBtu/hr total) - 9 total - Source represents a group of 3 heaters near the Development Phase temporary construction stockpile crush/screen facility	506810.38	5179434.79	1785.61	6		482.2	151	28.84	0.3333	4	g
LightA	Default	Diesel-powered Light plants - 11 - 14 hp each - Source represents 2 Light plants at road intersection	506474.57	5179563.58	1788.38	3		593.3	87	29.54	0.25	3	h
LightB	Default	Diesel-powered Light plants - 11 - 14 hp each - Source represents 2 Light plants at road intersection	505832.20	5179025.19	1828.09	3		593.3	87	29.54	0.25	3	h
LightC	Default	Diesel-powered Light plants - 11 - 14 hp each - Source represents 3 Light plants at the Temp Cons Pile crusher/screening area	506822.88	5179437.51	1783.65	3		593.3	87	29.54	0.25	3	h
LightD	Default	Diesel-powered Light plants - 11 - 14 hp each - Source represents 4 Light plants at the portal pad	507138.84	5179796.97	1785.00	3		593.3	87	29.54	0.25	3	h

(a) Stack characteristics representative of similarly sized engines.

(b) Emergency use - Only input into Emergency Operations model

(c) Heaters located at Intake Vents but directly vent into the Underground Mine and exhaust through the Exit Vents. Same characteristics as EVU and EVL sources.

(d) Stack characteristics at design specifications for associated baghouse dust collectors

(e) Requires 275-hp engine

(f) Diameter based on Portal and Exhaust Vent opening dimension. Flow rates are the ventilated exhaust from the Underground Mine and is detailed in Underground Sources page of Emissions Invnetory.

(g) Each heater requires a 32-hp engine. 9 heaters in total.

(h) Each llight plant requires a 14-hp engine. 11 light plants in total.

(i) Elevations of 1785 are at construction grade of the portal pad and mill pad. Other elevations are calculated by AERMAP.

(j) Mill pad or portal pad dust collector sources

Model Source Catalog

VOLUME SOURCES - Non Road

Source ID	Source Description	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Release Height (m)	Init. Horizontal Dimension (m)	Initial Vert. Dimension (m)	Side Length (m)	Vertical Dimension (m)	Total Length of Facility (m)	# of Volume Sources	Length per Vol Src[e] (m)	Notes
P1	250 TPH Portable Conical Crusher	506817.98	5179428.11	1785.13	2.16	3.09	2.01	13.3	4.315	13.3	1	13.3	b
P3A	Portable Screen (400 TPH)	506804.46	5179424.81	1787.36	2.45	2.77	2.28	11.9	4.9	11.9	1	11.9	b
P3B	Portable Screen (400 TPH)	506831.34	5179431.42	1783.1	2.45	2.77	2.28	11.9	4.9	11.9	1	11.9	b
CTF_T_1	CTF Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to and from haul trucks	506555.85	5179204.36	1791.7	2.00	36.05	1.86	155	4	620	4	155	c
CTF_T_2		506520.96	5179092.96	1781.7	2.00	36.05	1.86	155	4				
CTF_T_3		506491.30	5178971.05	1772.82	2.00	36.05	1.86	155	4				
CTF_T_4		506485.06	5178841.89	1776.08	2.00	36.05	1.86	155	4				
CUPILE_1	Cu Ore Pile Activities - Wind erosion and pile disturbance; Truck transfer to pile	506871.56	5179861.01	1790.99	9.00	16.28	8.37	70	18	70	1	70	d
CUPILE_T_1	Cu Ore Pile Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to haul trucks	506871.56	5179861.01	1790.99	2.00	16.28	1.86	70	4	70	1	70	c
CWP_T_1	CWP Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to haul trucks	507221.64	5179666.13	1763.49	2.00	17.83	1.86	76.67	4	230	3	76.67	c
CWP_T_2		507155.78	5179673.82	1765.97	2.00	17.83	1.86	76.67	4				
CWP_T_3		507087.44	5179679.38	1769.65	2.00	17.83	1.86	76.67	4				
DRAIN_CTF	Fugitive excavation, soil removal, and ground disturbance emissions for sources	506822.96	5178917.43	1755.28	2.00	10.47	1.86	45	4	45	1	45	c
DRAIN_PWP	Fugitive excavation, soil removal, and ground disturbance emissions for sources	506098.42	5179575.67	1776.11	2.00	7.44	1.86	32	4	32	1	32	c
MILL_T_1	Mill Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to haul trucks	506756.65	5179712.48	1786.67	2.00	20.93	1.86	90	4	360	4	90	c
MILL_T_2		506690.74	5179713.10	1788.23	2.00	20.93	1.86	90	4				
MILL_T_3		506598.18	5179717.98	1788.03	2.00	20.93	1.86	90	4				
MILL_T_4		506514.18	5179722.31	1786.86	2.00	20.93	1.86	90	4				
NCWR_T_1	NCWR Activities - excavation and ground disturbance; soil and topsoil removal; material transfers from haul trucks	507916.74	5178684.02	1760.58	2.00	29.07	1.86	125	4	500	4	125	c
NCWR_T_2		507809.88	5178683.72	1763.75	2.00	29.07	1.86	125	4				
NCWR_T_3		507695.77	5178667.79	1766.39	2.00	29.07	1.86	125	4				
NCWR_T_4		507612.00	5178663.07	1767.71	2.00	29.07	1.86	125	4				
NPILE	North Stockpile Activies - wind erosion and pile disturbance; truck transfer to pile	506487.98	5179893.59	1793.83	4.50	33.72	4.19	145	9				d

