July 6, 2017

David Johnson
Environmental Manager
Stillwater Mining Company – Stillwater Mine
2562 Nye Road
Nye, Montana 59061

Dear Mr. Johnson:

Montana Air Quality Permit #2459-18 is deemed final as of July 6, 2017, by the Department of Environmental Quality (Department). This permit is for an underground platinum/palladium mine. All conditions of the Department's Decision remain the same. Enclosed is a copy of your permit with the final date indicated.

For the Department,

Julie A. Merkel
Permitting Services Section Supervisor
Air Quality Bureau
(406) 444-3626

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

JM:EW
Enclosure

Montana Department of Environmental Quality
Air, Energy, and Mining Division

Montana Air Quality Permit #2459-18

Stillwater Mining Company
Stillwater Mine
2562 Nye Road
Nye, MT 59061

July 6, 2017

MONTANA AIR QUALITY PERMIT

Issued To: Stillwater Mining Company
2562 Nye Road
Nye, MT 59061

MAQP: #2459-18
Administrative Amendment (AA) Request Received: 05/17/2017
Department's Decision on AA: 06/19/2017
Permit Final: 07/06/2017

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

Section I. Permitted Facilities

A. Plant Location

Stillwater Mining operates an underground platinum/palladium mine, ore processing plant, and tailings disposal at the Nye facility. The facility is located approximately 6 miles south of Nye. The legal description of the mine site is Sections 1, 2, 10, 11, 15, 16, 21, and 23, Township 5 South, Range 15 East, in Stillwater County, Montana.

B. Current Permit Action

On May 17, 2017, the Department of Environmental Quality (Department) received a de minimis notification regarding the addition of an underground waste rock crusher and cement rock fill (CRF) plant that would be used to provide backfill material for production stopes in the east-side of the Stillwater Mine. The waste rock crusher is a rated to crush up to 150 metric tons (165 short tons) per hour and would be used to generate crushed waste rock for use with the CRF plant. The CRF plant is rated to produce up to 300 short tons (137 cubic yards) per hour of CRF to backfill select areas of the mine workings. CRF is a mix of cement, water, and crushed waste rock. This equipment would be located underground and would likely remain at its initial installation location for several years before potentially moving to other areas of the underground mine. Emissions from these sources will exhaust to the atmosphere via the mine ventilation exhaust.

Section II. Conditions and Limitations

A. Emission Limitations

1. Metallic mineral process fugitive emissions are subject to an opacity limitation of 10% (ARM 17.8.340 and 40 Code of Federal Regulations (CFR) 60, Subpart LL).

2. Mine production and milling rates shall not exceed 1,825,000 tons during any rolling 12-month time period or 5,000 tons per day (ARM 17.8.749).

3. Stillwater Mining shall not cause or authorize to be discharged into the atmosphere from any surface crushing operation, and associated material handling systems, any stack emissions that (ARM 17.8.340 and 17.8.752);

   a. Contain particulate matter in excess of 0.05 grams per dry standard cubic meter (g/dscm) or 0.022 grains per dry standard cubic foot (gr/dscf).

   b. Exhibit greater than 7% opacity.

4. Screening Plant production shall not exceed 285,000 tons during any rolling 12-month time period (ARM 17.8.749).

5. The Screen Plant Diesel-Fired Engine shall comply with the following;

   a. The maximum rated design capacity shall not exceed 100 brake-horsepower (bhp) (ARM 17.8.749).

   b. The diesel-fired engine shall be certified to the Tier 2 engine exhaust emission standard, at a minimum, as specified within 40 CFR Part 89.112, Table 1 (ARM 17.8.749).

   c. Hours of operation shall not exceed 2,400 hours during any rolling 12-month time period (ARM 17.8.749).

6. The waste rock crusher shall be operated underground and shall not exceed a maximum rated design capacity of 165 tons per hour (150 metric tons per hour) (ARM 17.8.749).

7. The Cement Rock Fill (CRF) plant shall be operated underground and shall not exceed a maximum rated design capacity of 300 tons per hour (137 cubic yards per hour) (ARM 17.8.749).

8. The Paste Plant Emergency Flush Pump Diesel-Fired Engine shall be used for emergency or back-up operations only and shall be limited to 500 hours of operation during any rolling 12-month time period. Preventative maintenance activities shall be included in the 500 hours of operation during any rolling 12-month time period (ARM 17.8.749).

9. The Shaft Emergency Diesel-Fired Engine Generator shall be used for emergency or back-up operations only and shall be limited to 500 hours of operation during any rolling 12-month time period. Preventative maintenance activities shall be included in the 500 hours of operation during any rolling 12-month time period (ARM 17.8.749).

10. The Emergency Fire Water Pump Diesel-Fired Engine shall comply with the following;

    a. The maximum rated design capacity shall not exceed 152 bhp (ARM 17.8.749).

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

11. Stillwater Mining is authorized to operate the following generator set(s) in support the Blitz Operation;

a. One or more diesel-fired generator set(s), where the combined maximum rated design capacity of the generator engine(s) shall not exceed 4,022 bhp (ARM 17.8.749).

b. At a minimum, generator engine(s) shall be certified to the Interim Tier 4 exhaust emission standard for generator sets with a maximum engine power rating greater than 900 kilowatts (kW) as specified within 40 CFR 1039.102, Table 7 (ARM 17.8.752).

c. Operation of the Blitz generator set engine(s) shall not exceed 6,500 hours each during any rolling 12-month period (ARM 17.8.749).

d. Generator set engines shall have a minimum exhaust stack height of 3.048 meters (m) from ground level (ARM 17.8.749).

e. All generator set engines shall be located not more than 200 m from the location sited in the modeling analysis (ARM 17.8.749).

12. Stillwater Mining is authorized operate the following generator sets in support the Benbow Operation;

a. One or more diesel-fired generator set(s), where the combined maximum rated design capacity of the generator engine(s) shall not exceed 4,022 brake-horsepower (bhp) (ARM 17.8.749).

b. At a minimum, the generator engine(s) shall be certified to the Interim Tier 4 exhaust emission standard for generator sets with a maximum engine power rating greater than 900 kW as specified within 40 CFR 1039.102, Table 7 (ARM 17.8.752).

c. Generator set engines shall have a minimum exhaust stack height of 3.048 meters (m) from ground level (ARM 17.8.749).

d. All generator set engines shall be located not more than 200 m from the location sited in the modeling analysis and no generator set engine can be located closer than 145 m northeast to the mine boundary point with a coordinate of -109.770269º longitude and 45.381019º latitude (NAD83) (ARM 17.8.749).

13. Stillwater Mining shall only burn diesel fuel for the engines defined under Section II.A.8, II.A.10, II.A.11, II.A.12, that is compliant with 40 CFR 80.510(b) having a sulfur content no greater than 0.0015% (15 parts per million) by weight (ARM 17.8.752).

14. The surface Nordberg cone crusher shall utilize a fabric filter baghouse to control particulate emissions (ARM 17.8.749).

15. The cement silo associated with the cement batch plant operation shall be enclosed with fabric filtration to control particulate emissions in the exhaust air (ARM 17.8.749).

16. The total propane consumption by all combustion sources at the facility shall be limited to 3,000,000 gallons per any 12-month rolling period (ARM 17.8.749).

17. The propane-fired portal heater at the 5000 East Portal shall be properly operated and maintained in a manner that satisfies the manufacture's terms for the guarantee of pollutant emission rates (ARM 17.8.752).

18. Stillwater Mining shall not cause or authorize to be discharged into the atmosphere, from any Non-NSPS-affected source visible emissions that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes (ARM 17.8.308 and ARM 17.8.752).

19. Water and/or chemical dust suppressant shall be available on site and used, as necessary, to maintain compliance with the opacity limitations in Section II.A.1 and Section II.A.18 (ARM 17.8.752).

20. Stillwater Mining shall not cause or authorize the use of any street, road, or parking lot without taking reasonable precautions to control emissions of airborne particulate matter (ARM 17.8.308 and ARM 17.8.749).

21. Stillwater Mining shall treat all unpaved portions of the haul roads, access roads, and the general plant area with water and/or chemical dust suppressant as necessary to maintain compliance with the reasonable precautions limitation in Section II.A.20 (ARM 17.8.749).

22. If the Department determines it to be necessary, Stillwater Mining shall provide mitigative measures to control wind-blown emissions from the east-side waste rock disposal area. The Department shall determine the necessity of the control measures above on the basis of personal observation, complaints, or any combination of the above (ARM 17.8.752)

23. If the Department determines it to be necessary, Stillwater Mining shall install a sprinkler system or provide equivalent mitigative measures to control wind-blown emissions from the tailings facilities. The Department shall determine the necessity of the above control measures based on personal observation, complaints, or any combination of the above (ARM 17.8.752).

24. Stillwater Mining shall utilize a dust suppression program on all dirt roads. The necessity for additional measures on other portions of the road or the entire road will be determined by the Department through on-site inspections, complaints, or any combination of the above (ARM 17.8.749).

25. Stillwater Mining shall comply with all applicable standards and limitations, and the reporting, recordkeeping, and notification requirements as required by 40 CFR 60, Subpart LL, *Standards of Performance for Metallic Mineral Processing Plants* (ARM 17.8.340 and 40 CFR Part 60, Subpart LL).

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

B. Testing Requirements

1. Within 60 days after achieving the maximum production rate, but not later than 180 days after initial start-up, a United States Environmental Protection Agency (USEPA) Method(s) 1-5 and Method 9 opacity source test must be performed on any 40 CFR 60, Subpart LL, affected equipment at the facility, as appropriate. After the initial source test, additional source testing shall be conducted as required by the Department or according to another testing/monitoring schedule as may be approved by the Department (ARM 17.8.105; ARM 17.8.340; 40 CFR Part 60, General Provisions; and 40 CFR 60, Subpart LL).