VOLUME SOURCES - Non Road (continued)

Source ID	Source Description	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Release Height (m)	Init. Horizontal (m)	Initial Vert. Dimension (m)	Side Length (m)	Vertical Dimension (m)	Total Length of (m)	# of Volume Sources	Length per Vol Src[e] (m)	Notes
POWDER	Fugitive excavation, soil removal, and ground disturbance emissions for sources	506497.09	5179457.98	1794.28	2.00	10.23	1.86	44	4	44	1	44	c
PORTAL_T_1	Portal Pad Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to and from haul trucks	507143.61	5179820.30	1796.03	2.00	13.37	1.86	57.5	4	230	4	57.5	c
PORTAL_T_2		507106.28	5179799.57	1791.21	2.00	13.37	1.86	57.5	4				
PORTAL_T_3		507052.46	5179792.92	1788.9	2.00	13.37	1.86	57.5	4				
PORTAL_T_4		506987.28	5179775.59	1785.03	2.00	13.37	1.86	57.5	4				
PWP_T_1	PWP Activities - excavation and ground disturbance; soil and topsoil removal; material transfers from haul trucks	506279.53	5179454.91	1791.83	2.00	22.67	1.86	97.5	4	390	4	97.5	c
PWP_T_2		506214.01	5179436.81	1792.02	2.00	22.67	1.86	97.5	4				
PWP_T_3		506150.35	5179413.19	1794.41	2.00	22.67	1.86	97.5	4				
PWP_T_4		506076.14	5179390.33	1795.41	2.00	22.67	1.86	97.5	4				
SPILE	South Stockpile Activies - wind erosion and pile disturbance; truck transfer to pile	506018.86	5178859.25	1838.84	4.50	27.91	4.19	120	9	120		1	d
SUBS	Subsoil Stockpile Activies - wind erosion and pile disturbance; truck transfer to pile	506024.04	5178692.01	1847.67	4.50	32.09	4.19	138	9	138		1	d
TEMP	Temporary construction stockpile - wind erosion and pile distrubance; transfers to and from haul trucks	506850.15	5179399.21	1784.48	3.05	18.14	2.84	78	6.096	78		1	d
TOPS	Topsoil Stockpile Activies - wind erosion and pile disturbance; truck transfer to pile	505770.23	5178842.50	1839.4	4.50	27.91	4.19	120	9	120		1	d
WRS_1	WRS - Wind erosion and pile disturbance; Truck transfer to pile	506764.15	5179948.71	1791.91	7.50	53.49	6.98	230	15	230	3	76.67	d
WRS_2		506711.19	5179930.46	1794.48	7.50	53.49	6.98	230	15				
WRS_3		506662.85	5179908.94	1795.79	7.50	53.49	6.98	230	15				
WRS_T_1	WRS Activities - excavation and ground disturbance; soil and topsoil removal; material transfers to haul trucks	506764.15	5179948.71	1791.91	2.00	17.83	1.86	76.67	4	230	3	76.67	c
WRS_T_2		506711.19	5179930.46	1794.48	2.00	17.83	1.86	76.67	4				
WRS_T_3		506662.85	5179908.94	1795.79	2.00	17.83	1.86	76.67	4				