2. Stillwater Mining shall conduct performance testing on the Blitz and Benbow generator set engines as follows (ARM 17.8.105; ARM 17.8.749; ARM 17.8.340 and 40 CFR Part 60, Subpart IIII):

    a. Generator set engines with a displacement of less than 30 Liter (L) per cylinder

        i. Within 180 day after initial start-up, Stillwater Mining shall conduct initial performance testing to demonstrate compliance with nitrogen oxide (NOx), carbon monoxide (CO), non-methane hydrocarbon (NMHC), and particulate matter emission standards in accordance with to the requirements specified in 40 CFR 60.4212.

        ii. After initial testing, Stillwater Mining shall conduct performance testing to demonstrate compliance with the CO emission standard every 2 years. Testing shall be in accordance to the requirements specified in 40 CFR 60.4212.

b. Generator set engines with a displacement of greater than or equal to 30 L per cylinder shall be performance tested initially and annually thereafter in accordance with the requirements of 40 CFR 60.4211 and 60.4213 to demonstrate compliance with the emission standards.

3. All compliance source tests must be conducted in accordance with the Montana Source Test Protocol and Procedures Manual (ARM 17.8.106).

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

C. Operational Reporting Requirement

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

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

a. The amount of ore and waste handled.

b. A description of any dust suppression program. With respect to the dust suppression program, the information shall include the areas of application, frequency of application, and amount.

c. Fuel consumption (Gasoline, diesel, and propane).

d. The total hours of operation for each diesel-fired engine addressed in Section II.A for the previous year.

e. A summary report listing the reasons for operation of each identified emergency diesel-fired engine for each time the emergency diesel engine was in operation.

f. Any other related information the Department may request.

2. Stillwater Mining shall notify the Department of any construction or improvement project conducted pursuant to ARM 17.8.745 that would include ***the addition of new emissions unit***, change in the control equipment, stack height, stack diameter, stack flow, stack gas temperature, source location, or fuel specifications, or would result in an increase in source capacity above its permitted operation or the addition of a new emission unit.

The notice must be submitted to the Department, in writing, 10 days prior to start up or use of the proposed de minimis change, or as soon as reasonably practicable in the event of an unanticipated circumstance causing the de minimis change, and must include the information requested in ARM 17.8.745(1)(d) (ARM 17.8.745).

3. Stillwater Mining shall document, by month, the total ore production at the facility. By the 25th day of each month, Stillwater Mining shall total ore production during the previous 12-months to verify compliance with the limitation in Section II.A.2. A written report of the compliance verification shall be submitted along with the annual emissions inventory (ARM 17.8.749).

4. Stillwater Mining shall document, by month, the total hours of operation for each of the diesel-fired engines identified within Section II.A. By the 25th day of each month, Stillwater Mining shall total the hours of operation of the identified diesel-fire engines during the previous 12 months to verify compliance with the limitations within Section II.A.5, II.A.8, II.A.9, II.A.10, II.A.11 and II.A.12. The information for each of the previous months, along with a written report of the compliance verification, shall be submitted along with the annual emission inventory (ARM 17.8.749).

5. Stillwater Mining shall document, by month, the total consumption of propane within Portal Heaters, Space Heaters, Line Heaters and other combustion sources (EU016). By the 25th day of each month, Stillwater Mining shall total the propane consumption during the previous 12 months to verify compliance with the limitation in Section II.A.16. A written report of the compliance verification shall be submitted along with the annual emissions inventory (ARM 17.8.749).

D. Notification

1. Stillwater Mining shall provide the Department with written notification of the following dates within the specified time periods as required for 40 CFR Part 60, Subpart LL, affected facilities (ARM 17.8.340 and 40 CFR 60, Subpart LL), as appropriate:

   a. Commencement of construction within 30 days after commencement of construction;

   b. Anticipated start-up date between 30 and 60 days prior to anticipated start-up date; and

   c. Actual start-up date within 15 days after the actual start-up date.

2. Stillwater Mining shall provide the Department with written notification of the actual start-up (including engine replacement) date for each engine within 15 days after engine start-up.

Section III. General Conditions

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

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

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

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

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

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

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

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

Montana Air Quality Permit (MAQP) Analysis
Stillwater Mining Company – Nye Facility
MAQP #2459-18

I. Introduction/Process Description

A. Permitted Equipment

Unit ID	Emitting Unit Name
EU001	Mine Ventilation Exhaust
EU002	Crushing Ore (Surface)
EU003	Load & Dump: Coarse Ore into Crusher Hopper
EU004	Load & Dump: Coarse Ore into Mill Hopper
EU005	Conveying System Transfer Points
EU006	Load & Dump Waste Rock onto Tailings Embankment/Storage
EU007	Disturbed Areas
EU008	Haul Roads
EU009	Diesel Use
EU010	Unleaded Gasoline Use (65,000 gallons per year (gal/yr))
EU011	Paste Plant Emergency Flush Pump Emergency Diesel-Fired Engine (225 brake-horsepower (bhp))
EU012	Concrete Batch Plant Operations
EU015	Soda Ash Silo
EU016	Propane Combustion from Portal Heaters, Space Heaters, Line Heaters and Other Combustion Sources
EU017	Shaft Emergency Diesel-Fired Generator Engine (947 bhp)
EU018	Blitz Diesel-Fired Generator Engine(s) (up to 4,022 bhp)
EU019	Benbow Diesel-Fired Generator Engine(s) (up to 4,022 bhp)
EU020	Screening Plant Material Handling
EU021	Screening Plant with Diesel-Fired Engine (100 bhp)
EU022	Emergency Fire Water Pump Diesel-Fired Engine (152 bhp)
IEU01	Grinding Mills (wet process)
IEU02	Cycloning (wet process)
IEU03	Flotation Circuit (wet process)
IEU04	Thickener (wet process)
IEU05	Vacuum filter (wet process)
IEU06	Paste Plant Operations
IEU07	Open Burning
IEU08	Above Ground Fuel Storage

B. Source Description

The Stillwater Mining Company's (Stillwater Mining) Nye Mine is located in Stillwater County near Nye, Montana. The legal description of the mine site is Sections 1, 2, 10, 11, 15, 16, 21, and 23, Township 5 South, Range 15 East, Stillwater County, Montana. The facility is an underground platinum/palladium (platinum

group metals) mine. The operation includes ore and waste excavation, surface and underground crushing, conveying, grinding, flotation concentration, tailings disposal, a concrete batch operation, and a paste plant operation. The concentrate extracted from the Nye mine is trucked to the Stillwater Mining Company Metallurgical Complex (smelter and refinery) for further refining and processing.

C. Permit History

(NOTE: Administrative Rules of Montana (ARM) references in this Permit History section reflect the rule numbers as they existed at the time of that permit action.)

MAQP #2459 was issued for the Stillwater Mine on March 29, 1988, to Stillwater Mining. The permit was based on 1000 tons per day (TPD) of ore production.

MAQP #2459A was an alteration issued October 21, 1988, to extend mining to the east side of the Stillwater River with no increase in ore production, but a slight increase in particulate emissions.

MAQP #2459A-2 was issued March 11, 1991, to clarify language relative to the annual production limitation.

MAQP #2459-03 was issued August 14, 1992, to increase the ore production rate from 1000 to 3500 TPD and from 365,000 to 730,000 tons per year (TPY).

MAQP #2459-04 was a modification issued on April 27, 1993.

MAQP #2459-05 was a modification to clarify the performance testing requirement on the wet scrubber controlling emissions from the concentrate dryer. The permit was also updated to include a more specific listing of applicable regulations.

MAQP #2459-06 was an alteration issued October 18, 1995, to replace the concentrate dryer wet scrubber with a fabric filter collector (baghouse). Notification and testing requirements, relative to the baghouse, were also added.

MAQP #2549-07 was a modification issued on April 17, 1997, to add crushing, screening, and hauling of bedding material to the emission inventory in the permit analysis. It had been inadvertently taken out of the emission inventory in a previous permitting action. Permit number citations in the permit and analysis were also updated.

MAQP #2459-08 was issued on October 25, 1998. Stillwater Mining requested a production limit increase from 730,000 TPY or 3,500 TPD to 1,825,000 TPY or 5,000 TPD. The increased activity at the mine resulted in an increase in Particulate Matter with an aerodynamic diameter of 10 microns or less (PM_{10}) emissions of approximately 48 TPY. A New Source Review/Prevention of Significant Deterioration (PSD) review was not required for the proposed production increase because the facility is not a listed source and the facility's potential to emit (excluding fugitive emissions) does not exceed 250 TPY of any pollutant.

In addition, Stillwater Mining planned to construct and operate a new tailings impoundment located approximately 7 miles northeast of the mine site (2 miles northeast of Nye), install a pipeline system along Stillwater County Road 420 and reclaim the resulting surface disturbance, and expand the waste rock storage area located on the east side of the Stillwater River at the mine site.

Further, the language in Section II.A.1 was revised to remove the language requiring dryer emission testing every 4 years. Testing was required when the dryer's process rate increased above the process rate that the dryer was functioning at during the last performance test. For example, if the dryer process rate increased above the level it was operating at during the particulate test performed on October 21, 1996, an emissions test would be required. Also, the Department of Environmental Quality (Department) removed the requirement for Stillwater Mining to move the downwind PM_{10} sampler within 90 days after MAQP #2459-08 was final. The permit did specify that Stillwater Mining would move the sampling site to a different location, approved by the Department, at such time as the east-side waste rock storage encroached on the current location. Stillwater Mining was required to request the Department's approval of the new downwind PM_{10} sampler at least 90 days prior to moving to a new site.

Finally, the Department added crushing, screening, and hauling of bedding material to the emission inventory in the Permit Analysis. This activity was listed in MAQP #2459-07. Controlled emissions from this activity were 2.32 TPY. **MAQP #2459-08** replaced MAQP #2459-07.

Stillwater Mining submitted an application on January 20, 2000, for the modification of MAQP #2459-08. The modification included the installation and operation of a new surface jaw crusher and conveying system. The new system was determined to be subject to 40 Code of Federal Regulations (CFR) 60, Subpart LL, New Source Performance Standards for Metallic Mineral Processing. **MAQP #2549-09** replaced MAQP #2459-08.

On April 11, 2001, the Department received a letter from Stillwater Mining requesting a need for permit determination for the addition of an emergency generator at the Hertzler Pump Station, a Nordberg cone crusher (maximum capacity 70 tons per hour (TPH)), and associated material handling equipment. Because the potential uncontrolled emissions from the proposed changes did not exceed the de minimis threshold of 15 TPY, the permit action was accomplished under the ARM 17.8.705(1)(r). The crushing system was determined to be subject to 40 CFR 60, Subpart LL, New Source Performance Standards for Metallic Mineral Processing. **MAQP #2459-10** was issued to update the permit with the new equipment and replaced MAQP #2459-09.

On December 27, 2001, Stillwater Mining submitted a complete permit application for the modification of air quality Preconstruction MAQP #2459-10. The modification involved the addition of an existing but not-permitted cement batch plant including conveyors and material silos and the modification of the existing Nordberg cone crusher. Further, the permit action incorporated an existing, but not-permitted, paste plant and associated cement silo in accordance with ARM 17.8.705(1)(r).

The above cited cement batch and paste plant operations were added to the facility as separate and distinct projects in the past but were not permitted at the time of construction. Potential emissions from the paste plant operation were less than the de minimis threshold of 15 TPY so the plant was added to the permit under ARM 17.8.705(1)(r).

On October 11, 2001, Stillwater Mining submitted information requesting a de minimis determination for the cement batch plant operation. Based on the information submitted, the Department determined that the concrete batch plant operations did not meet the definition of a de minimis source of emissions as defined in the ARM 17.8.705(1)(r).

Emission inventory calculations submitted by Stillwater Mining indicated that the cement batch plant potential to emit (PTE) is less than the de minimis threshold of 15 TPY. However, the calculations submitted to the Department included control credit for several emission points within the cement batch system. Control credit cannot be used when determining a source's PTE for a de minimis determination. Without control credit applied, the concrete batch operations exceed the de minimis threshold; therefore, a permit modification was required.

Further, as part of this permit action Stillwater Mining proposed to modify the existing Nordberg cone crusher, permitted under MAQP #2459-10, to increase the crusher production capacity from 70 TPH to 150 TPH. Potential uncontrolled emissions from the Nordberg crushing operation and associated equipment exceed the de minimis threshold and, therefore, modifying the crusher to increase capacity required a permit modification. The Nordberg cone crusher and all associated material transfer points are subject to the requirements of 40 CFR Part 60, Subpart LL, Metallic Mineral Processing Plants. Total potential controlled and uncontrolled emissions for the permit action were included in the emission inventory, Section IV.

Finally, in accordance with MAQP #2459-10, as of October 1, 2001, the downwind PM_{10} air sampler was relocated to the Stillwater Valley Ranch (Stillwater North). Attachment 1, Ambient Air Monitoring Plan – Stillwater Mining Company, to air quality **MAQP #2459-11** incorporated the changed downwind PM_{10} monitoring location as well as the changes previously identified. **MAQP #2459-11** replaced MAQP #2459-10.

On March 19, 2002, the Department received a letter from Stillwater Mining requesting a modification to MAQP #2459-11. The modification included removing the Hertzler Pump Station emergency diesel generator from the list of permitted equipment and adding an emergency diesel generator (Paste Plant Emergency Flush Pump) to the Paste Plant facility. Stillwater Mining developed an alternative method of clearing the Hertzler tailings pipeline during power outages. The alternative method uses a combination of high pressure water and pigging of the line. Because Stillwater Mining developed the previously described new method of clearing the Hertzler tailings pipeline the Hertzler Pump Station emergency diesel generator was no longer required.

The Paste Plant Emergency Flush Pump is used only during power outages to flush the paste line to avoid plugging. Because potential uncontrolled emissions from the proposed Paste Plant Emergency Flush Pump, operating under 500 hours authorized by the permit, did not exceed the de minimis threshold of 15 TPY, the permit action was completed in accordance with ARM 17.8.705(1)(r). **MAQP #2459-12** replaced MAQP #2459-11.

On May 1, 2002, the Department received a permit application for proposed changes at the Stillwater Mining facility. The proposed changes included the addition of two 1500 cubic feet per minute (cfm) 400 kilowatt (kW) diesel air compressor engines (compressors #1 and #2) and the removal of emergency/back-up status requirements for the existing 2000 kW Caterpillar diesel powered electric generator (shaft generator). After initial review, the Department determined that the application was incomplete for lack of equipment specific information and nitrogen oxides (NO_x) air dispersion modeling. Stillwater Mining was sent a letter of incompleteness indicating the previously cited application deficiencies. On September 3, 2002, the Department received the requested incomplete information from Stillwater Mining. However, after review of the information submitted, the Department again determined that the application was incomplete and sent Stillwater Mining a letter indicating application deficiencies. Subsequently, on November 15, 2002, the Department received a letter from Stillwater Mining including the requested incomplete information and withdrawing the request to remove emergency/back-up status for the shaft generator. The application for the addition of compressors #1 and #2 was deemed complete on November 15, 2002.

Further, on May 21, 2002, the Department received a request from Stillwater Mining to relax or discontinue ambient air monitoring requirements for their facility. When determining if permitted ambient monitoring requirements can be relaxed or discontinued the Department uses the Department Monitoring Requirements Guidance Statement established October 9, 1998. The guidance statement provides an ambient air monitoring decision matrix to be used for determining the need for ambient monitoring.

Since 1988, Stillwater Mining had operated ambient air samplers on a once-every-6-day schedule from November through April and on a once-every-3-day schedule from May through October. Based on actual sampling data from the period of 1997 through 2000 and using the Department's ambient air monitoring decision matrix, the Department determined, with a high level of confidence, that discontinuation of ambient monitoring was appropriate for the Stillwater Mining facility. As stated in a letter to Stillwater Mining dated June 10, 2002, effective at the end of June 2002, Stillwater Mining is no longer subject to ambient air monitoring requirements. Under this permit action, Attachment 1, Ambient Air Monitoring Plan, was removed. Finally, the Department updated various sections of the permit to reflect current permit language and requirements. **MAQP #2459-13** replaced MAQP #2459-12.

On November 4, 2011, the Department received an MAQP modification application from Bison Engineering, Incorporated (Bison) on behalf of Stillwater Mining to install a new 28 million British Thermal Units per hour (MMBtu/hr) propane-fired portal heater at the 5000 East Portal to provide additional warm air to the

underground mining operations during the winter months. In addition, Stillwater Mining proposed to increase the underground ventilation capacity to 2,000,000 cubic feet per minute (cfm) to meet Mine Safety and Health Administration (MSHA) standards as the total underground area expands. A propane-fired concentrate dryer was decommissioned and replaced with a hydraulic system that does not generate air emissions; therefore, Stillwater Mining requested that this dryer be removed from the MAQP.

On November 30, 2011, the Department received an email correspondence from Stillwater Mining with an updated list of permitted equipment. The updated list indicated that the two 400 kW diesel compressor engines that were permitted in MAQP #2459-13 were never installed and could be removed from the list of permitted equipment. This correspondence also indicated that Stillwater Mining would prefer for all of the propane-fired portal and space heaters to be grouped together as a single emitting unit referred to as Propane Usage rather than listing each unit individually. This Propane Usage unit would include the new 28 MMBtu/hr portal heater.

The Department incorporated into the MAQP emitting units that were approved in accordance with the ARM 17.8.745 de minimis rule that had occurred since the issuance of MAQP #2459-13. These actions are listed below.

- On October 14, 2003, the Department approved the addition of two 2.5 MMBtu/hr propane-fired heated make-up air units for providing air exchange within the mill building.

- On January 2, 2004, the Department approved the addition of a 1.0 MMBtu/hr natural gas-fired heated make-up air unit and 50 cubic yard per day (yd^3/day) concrete batch plant. A November 30, 2011 email correspondence from Stillwater Mining stated that the natural gas-fired heater does not exist at the facility; therefore, it was not included as a permitted emitting unit. The 50 yd^3/day concrete batch plant was added to the MAQP.

- Stillwater Mining notified the Department via correspondence dated January 27, 2004 of the installation of a 1.65 MMBtu/hr propane-fired heated make-up air unit to provide air exchange within the emissions testing bay. The correspondence demonstrated that this action was in accordance with de minimis requirements.

- On August 5, 2004, the Department approved the addition of two 0.120 MMBtu/hr propane-fired heaters for use in the administrative building and the installation of a 50 ton capacity soda ash silo.

- Stillwater Mining requested a de minimis determination in a May 1, 2006 letter for the temporary use of a 1.5 megawatt (MW) diesel generator. Stillwater Mining confirmed in a November 11, 2011 email that this unit was only required for temporary use and is not currently located on site; therefore, it was not included as a permitted emitting unit.

- On May 2, 2008, the Department approved the temporary use of three 400 kW diesel generators. Stillwater Mining confirmed in a November 11, 2011 email that these units were only required for temporary use and are not currently located on site; therefore, they were not included as permitted emitting units.

- On June 22, 2011, the Department approved the temporary use of three 689 bhp diesel generator engines. Stillwater Mining confirmed in a November 11, 2011 email that these units were only required for temporary use and are not currently located on site; therefore, they were not included as permitted emitting units.