(a) All source dimensions based on EPA guidance for Single Volume Sources at Surface Level.
Single Volume Source: Init. Horizontal Dim. = Side Length / 4.3
Surface Based Source: Init. Vertical Dim. = Vertical Dimension / 2.15
(b) Source characteristics based on physical dimensions of similarly sized equipment.
(c) Vertical dimension based on the height of a CAT D9T Dozer in order to simulate material excavation, soil removal, and ground clearing.
(d) Vertical dimension based on stockpile height to simulate emissions spanning the vertical dimension of the pile.
(e) Length per volume source is used to calculated the Initial Horizontal Dimension for individual volume sources that are part of a group of sources spanning an area
i.e., The entire NCWR is 500 m in length and uses 4 volume sources to represent emissions. Each of the 4 volume sources is effecitvely 125 meters in length (500/4 = 125)

Model Source Catalog

VOLUME SOURCES - Haul and Access Roads

Road Type	Source Description	Easting (X)	Northing (Y)	Base Elevation[c]	Release Height	Init. Horiz. Dim.	Init. Vert. Dim.	Vehicle Height	Vehicle Width	Vehicle Length	Plume Height	Road Width	Road Width	Width of Plume	Notes
		(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(ft)	(m)	(m)	
Haul Road - CTF	Haul Road Segments comprising the CTF Haul Road	Varies	Varies	Varies	3.50	7.44	3.25	4.11	--	8.81	6.995		10	16	d, f
Haul Road - Service	Haul Road Segments comprising the Service Haul Roads	Varies	Varies	Varies	3.50	4.51	3.25	4.11	3.69	8.81	6.995	--	--	9.69	e, f, g
Construction Access Road	Temporary Construction Access Road sources (Source ID: CON)	Varies	Varies	Varies	2.11	3.88	1.96	2.48	2.35	7.87	4.217			8.35	e, h
Main Access Road	Main Access Road sources (Source ID: ACC)	Varies	Varies	Varies	2.11	6.48	1.96	2.48	--	7.87	4.217	26.00	7.92	13.92	d, h

(a) Volume sources designed using Guidance per EPA Haul Road Workgroup Final Report 2012

(b) Volume sources designed as adjacent, surface based sources

Adjacent Volume Sources: Init. Horizontal Dim. = Width of Plume / 2.15

Surface Based Source: Init. Vertical Dim. = Plume Height / 2.15

(c) Sources located on the mill or portal pads have an adjusted elevation 1785 meters

(d) Initial Horizontal Dimension based on two lane roadway

(e) Initial Horizontal Dimension based on vehicle width (single lane roadway)

(f) Based on dimensions of a Haul Truck with a target payload of 42 - 44 tons

(g) Service Haul Roads provide access to the PWP, NCWR, CWP, Topsoil and Subsoil Stockpiles

(h) Based on dimensions of an International Durastar Extended Cab - Characteristic of average payload vehicle traveling on roadway

(i) All adjacent

Constructed to DESCRIPTION OF TINTINA MONTANA / BLACK BUTTE SITE

METEOROLOGICAL DATA (03.23.2018)

INTRODUCTION

In April 2012 Bison Engineering Inc. (Bison) established a 10-meter meteorological tower at the Tintina Montana, Inc. Black Butte site, approximately 16 miles north of White Sulphur Springs, Montana. Data were collected continuously at that location until February 6, 2018, when the tower was moved approximately 300 feet to the southwest because of construction of a new building (~ December 2017) in close proximity to the tower. Data collection at the new site began on March 7, 2018 with no changes to the original equipment. All data used for this dispersion modeling study were collected at the original monitoring location. Bison used PSD-compliant instrumentation and procedures in accordance with the following EPA and State of Montana guidance documents:

- *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD)*. United States Environmental Protection Agency. EPA-450/4-87-007. 1987.

- *Quality Assurance Handbook for Air Pollution Measurement Systems: Volume IV: Meteorological Measurements Version 2.0 (Final)*. United States Environmental Protection Agency. EPA/454/B-08-002. March 2008.