This permit action added the new portal heater, removed the concentrate dryer, incorporated the de minimis actions that have been approved since the previous permit issuance, updated the emission inventory to reflect the new equipment and ventilation capacity, and updated permit language and rule references to current Department practices. **MAQP #2459-14** replaced MAQP #2459-13.

On January 13, 2012, the Department issued the final version of MAQP #2459-14 to Stillwater Mining. Stillwater Mining submitted comments on the Preliminary Determination of MAQP #2459-14 which were received within the designated public comment period; however, these comments were not addressed in the Department's Decision, because the submitted comments were not properly relayed to the permit writer. As the Department is obligated to address the permittee's comments, the Department issued an AA to address Stillwater Mining's initial comments on the Preliminary Determination of MAQP #2459-14. The Department reviewed the comments and incorporated the following changes:

- De minimis request for the addition of a 2 MMBtu/hr propane-fired space heater and proposal to include a 149 MMBtu/hr maximum combined heat input capacity limit to address all propane fired-combustion sources.

- Corrected the potential emissions from the concrete batch plant.

- Added applicability statements for 40 CFR 60, Subpart IIII and 40 CFR 63, Subpart ZZZZ.

- Included an annual hourly limit with recordkeeping and reporting requirements for the Shaft Emergency Diesel Generator Engine.

- Updated the facility's potential gasoline combustion capacity; and includes a new and complete version of the facility-wide emission inventory.

MAQP #2459-15 replaced MAQP #2459-14.

On September 5, 2012, the Department received an application for modification of MAQP #2549-15 from Bison on behalf of Stillwater Mining. The application proposed the following modifications:

- Stillwater Mining will expand its operations through two projects identified as the Blitz and Benbow expansions. The Blitz expansion will occur using the existing access portal located on the 5000 East level. The Benbow expansion will occur via a new access portal to the east of current mining operations. No additional mine production was proposed through the expansion projects.

- Installation of up to 3.0 MW of electrical generation at each the Blitz and Benbow expansion sites to be provided by diesel-fired generator sets of up to 4,022 bhp at each location. Stillwater Mining requested the permit modification be written de minimis friendly with respect to the diesel generator sets to allow the operation of one or more diesel generator engines at each location that meets or exceeds U.S. Environmental Protection Agency's (USEPA) Interim Tier 4 standard for generator sets greater than 900 kW, as detailed within 40 CFR Part 1039.102, Table 7.

- Modify the permit limit for propane combustion sources from a heat input capacity of 149 MMBtu to a rolling-12 month consumption limit of 3,000,000 gallons for sources identified under emission unit EU016 Propane Combustion from Portal Heaters, Space heaters, and Line Heaters. Previously, the emission inventory for sources within this emission category was generated through the application of AP-42, Chapter 1.5 for Liquefied Petroleum Gas Combustion.

  However, the manufacturer's guaranteed emission rate of CO for the 5000 East Portal Heater exceeds the equivalent AP-42 emission factor. In order to minimize recordkeeping and avoid the installation of an additional method of fuel monitoring, Stillwater Mining opted to employ the higher CO emission factor from the 5000 East Portal Heater for all propane combustion units under EU016. This presents a conservative or worst-case approach and avoids the need for separate emission limits and fuel consumption recordkeeping requirements for the portal heater.

- Change the name of emission unit EU016 to "Propane Combustion from Portal Heaters, Space Heaters, Line Heaters, and Other Combustion Sources," to comprehensively address all propane fueled equipment.

- Categorization of particulate emissions from the mine ventilation exhaust (EU001) as fugitive emissions similar to the gaseous emissions from this source. With issuance of MAQP #2459-13 the emission inventory changed categorization of gaseous emissions from non-fugitive to fugitive, while categorization of particulate matter remained non-fugitive. At the time of this permit action, all underground equipment are considered fugitive. The Department has revised the emission inventory of underground equipment and categorized said equipment accordingly, based on fugitive or non-fugitive.

- Revise potential emission calculations of the mine ventilation exhaust (EU001) for particulate emissions from the current 1999 Title V permit application based method to an emission estimate based on 2010 emission testing. Similar to the action which revised the gaseous emission inventory. With issuance of MAQP #2459-14 the emission inventory calculated gaseous emissions based on the results of source testing permit performed on July 20, 2010 through July 22, 2010. The Department was concerned that an estimate based on the 2010 source test would not represent the potential to emit of this source. Therefore, the Department updated the emission inventory of the mine ventilation exhaust based on an emission estimate of the actual equipment operating within the underground portion of the mine.

- Correction to the heat input capacity rating of the propane-fired portal heater at the 5000 East Portal from 28 MMBtu/hr to the actual maximum heat input capacity rating of 21 MMBtu/hr. This update was based on manufacturer's data which indicated that the portal heater was only capable of firing three of the 7,000 MMBtu/hr burners at any given time, effectively limiting the maximum potential firing rating to 21 MMBtu/hr. In turn, this reduction in rated heat output decreased the maximum potential hourly CO, NO_x, and volatile organic compounds (VOC) emission rates of this unit; as previous emission estimates were based on the firing of four burners.

MAQP #2459-16 replaced MAQP #2459-15.

On April 25, 2014, the Department received an application for modification of MAQP #2459-16 from Bison Engineering, Inc. (Bison), on behalf of Stillwater Mining. The application proposed the installation and operation of additional permitted equipment and operational changes to the existing Blitz Generator Set(s). Specific elements proposed through this modification included;

- Installation of a screen plant and associated 100 bhp diesel-fired engine to size tunnel boring cuttings to produce road-base material for the mine site. Stillwater Mining requested a screen throughput limit of 285,000 tons per year and an hourly operation limit of 2,400 hours per year. The diesel-fired engine proposed for this source would be Tier 2 certified. Associated haul road emissions and material handling emissions increases was incorporated into the emission inventory.

- Installation of a 152 bhp Emergency Fire Water Pump Diesel-Fired Engine.

- Restrictions on the Blitz Diesel-Fired Generator Engine (EU018) to limit hours of operation to 6,500 hours per year. The intent of this reduction was to decrease the facility's potential emissions relative to the PSD major source threshold in order to provide operation flexibility for future projects.

MAQP #2459-17 replaced MAQP #2459-16.

D. Current Permit Action

On May 17, 2017, the Department received a de minimis notification regarding the addition of an underground waste rock crusher and cement rock fill (CRF) plant that would be used to provide backfill material for production stopes in the east-side of the Stillwater Mine. The waste rock crusher is a rated to crush up to 150 metric tons (165 short tons) per hour and would be used to generate crushed waste rock for use with the CRF plant. The CRF plant is rated to produce up to 300 short tons (137 cubic yards) per hour of CRF to backfill select areas of the mine workings. CRF is a mix of cement, water, and crushed waste rock. This equipment would be located underground and would likely remain at its initial installation location for several years before potentially moving to other areas of the underground mine. Due to this equipment being located over a mile underground, the potential emission levels have a conservative 90% control efficiency applied to the fugitive particulate prior to release to the atmosphere via the mine ventilation exhaust. Emissions from these sources will exhaust to the atmosphere via the mine ventilation exhaust and will be included in the EU001 Mine Ventilation Exhaust emitting point. **MAQP #2459-18** replaces MAQP #2459-17.

E. Additional Information

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

II. Applicable Rules and Regulations

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

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

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

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

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

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

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

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

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

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

Stillwater Mining must comply with the applicable ambient air quality standards.

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

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

2. ARM 17.8.308 Particulate Matter, Airborne. This rule requires that no person shall cause or authorize the production, handling, transportation, or storage of any material unless reasonable precautions to control emission of airborne particulate matter are taken. Such emissions of airborne particulate matter from any stationary source shall not exhibit an opacity of 20% or greater averaged over 6 consecutive minutes.

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

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

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

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

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

   b. 40 CFR 60, Subpart LL – Standards of Performance for Metallic Mineral Processing Plants - requires an opacity limitation of 10% for metallic mineral process fugitive emissions, a stack emission limitation of 0.05 grams per dry standard cubic meter (0.022 grains per dry standard cubic foot), and a stack opacity limitation of 7%. The surface mining operations at Stillwater Mining are subject to 40 CFR 60, Subpart LL.

   c. 40 CFR 60, Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (CI ICE). Owners and operators of stationary CI ICE that commence construction after July 11, 2005, where the stationary CI ICE are manufactured after April 1, 2006, and are not fire pump engines, and owners and operators of stationary CI ICE that modify or reconstruct their stationary CI ICE after July 11, 2005, are subject to this subpart. Based on the information submitted by Stillwater Mining, the CI ICE equipment installed prior to issuance of MAQP #2459-16 (MAQP #2459-16 added the Benbow and Blitz Gensets) are not currently subject to this subpart because the engines commenced construction prior to the applicability dates. Engines installed, modified or replaced after the affected date would likely trigger applicability.

7. ARM 17.8.341 Emission Standards for Hazardous Air Pollutants. The owner or operator of any existing or new stationary source, as defined and applied in 40 CFR Part 61, shall comply with the standards and provisions of 40 CFR Part 61.

8. ARM 17.8.342 Emission Standards for Hazardous Air Pollutants for Source Categories. This rule incorporates, by reference, 40 CFR 63, National Emission Standards for Hazardous Air Pollutants (NESHAP) for Source Categories. The source, as defined and applied in 40 CFR Part 63, shall comply with the requirements of 40 CFR Part 63, as listed below:

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

   b. 40 CFR 63, Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE). The diesel-fired RICE engines operated by Stillwater Mining are considered affected sources under this subpart.

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

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

2. ARM 17.8.402 Requirements. Stillwater Mining must demonstrate compliance with the ambient air quality standards with a stack height that does not exceed Good Engineering Practices (GEP). The proposed heights of all stacks for the Benbow and Blitz engines are below the allowable 65-meter GEP stack height.

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

1. ARM 17.8.504 Air Quality Permit Application Fees. This rule requires that an applicant submit an air quality permit application fee concurrent with the submittal of an air quality permit application. A permit application is incomplete until the proper application fee is paid to the Department. A permit fee is not required for the current permit action because the permit action is considered an administrative permit change.

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

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

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

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

2. ARM 17.8.743 Montana Air Quality Permits--When Required. This rule requires a person to obtain an air quality permit or permit modification to construct, modify, or use any air contaminant sources that have the PTE greater than 25 TPY of any pollutant. Stillwater Mining has the PTE greater than 25 TPY of PM, PM_{10}, PM with an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$), NO_x, CO, and VOC; therefore, a permit is required.

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

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

5. ARM 17.8.748 New or Modified Emitting Units--Permit Application Requirements. (1) This rule requires that a permit application be submitted prior to installation, modification, or use of a source. A permit application was not required for the current permit action because the permit change is considered an administrative permit change. (7) This rule requires that the applicant notify the public by means of legal publication in a newspaper of general circulation in the area affected by the application for a permit. An affidavit of publication of public notice was not required for the current permit action because the permit change is considered an administrative permit change.

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

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

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

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

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

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

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

13. ARM 17.8.764 Administrative Amendment to Permit. An air quality permit may be amended for changes in any applicable rules and standards adopted by the Board of Environmental Review (Board) or changed conditions of operation at a source or stack that do not result in an increase of emissions as a result of those changed conditions. The owner or operator of a facility may not increase the facility's emissions beyond permit limits unless the increase meets the criteria in ARM 17.8.745(1) for a de minimis change not requiring a permit, or unless the owner or operator applies for and receives another permit in accordance with ARM 17.8.748, ARM 17.8.749, ARM 17.8.752, ARM 17.8.755, and ARM 17.8.756, and with all applicable requirements in ARM Title 17, Chapter 8, Subchapters 8, 9, and 10.

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

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

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

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

   This Stillwater Mining facility is not a major stationary source because it is not listed and it does not have the potential to emit more than 250 TPY (excluding fugitive emissions) of any pollutant.

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

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

   a. PTE > 100 TPY of any pollutant.

   b. PTE > 10 TPY of a single HAP, or PTE > 25 TPY of combined HAPs, or a lesser quantity as the Department may establish by rule.

   c. Sources with PTE > 70 TPY of PM_{10} in a serious PM_{10} nonattainment area.

2. ARM 17.8.1204 Air Quality Operating Permit Program Applicability. Title V of the FCAA Amendments of 1990 requires that all sources, as defined in ARM 17.8.1204(1), obtain a Title V Operating Permit. In reviewing and issuing MAQP #2459-18 for Stillwater, the following conclusions were made:

   a. The facility's PTE is greater than 100 TPY for CO.

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

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

   d. This facility is subject to a current NSPS (40 CFR 60, Subpart A, Subpart LL, and Subpart IIII)

   e. This facility is subject to a current NESHAP (40 CFR 60, Subpart A and Subpart ZZZZ).

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

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

Based on the preceding information, Stillwater Mining is subject to the Title V Operating Permit program. Operating Permit #OP2459-07 was issued final and effective on January 17, 2015.

III. BACT Determination

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

A BACT determination was not required for the current permit action because the permit change is considered an administrative permit change.

IV. Emission Inventory

Facility Fugitive and Non-Fugitive Sources:

		Emissions TPY [PTE]						
Unit #	**Source**	**PM**	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**CO**	**VOC**	**SO_2**
EU001	Mine Ventilation Exhaust	81.05	33.25	12.25	100.60	66.89	ND	4.44
EU002	Crushing Ore (Surface)	18.71	8.40	2.87				
EU003	Load & Dump: Coarse Ore into Crusher Hopper	36.50	14.60	5.48				
EU004	Load & Dump: Coarse Ore into Mill Hopper	36.50	14.60	5.48				
EU005	Conveying System Transfer Points	16.43	6.57	2.46				
EU006	Load & Dump Waste Rock onto Tailings Embankment/Storage	21.90	8.76	3.29				
EU007	Disturbed Areas	10.41	5.21	0.57				
EU008	Haul Roads	176.88	46.03	4.60				
EU009	Diesel Use	7.86	7.86	7.86	111.77	24.08	9.12	7.35
EU010	Unleaded Gasoline Use (65,000 gallons per year (gal/yr))	0.42	0.42	0.42	6.89	4.18	12.80	0.35
EU011	Paste Plant Emergency Flush Pump Emergency Diesel-Fired Engine (225 horsepower (bhp))	0.12	0.12	0.12	1.74	0.38	0.14	0.12
EU012	Concrete Batch Plant	0.41	0.32	0.25				
EU015	Soda Ash Silo	0.01	0.01	0.01				
EU016	Propane Combustion from Portal Heaters, Space Heaters, Line Heaters, and Other Combustion Sources	1.05	1.05	1.05	19.50	40.98	1.20	2.25
EU017	Shaft Emergency Diesel-Fired Generator Engine (947 bhp)	0.17	0.17	0.17	5.68	1.30	0.15	0.10
EU018	Blitz Generator Sets (≤ 4022 bhp)	2.15	2.15	2.15	14.40	75.22	8.60	0.14
EU019	Benbow Generator Sets (≤ 4022 bhp)	2.90	2.90	2.90	19.41	101.39	11.59	0.19

Facility Fugitive and Non-Fugitive Sources:

		Emissions TPY [PTE]						
Unit #	**Source**	**PM**	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**CO**	**VOC**	**SO_2**
EU020	Screening Plant Material Handling	14.25	5.70	2.14				
EU021	Screening Plant	0.51	0.31	0.08				
	Screening Plant Diesel-Fired Engine (100 bhp)	0.08	0.08	0.08	1.48	0.99	0.30	0.005
EU022	Emergency Fire Water Pump Diesel-Fired Engine (152 bhp)	0.08	0.08	0.08	1.18	0.25	0.10	0.0004
IEU01	Grinding Mills (wet process)							
IEU02	Cycloning (wet process)							
IEU03	Flotation Circuit (wet process)							
IEU04	Thickener (wet process)							
IEU05	Vacuum filter (wet process)							
IEU06	Paste Plant Operations	1.61	1.03	0.24				
IEU07	Open Burning	0.34	0.34	0.34		2.80	0.38	
IEU08	Above Ground Fuel Storage						0.62	
	EMISSION TOTALS ►	**430.34**	**159.96**	**54.89**	**282.65**	**318.46**	**45.00**	**14.95**

Facility Non-Fugitive Sources:

		Emissions TPY [PTE]						
Unit #	**Source**	**PM**	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**CO**	**VOC**	**SO_2**
EU002	Crushing Ore (Surface)	18.71	8.40	2.87				
EU011	Paste Plant Emergency Flush Pump Emergency Diesel-Fired Engine (225 horsepower (bhp))	0.12	0.12	0.12	1.74	0.38	0.14	0.12
EU012	Concrete Batch Plant Operations	0.41	0.32	0.25				
EU015	Soda Ash Silo	0.01	0.01	0.01				
EU016	Propane Combustion from Portal Heaters, Space Heaters, Line Heaters, and Other Combustion Sources	1.05	1.05	1.05	19.50	40.98	1.20	2.25
EU017	Shaft Emergency Diesel-Fired Generator Engine (947 bhp)	0.17	0.17	0.17	5.68	1.30	0.15	0.10
EU018	Blitz Generator Sets (≤ 4022 bhp)	2.15	2.15	2.15	14.40	75.22	8.60	0.14
EU019	Benbow Generator Sets (≤ 4022 bhp)	2.90	2.90	2.90	19.41	101.39	11.59	0.19
EU022	Emergency Fire Water Pump Diesel-Fired Engine (152 bhp)	0.08	0.08	0.08	1.18	0.25	0.10	0.0004
	EMISSION TOTALS ►	**25.60**	**15.10**	**9.51**	**60.74**	**219.27**	**21.68**	**2.79**

Notes:
a. Wet Processes are considered to have negligible emissions.
b. Empty cells are equivalent to zero potential emissions
c. Gaseous mine ventilation exhaust emissions result from explosive detonation and mobile diesel sources only and are considered fugitive or non-regulated emissions. All underground stationary point sources are electrically powered.

awcfm, actual wet cubic feet per minute
bhp, brake-horsepower
Btu, British Thermal Units
CO, carbon monoxide
dscfm, dry standard cubic feet per minute
PTE, Potential To Emit
PM, particulate matter
PM_{COND}, condensable particulate matter
PM_{10}, particulate matter with an aerodynamic diameter of 10 microns or less

ft^2, square foot g, gram gr, grains Hg, mercury lb, pound MMBtu, million British Thermal Units MMscf, million standard cubic feet NMHC, non-methane hydrocarbons NO_X, oxides of nitrogen	$PM_{2.5}$, particulate matter with an aerodynamic diameter of 2.5 microns or less [Sum of condensable and filterable] SCC, source code classification scf, standard cubic feet SO_2, oxides of sulfur TPH, tons per hour TPY, tons per year VMT, vehicle miles travelled VOC, volatile organic compounds

EU001 Mine Ventilation Exhaust:

EU001a – Underground Gaseous Emissions:

Stack Parameters:

Exhaust Flow Rate:	2,000,000.00	awcfm
	1531654.959	dscfm (Calculated)
Moisture:	2.42	% (EEMC Source Test)
Temperature:	68	ºFahrenheit (EEMC Source Test)
	528	ºRankine
Absolute Pressure:	25.2	inches Hg (EEMC Source Test)