- *Montana Ambient Air Monitoring Program Quality Assurance Project Plan: Volume I, Continuous Monitor, Filter-Based Sampler, and Meteorological Sensor Requirements for Monitoring Ambient Air*. Montana Department of Environmental Quality. April 2013.

The original station was located on fairly uniform terrain 1-2 miles east of the proposed mining area. Figure 1 shows a photo of the original tower. Figures 2 and 3 are maps of the meteorological station and surrounding area in relation to the zone deposits and the modeled ambient air boundaries (property boundaries). Meteorological data were collected by a Campbell Scientific Model CR1000 datalogger and recorded at one-hour intervals. Table 1 summarizes the meteorological parameters measured at the site, including instrument models and measurements heights. The long horizontal bar at the top of the tower is a bird perch; it prevents birds from perching on (and potentially damaging) the wind vane and anemometer cups.

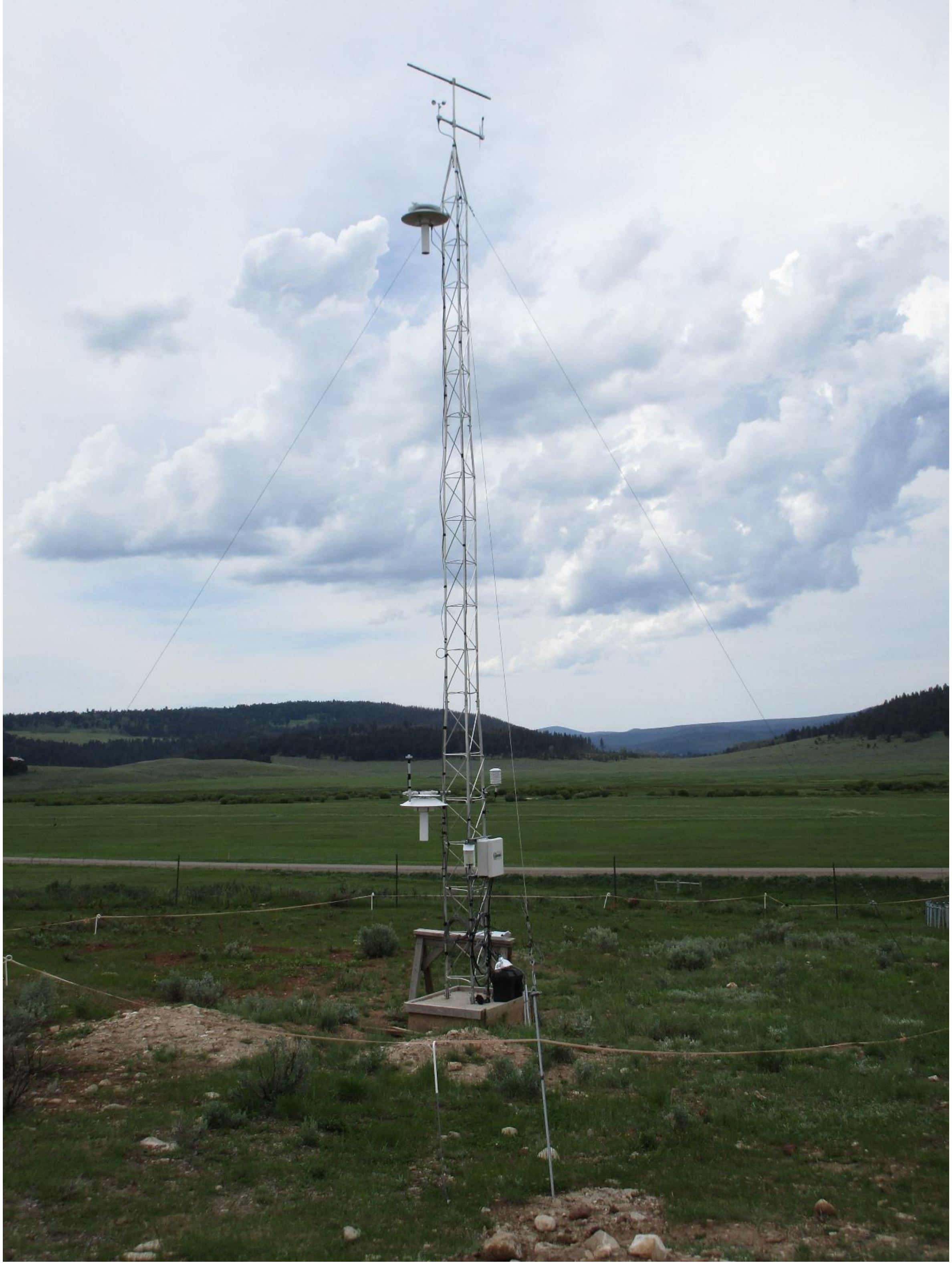


Figure 1: Tintina / Black Butte Site Meteorological Monitoring Station

Table 1: Tintina / Black Butte Site Meteorological Monitoring Parameters

Parameter	Height (s)	Manufacturer	Model	Units
Wind Speed	10 meters	Climatronics	Wind Mark III / 102083	m/s
Wind Direction	10 meters	Climatronics	Wind Mark III / 102083	Degrees (from)
Wind Direction Standard Deviation (calculated using Yamartino algorithm)	10 meters	Climatronics	Wind Mark III / 102083	Degrees
Temperature / Delta Temperature (fan aspirated)	2 meters 9 meters	Climatronics	100093 (matched set)	°C
Relative Humidity	2 meters	Met One	083E-0-35	Percent RH
Solar Radiation	2 meters	LiCor	Li-200R	Watts/m^2
Barometric Pressure	1.5 meters	Climatronics	102663	Inches Hg
Precipitation	0.5 meters	Met One	375 (heated tipping-bucket gauge)	Inches Rain
Tower Location: N 46° 46.374’ W 110° 52.886’				

DATA QUALITY ASSURANCE

Primary elements of quality assurance for the Tintina / Black Butte site include:

- Weekly remote downloading and review of the meteorological data
- Quarterly audits and calibrations
- Final data review in conjunction with quarterly data reporting

Weekly Downloading and Data Review

The datalogger is connected to a phone modem that is used to remotely view instrument behavior in real time and download data at least once per week. The datalogger displays instantaneous instrument responses every two seconds and those readings were observed for suspicious behavior, such as unchanging or out-of-range values. A review of the new hourly data file was also conducted at those times.

Quarterly Audits and Calibrations

Quarterly audits and calibrations have been conducted since the start of monitoring, and are documented in the quarterly reports that have been submitted to DEQ. The general procedure for each quarterly audit/calibration includes the following:

- The as-found condition of each meteorological sensor is audited using quantitative test procedures.
- Based on the audit results, calibration adjustments are made as necessary.
- Routine maintenance is performed, including annual replacement of temperature sensor aspirator fans and periodic replacement of wind sensors with refurbished units.
- During the next calendar quarter the audit/calibration is performed by a different person with different equipment test standards.

Table 2 summarizes the methodologies employed for each meteorological parameter.

Table 2: Meteorological Audit / Calibration Methodologies

Parameter	Test Type	Audit/Calibration Standard
Wind Speed	Response to known rotation rates of 0, 300 and 600 rpm	Synchronous motors
	Bearing check	Torque watch or torque disk
Wind Direction	Alignment check with respect to true north	Solar sighting, magnetic determination or GPS measurements
	Bearing check	Torque watch or torque disk
	Linearity check at 30-degree intervals	Climatronics linearity fixture
Temperature / Delta Temperature	Verify sensors simultaneously at 3 known temperatures	NIST-Traceable temperature sensor with water bath or drywell
Relative Humidity	Collocated performance check	NIST-Traceable wet/dry bulb thermometers and saturation vapor pressure tables
Solar Radiation	Collocated performance check	Certified transfer standard
Barometric Pressure	Collocated performance check	Certified transfer standard
Precipitation	Volumetric check	Known water volume in buret or graduated cylinder