Basis:
Portal 5150 Upper West - Source Test Data, EEMC; July 20, 2010 - July 22, 2010
Standard Conditions → 32ºF at 29.92 inches Hg [volume/mole = 359 scf/lb-mole]
Operating Hours: 8760 hours/year

NO_x Emissions:

Emission Factor = 1.95 ppmv [EEMC Source Test Data]
Calculation:
(1.95 ppmv/1000000 ppmv)*(46.01 lb/1 lb-mol)*(1 lb-mol/359 scf)*(1,531,655 scf /1 min)*(60 min/1 hr) = 22.97 lbs/hr
(22.97 lbs/hr) * (8760 hrs/yr) * (0.0005 ton/lb) = 100.60 tons/yr

CO Emissions:

Emission Factor = 2.13 ppmv [EEMC Source Test Data]
Calculation:
(2.13 ppmv/1000000 ppmv)*(28.01 lb/1 lb-mol)*(1 lb-mol/359 scf)*(1,531,655 scf /1 min)*(60 min/1 hr) = 15.27 lbs/hr
(15.27 lbs/hr) * (8760 hrs/yr) * (0.0005 ton/lb) = 66.89 tons/yr

SO_2 Emissions:

Emission Factor = 0.05 ppmv [EEMC Source Test Data]
Calculation:
(0.05 ppmv/1000000 ppmv)*(64.01 lb/1 lb-mol)*(1 lb-mol/359 scf)*(1,531,655 scf /1 min)*(60 min/1 hr) = 0.82 lbs/hr
(0.82 lbs/hr) * (8760 hrs/yr) * (0.0005 ton/lb) = 3.59 tons/yr

EU001b – Underground Primary Crushing - Jaw Crusher [SCC 3-03-024-05]:

Maximum Process Rate = 912,500 ton/yr (Application information, max mine production)
Maximum Hours of Operation = 8,760 hrs/yr

PM Emissions:

Emission Factor = 0.02 lb/ton (primary crushing - high moisture ore, AP 42, Table 11.24.2-2, 8/82)

Calculation: (912,500 ton/yr) * (0.02 lb/ton) * (ton/2000 lb) = 9.13 ton/yr

PM_{10} Emissions:
Emission Factor = 0.009 lb/ton (primary crushing - high moisture ore, AP 42, Table 11.24.2-2, 8/82)
Calculation: (912,500 ton/yr) * (0.009 lb/ton) * (ton/2000 lb) = 4.11 ton/yr

$PM_{2.5}$ Emissions:
Emission Factor = 0.003 lb/ton (PM2.5 = 15% of PM ►AP-42 Appendix B.2 - Table B.2.2, Category 3, 1/90)
Calculation: (912,500 ton/yr) * (0.003 lb/ton) * (ton/2000 lb) = 1.37 ton/yr

EU001c – Underground Conveying System Transfer Points - West Side [SCC 3-03-024-08]:
Maximum Process Rate = 912,500 ton/yr (Application information, max mine production)
Maximum Hours of Operation = 8,760 hrs/yr
Number of Transfers = 9 transfers

PM Emissions:
Emission Factor = 0.01 lb/ton (Material handling & transfer (non-bauxite) - high moisture ore, AP 42, Table 11.24.2-2, 8/82)
Calculation: (912,500 ton/yr) * (0.01 lb/ton) * (1 - 0/100) * (9 transfers) * (ton/2000 lb) = 41.06 ton/yr

PM_{10} Emissions:
Emission Factor = 0.004 lb/ton (Material handling & transfer (non-bauxite) - high moisture ore, AP 42, Table 11.24.2-2, 8/82)
Calculation: (912,500 ton/yr) * (0.004 lb/ton) * (1 - 0/100) * (9 transfers) * (ton/2000 lb) = 16.43 ton/yr

$PM_{2.5}$ Emissions:
Emission Factor = 0.0015 lb/ton (PM2.5 = PM * 15%, AP 42, Appendix B.2, Category 3, 9/90)
Calculation: (912,500 ton/yr) * (0.0015 lb/ton) * (1 - 0/100) * (9 transfers) * (ton/2000 lb) = 6.16 ton/yr

EU001d – Underground Conveying System Transfer Points - East Side [SCC 3-03-024-08]:
Maximum Process Rate = 912,500 ton/yr (Application information, max mine production)
Maximum Hours of Operation = 8,760 hrs/yr
Number of Transfers = 6 transfers

PM Emissions:
Emission Factor = 0.01 lb/ton (Material handling & transfer (non-bauxite) - high moisture ore, AP 42, Table 11.24.2-2, 8/82)
Calculation: (912,500 ton/yr) * (0.01 lb/ton) * (1 - 0/100) * (6 transfers) * (ton/2000 lb) = 27.38 ton/yr

PM_{10} Emissions:
Emission Factor = 0.004 lb/ton (Material handling & transfer (non-bauxite) - high moisture ore, AP 42, Table 11.24.2-2, 8/82)
Calculation: (912,500 ton/yr) * (0.004 lb/ton) * (1 - 0/100) * (6 transfers) * (ton/2000 lb) = 10.95 ton/yr

$PM_{2.5}$ Emissions:
Emission Factor = 0.0015 lb/ton (PM2.5 = PM * 15%, AP 42, Appendix B.2, Category 3, 9/90)
Calculation: (912,500 ton/yr) * (0.0015 lb/ton) * (1 - 0/100) * (6 transfers) * (ton/2000 lb) = 4.11 ton/yr

EU001e – Underground Blasting:

Area (A) Per Blast:	560	ft^2 (historical maximum)
Blast Per Day:	70	Blast (historical maximum)

PM Emissions:
Emission Factor (lb/blast) = $0.000014 (A)^{1.5}$ (AP-42 Table 11.9-1, 7/98)
$(0.000014) * (560\ ft^2)^{1.5}$ = 0.186 lbs/blast

Emission Factor = 0.186 lbs/blast
Calculation (0.186 lbs/blast) * (70 blast/day) = 12.99 lbs/day
(12.99 lbs/day) * (365 days/yr) * (0.0005 ton / lb) = 2.37 tons/yr

PM_{10} Emissions:
Emission Factor = 0.096 lbs/blast (PM→ PM10 scaling factor = 0.52, AP-42 Table 11.91, 7/98)
Calculations (0.096 lbs/blast) * (70 blast/day) = 6.75 lbs/day
(6.75 lbs/day) * (365 days/yr) * (0.0005 ton / lb) = 1.23 tons/yr

$PM_{2.5}$ Emissions:
Emission Factor = 0.006 lbs/blast (PM→PM2.5 scaling factor = 0.15, AP-42 Table 11.91, 7/98)
Calculations (0.006 lbs/blast) * (70 blast/day) = 0.39 lbs/day
(0.39 lbs/day) * (365 days/yr) * (0.0005 ton / lb) = 0.07 tons/yr

EU001f – Underground Waste Rock Crusher
Maximum Process Rate = 165 ton/hr (Max rate for waste rock crusher)
Maximum Hours of Operation = 8,760 hrs/yr

PM Emissions:
Emission Factor = 0.0054 lb/ton (tertiary crushing (uncontrolled), AP 42, Table 11.19.2-2, 8/04)
Control Efficiency = 90% (underground equipment, equivalent to a building enclosure)
Calculation: (165 ton/hr) * (8760 hrs/yr) * (0.0054 lb/ton) * (ton/2000 lb) = 3.90 ton/yr
Calculation: (165 ton/hr) * (8760 hrs/yr) * (0.0054 lb/ton) * (ton/2000 lb) * (1 - 90/100) = 0.39 ton/yr

PM_{10}/$PM_{2.5}$ Emissions:
Emission Factor = 0.0024 lb/ton (tertiary crushing PM10 as an upper limit (uncontrolled), AP 42, Table 11.19.2-2, 8/04)
Control Efficiency = 90% (underground equipment, equivalent to a building enclosure)
Calculation: (165 ton/hr) * (8760 hrs/yr) * (0.0024 lb/ton) * (ton/2000 lb) = 1.73 ton/yr
Calculation: (165 ton/hr) * (8760 hrs/yr) * (0.0024 lb/ton) * (ton/2000 lb) * (1 - 90/100) = 0.17 ton/yr

EU001g – Underground Cement Rock Fill Plant
Control Efficiency = 90% (underground equipment, equivalent to a building enclosure)
Cement delivery to silo (3-05-011-07)
PM Emissions:
Emission Factor = 0.00099 lb/ton (controlled, AP 42, Table 11.12-2, 6/06)
Calculation: (137 yd^3/hr) * (320 lb/yd^3) * (ton/2000 lb) * (8760 hrs/yr) * (0.00099 lb/ton) * (ton/2000 lb) = 0.10 ton/yr
Calculation: (0.10 ton/yr) * (1 – 90/100) = 0.01 ton/yr

PM_{10}/$PM_{2.5}$ Emissions:
Emission Factor = 0.00034 lb/ton (controlled, AP 42, Table 11.12-2, 6/06)
Calculation: (137 yd^3/hr) * (320 lb/yd^3) * (ton/2000 lb) * (8760 hrs/yr) * (0.00034 lb/ton) * (ton/2000 lb) = 0.03 ton/yr
Calculation: (0.03 ton/yr) * (1 – 90/100) = 0.00 ton/yr

Weigh hopper loading (3-05-011-08)
PM Emissions:
Emission Factor = 0.0048 lb/ton (aggregate & sand, uncontrolled, AP 42, Table 11.12-2, 6/06)
Calculation: (137 yd^3/hr) * (3768 lb/yd^3) * (ton/2000 lb) * (8760 hrs/yr) * (0.0048 lb/ton) * (ton/2000 lb) = 5.43 ton/yr
Calculation: (5.43 ton/yr) * (1 – 90/100) = 0.54 ton/yr