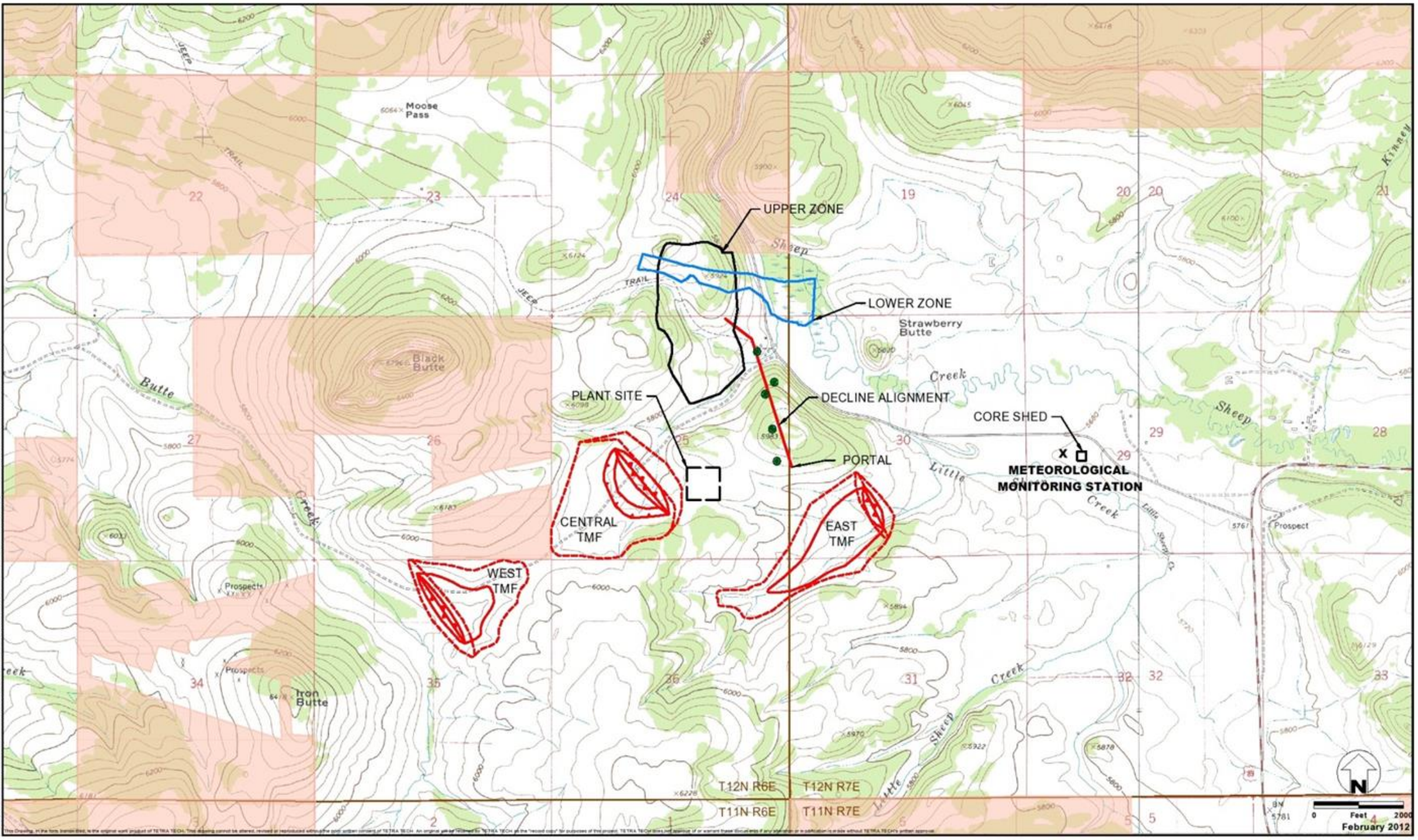
Final Data Review

Quarterly reports are prepared within 45 days following the end of each calendar quarter. At that time the hourly data undergo a final review by Bison’s meteorologist to identify – and possibly invalidate – periods of suspect data behavior. Examples include:

- Unchanging wind speed or wind direction values, indicating freezing of sensors due to ice or snow
- Any values outside expected ranges for each parameter

- Winter precipitation values that may have been affected by blowing or drifting snow

Figure 2 – Location of Tintina Site-Specific Meteorological Monitoring Station



● ADIT ALIGNMENT HOLES

[ ] TAILINGS MANAGEMENT FACILITY

▨ USFS PROPERTY

Site Plan
Black Butte Copper Project
Meagher County, Montana

Figure 3 – Tintina Meteorological Monitoring Station and Modeled Ambient Air Boundaries