$PM_{10}/PM_{2.5}$ Emissions:
Emission Factor = 0.0028 lb/ton (aggregate & sand, uncontrolled, AP 42, Table 11.12-2, 6/06)
Calculation: (137 yd^3/hr) * (3768 lb/yd^3) * (ton/2000 lb) * (8760 hrs/yr) * (0.0028 lb/ton) * (ton/2000 lb) = 3.17 ton/yr
Calculation: (3.17 ton/yr) * (1 – 90/100) = 0.32 ton/yr

Central Mix Loading (3-05-011-09)
PM Emissions:
Emission Factor = 0.0184 lb/ton (cement & supplement, controlled, AP 42, Table 11.12-2, 6/06)
Calculation: (137 yd^3/hr) * (320 lb/yd^3) * (ton/2000 lb) * (8760 hrs/yr) * (0.0184 lb/ton) * (ton/2000 lb) = 1.77 ton/yr
Calculation: (1.77 ton/yr) * (1 – 90/100) = 0.18 ton/yr

$PM_{10}/PM_{2.5}$ Emissions:
Emission Factor = 0.0055 lb/ton (cement & supplement, controlled, AP 42, Table 11.12-2, 6/06)
Calculation: (137 yd^3/hr) * (320 lb/yd^3) * (ton/2000 lb) * (8760 hrs/yr) * (0.0055 lb/ton) * (ton/2000 lb) = 0.53 ton/yr
Calculation: (0.53 ton/yr) * (1 – 90/100) = 0.05 ton/yr

EU002 Ore Crushing (surface):

EU002a – Primary Crushing (jaw crusher) [SCC 3-03-024-05]:
Maximum Process Rate = 1,825,000 ton/yr (Application information, maximum mine production)
Maximum Hours of Operation = 8,760 hrs/yr

PM Emissions:
Emission Factor = 0.02 lb/ton (primary crushing - high moisture ore, AP 42, Table 11.24.2-2, 8/82)
Calculation: (1,825,000 ton/yr) * (0.02 lb/ton) * (ton/2000 lb) = 18.25 ton/yr

PM_{10} Emissions:
Emission Factor = 0.009 lb/ton (primary crushing - high moisture ore, AP 42, Table 11.24.2-2, 8/82)
Calculation: (1,825,000 ton/yr) * (0.009 lb/ton) * (ton/2000 lb) = 8.21 ton/yr

$PM_{2.5}$ Emissions:
Emission Factor = 0.003 lb/ton (PM2.5 = PM * 15%, AP 42, Appendix B.2, Category 3, 9/90)
Calculation: (1,825,000 ton/yr) * (0.003 lb/ton) * (ton/2000 lb) = 2.74 ton/yr

EU002b – Secondary Crushing (cone crusher) [SCC 3-03-024-06]:
Maximum Process Rate = 1,825,000 ton/yr (Application information, maximum mine production)
Maximum Hours of Operation = 8,760 hrs/yr

PM Emissions:
Emission Factor = 0.05 lb/ton (secondary crushing - high moisture ore, AP 42, Table 11.24.2-2, 8/82)
Control Efficiency = 99% (fabric filter)
Calculation: (1,825,000 ton/yr) * (0.05 lb/ton) * (1 - 99/100) * (ton/2000 lb) = 0.46 ton/yr

PM_{10} Emissions:
Emission Factor = 0.02 lb/ton (secondary crushing - high moisture ore, AP 42, Table 11.24.2-2, 8/82)
Control Efficiency = 99% (fabric filter)
Calculation: (1,825,000 ton/yr) * (0.02 lb/ton) * (1 - 99/100) * (ton/2000 lb) = 0.18 ton/yr

$PM_{2.5}$ Emissions:
Emission Factor = 0.015 lb/ton (PM2.5 = PM * 30%, AP 42, Appendix B.2, Category 4, 9/90)
Control Efficiency = 99% (fabric filter)
Calculation: (1,825,000 ton/yr) * (0.015 lb/ton) * (1 - 99/100) * (ton/2000 lb) = 0.14 ton/yr

EU003 Load & Dump Coarse Ore/Fine Ore into Crusher Hopper [SCC 3-03-024-08]:

Maximum Process Rate = 1,825,000 ton/yr (Application information, max mine production)
Maximum Hours of Operation = 8,760 hrs/yr
Number of Transfers = 4 transfers

PM Emissions:

Emission Factor = 0.01 lb/ton (Material handling & transfer (non-bauxite) - high moisture ore, AP 42, Table 11.24.2-2, 8/82)
Calculation: (1,825,000 ton/yr) * (0.01 lb/ton) * (4 transfers) * (ton/2000 lb) = 36.50 ton/yr

PM_{10} Emissions:

Emission Factor = 0.004 lb/ton (Material handling & transfer (non-bauxite) - high moisture ore, AP 42, Table 11.24.2-2, 8/82)
Calculation: (1,825,000 ton/yr) * (0.004 lb/ton) * (4 transfers) * (ton/2000 lb) = 14.60 ton/yr

$PM_{2.5}$ Emissions:

Emission Factor = 0.0015 lb/ton (PM2.5 = PM * 15%, AP 42, Appendix B.2, Category 3, 9/90)
Calculation: (1,825,000 ton/yr) * (0.0015 lb/ton) * (4 transfers) * (ton/2000 lb) = 5.48 ton/yr

EU004 Load & Dump Fine Ore into Crusher Hopper or Coarse Ore Stockpile [SCC 3-03-024-08]:

Maximum Process Rate = 1,825,000 ton/yr (Application information, max mine production)
Maximum Hours of Operation = 8,760 hrs/yr
Number of Transfers = 4 transfers

PM Emissions:

Emission Factor = 0.01 lb/ton (Material handling & transfer (non-bauxite) - high moisture ore, AP 42, Table 11.24.2-2, 8/82)
Calculation: (1,825,000 ton/yr) * (0.01 lb/ton) * (4 transfers) * (ton/2000 lb) = 36.50 ton/yr

PM_{10} Emissions:

Emission Factor = 0.004 lb/ton (Material handling & transfer (non-bauxite) - high moisture ore, AP 42, Table 11.24.2-2, 8/82)
Calculation: (1,825,000 ton/yr) * (0.004 lb/ton) * (4 transfers) * (ton/2000 lb) = 14.60 ton/yr

$PM_{2.5}$ Emissions:

Emission Factor = 0.0015 lb/ton (PM2.5 = PM * 15%, AP 42, Appendix B.2, Category 3, 9/90)
Calculation: (1,825,000) * (0.0015 lb/ton) * (4 transfers) * (ton/2000 lb) = 5.48 ton/yr

EU005 Surface Conveying System Transfer Points [SCC 3-03-024-08]:

Maximum Process Rate = 1,825,000 ton/yr (Application information, max mine production)
Maximum Hours of Operation = 8,760 hrs/yr
Number of Transfers = 18 transfers

PM Emissions:

Emission Factor = 0.01 lb/ton (Material handling & transfer (non-bauxite) - high moisture ore, AP 42, Table 11.24.2-2, 8/82)
Control Efficiency = 90% (enclosure)
Calculation: (1,825,000 ton/yr) * (0.01 lb/ton) * (1 - 90/100) * (18 transfers) * (ton/2000 lb) = 16.43 ton/yr

PM_{10} Emissions:

Emission Factor = 0.004 lb/ton (Material handling & transfer (non-bauxite) - high moisture ore, AP 42, Table 11.24.2-2, 8/82)
Control Efficiency = 90% (enclosure)

Calculation: (1,825,000 ton/yr) * (0.004 lb/ton) * (1 - 90/100) * (18 transfers) * (ton/2000 lb) = 6.57 ton/yr

$PM_{2.5}$ Emissions:
Emission Factor = 0.0015 lb/ton (PM2.5 = PM * 15%, AP 42, Appendix B.2, Category 3, 9/90)
Control Efficiency = 90% (enclosure)
Calculation: (1,825,000 ton/yr) * (0.0015 lb/ton) * (1 - 90/100) * (18 transfers) * (ton/2000 lb) = 2.46 ton/yr

EU006 Load & Dump Waste Rock onto Tailings Embankment [SCC 3-03-024-08]:
Maximum Process Rate = 1,095,000 ton/yr (Application information, max mine production)
Maximum Hours of Operation = 8,760 hrs/yr
Number of Transfers = 4 transfers

PM Emissions:
Emission Factor = 0.01 lb/ton (Material handling & transfer (non-bauxite) - high moisture ore, AP 42, Table 11.24.2-2, 8/82)
Calculation: (1,095,000 ton/yr) * (0.01 lb/ton) * (4 transfers) * (ton/2000 lb) = 21.90 ton/yr

PM_{10} Emissions:
Emission Factor = 0.004 lb/ton (Material handling & transfer (non-bauxite) - high moisture ore, AP 42, Table 11.24.2-2, 8/82)
Calculation: (1,095,000 ton/yr) * (0.004 lb/ton) * (4 transfers) * (ton/2000 lb) = 8.76 ton/yr

$PM_{2.5}$ Emissions:
Emission Factor = 0.0015 lb/ton (PM2.5 = PM * 15%, AP 42, Appendix B.2, Category 3, 9/90)
Calculation: (1,095,000 ton/yr) * (0.0015 lb/ton) * (4 transfers) * (ton/2000 lb) = 3.29 ton/yr

EU008 Haul Roads:

EU008a – Ore hauled from mine to mill hopper grizzly in front end loader:
Vehicle Miles Traveled (VMT) per Day = 5,819 VMT/yr (Application Info)
VMT per hour = (5,819 VMT/yr) / (8760 hrs/yr) = 0.66 VMT/hr
Hours of Operation = 8,760 hrs/yr
Number of days > 0.01 inches of rain = 120 days/yr (AP-42, Section 13.2.2, Figure 13.2.2-1, 11/06)

PM Emissions:
Predictive equation for emission factor for unpaved roads at industrial sites provided per AP 42, Ch. 13.2.2, 11/06.
Emission Factor = k * (s / 12)^a * (W / 3)^b = 6.73 lb/VMT
Where: k = constant = 4.9 lbs/VMT (Value for PM30/TSP, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content = 4.8 % (Mean value, sand/gravel processing, plant road, AP 42, Table 13.2.2-1, 11/06)
W = mean vehicle weight = 25.22 tons (Application Info)
a = constant = 0.7 (Value for PM30/TSP, AP 42, Table 13.2.2-2, 11/06)
b = constant = 0.45 (Value for PM30/TSP, AP 42, Table 13.2.2-2, 11/06)
Natural mitigation = 67% = (365 - 120) / 365 (AP-42, Section 13.2.2, Equation (2), 11/06)
Control Efficiency = 50% (Water spray or chemical dust suppressant)
Calculation: (5,819 VMT/yr) * (6.73 lb/VMT) * (67%) * (ton/2000 lb) = 13.13 tons/yr (Uncontrolled Emissions)
Calculation: (5,819 VMT/yr) * (6.73 lb/VMT) * (67%) * (ton/2000 lb) * (1-50/100) = 6.57 tons/yr (Apply 50% control efficiency)

PM_{10} Emissions:
Predictive equation for emission factor for unpaved roads at industrial sites provided per AP 42, Ch. 13.2.2, 11/06.
Emission Factor = k * (s / 12)^a * (W / 3)^b = 1.71 lb/VMT
Where: k = constant = 1.5 lbs/VMT (Value for PM10, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content = 4.8 % (Mean value, sand/gravel processing, plant road, AP 42, Table 13.2.2-1, 11/06)

W = mean vehicle weight = 25.22 tons (Application Info)
a = constant = 0.9 (Value for PM10, AP 42, Table 13.2.2-2, 11/06)
b = constant = 0.45 (Value for PM10, AP 42, Table 13.2.2-2, 11/06)
Natural mitigation = 67% = (365 - 120) / 365 (AP-42, Section 13.2.2, Equation (2), 11/06)
Control Efficiency = 50% (Water spray or chemical dust suppressant)
Calculation: (5,819 VMT/yr) * (1.71 lb/VMT) * (67%) * (ton/2000 lb) = 3.35 tons/yr (Uncontrolled Emissions)
Calculation: (5,819 VMT/yr) * (1.71 lb/VMT) * (67%) * (ton/2000 lb) * (1-50/100) = 1.67 tons/yr (Apply 50% control efficiency)

$PM_{2.5}$ Emissions:

Predictive equation for emission factor for unpaved roads at industrial sites provided per AP 42, Ch. 13.2.2, 11/06.
Emission Factor = k * (s / 12)^a * (W / 3)^b = 0.17 lb/VMT
Where: k = constant = 0.15 lbs/VMT (Value for PM2.5, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content = 4.8 % (Mean value, sand/gravel processing, plant road, AP 42, Table 13.2.2-1, 11/06)
W = mean vehicle weight = 25.22 tons (Application Info)
a = constant = 0.9 (Value for PM2.5, AP 42, Table 13.2.2-2, 11/06)
b = constant = 0.45 (Value for PM2.5, AP 42, Table 13.2.2-2, 11/06)
Natural mitigation = 67% = (365 - 120) / 365 (AP-42, Section 13.2.2, Equation (2), 11/06)
Control Efficiency = 50% (Water spray or chemical dust suppressant)
Calculation: (5,819 VMT/yr) * (0.17 lb/VMT) * (67%) * (ton/2000 lb) = 0.33 tons/yr (Uncontrolled Emissions)
Calculation: (5,819 VMT/yr) * (0.17 lb/VMT) * (67%) * (ton/2000 lb) * (1-50/100) = 0.17 tons/yr (Apply 50% control efficiency)

EU008b – Ore from east side (above 5000 feet):

Vehicle Miles Traveled (VMT) per Day = 7,120 VMT/yr (Application Info)
VMT per hour = (7,120 VMT/yr) / (8760 hrs/yr) = 0.81 VMT/hr
Hours of Operation = 8,760 hrs/yr
Number of days > 0.01 inches of rain = 120 days/yr (AP-42, Section 13.2.2, Figure 13.2.2-1, 11/06)

PM Emissions:

Predictive equation for emission factor for unpaved roads at industrial sites provided per AP 42, Ch. 13.2.2, 11/06.
Emission Factor = k * (s / 12)^a * (W / 3)^b = 10.51 lb/VMT
Where: k = constant = 4.9 lbs/VMT (Value for PM30/TSP, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content = 4.8 % (Mean value, sand/gravel processing, plant road, AP 42, Table 13.2.2-1, 11/06)
W = mean vehicle weight = 68 tons (Application Info)
a = constant = 0.7 (Value for PM30/TSP, AP 42, Table 13.2.2-2, 11/06)
b = constant = 0.45 (Value for PM30/TSP, AP 42, Table 13.2.2-2, 11/06)
Natural mitigation = 67% = (365 - 120) / 365 (AP-42, Section 13.2.2, Equation (2), 11/06)
Control Efficiency = 50% (Water spray or chemical dust suppressant)
Calculation: (7,120 VMT/yr) * (10.51 lb/VMT) * (67%) * (ton/2000 lb) = 25.11 tons/yr (Uncontrolled Emissions)
Calculation: (7,120 VMT/yr) * (10.51 lb/VMT) * (67%) * (ton/2000 lb) * (1-50/100) = 12.56 tons/yr (Apply 50% control efficiency)

PM_{10} Emissions:

Predictive equation for emission factor for unpaved roads at industrial sites provided per AP 42, Ch. 13.2.2, 11/06.
Emission Factor = k * (s / 12)^a * (W / 3)^b = 2.68 lb/VMT
Where: k = constant = 1.5 lbs/VMT (Value for PM10, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content = 4.8 % (Mean value, sand/gravel processing, plant road, AP 42, Table 13.2.2-1, 11/06)
W = mean vehicle weight = 68 tons (Application Info)
a = constant = 0.9 (Value for PM10, AP 42, Table 13.2.2-2, 11/06)
b = constant = 0.45 (Value for PM10, AP 42, Table 13.2.2-2, 11/06)
Natural mitigation = 67% = (365 - 120) / 365 (AP-42, Section 13.2.2, Equation (2), 11/06)
Control Efficiency = 50% (Water spray or chemical dust suppressant)

Calculation: (7,120 VMT/yr) * (2.68 lb/VMT) * (67%) * (ton/2000 lb) = 6.40 tons/yr (Uncontrolled Emissions)
Calculation: (7,120 VMT/yr) * (2.68 lb/VMT) * (67%) * (ton/2000 lb) * (1-50/100) = 3.20 tons/yr (Apply 50% control efficiency)

$PM_{2.5}$ Emissions:

Predictive equation for emission factor for unpaved roads at industrial sites provided per AP 42, Ch. 13.2.2, 11/06.
Emission Factor = k * (s / 12)^a * (W / 3)^b = 0.27 lb/VMT
Where: k = constant = 0.15 lbs/VMT (Value for PM2.5, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content = 4.8 % (Mean value, sand/gravel processing, plant road, AP 42, Table 13.2.2-1, 11/06)
W = mean vehicle weight = 68 tons (Application Info)
a = constant = 0.9 (Value for PM2.5, AP 42, Table 13.2.2-2, 11/06)
b = constant = 0.45 (Value for PM2.5, AP 42, Table 13.2.2-2, 11/06)
Natural mitigation = 67% = (365 - 120) / 365 (AP-42, Section 13.2.2, Equation (2), 11/06)
Control Efficiency = 50% (Water spray or chemical dust suppressant)
Calculation: (7,120 VMT/yr) * (0.27 lb/VMT) * (67%) * (ton/2000 lb) = 0.64 tons/yr (Uncontrolled Emissions)
Calculation: (7,120 VMT/yr) * (0.27 lb/VMT) * (67%) * (ton/2000 lb) * (1-50/100) = 0.32 tons/yr (Apply 50% control efficiency)

EU008c – Ore to coarse ore pile from west side:

Vehicle Miles Traveled (VMT) per Day = 377 VMT/yr (Application Info)
VMT per hour = (377 VMT/yr) / (8760 hrs/yr) = 0.04 VMT/hr
Hours of Operation = 8,760 hrs/yr
Number of days > 0.01 inches of rain = 120 days/yr (AP-42, Section 13.2.2, Figure 13.2.2-1, 11/06)

PM Emissions:

Predictive equation for emission factor for unpaved roads at industrial sites provided per AP 42, Ch. 13.2.2, 11/06.
Emission Factor = k * (s / 12)^a * (W / 3)^b = 10.65 lb/VMT
Where: k = constant = 4.9 lbs/VMT (Value for PM30/TSP, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content = 4.8 % (Mean value, sand/gravel processing, plant road, AP 42, Table 13.2.2-1, 11/06)
W = mean vehicle weight = 70 tons (Application Info)
a = constant = 0.7 (Value for PM30/TSP, AP 42, Table 13.2.2-2, 11/06)
b = constant = 0.45 (Value for PM30/TSP, AP 42, Table 13.2.2-2, 11/06)
Natural mitigation = 67% = (365 - 120) / 365 (AP-42, Section 13.2.2, Equation (2), 11/06)
Control Efficiency = 50% (Water spray or chemical dust suppressant)
Calculation: (377 VMT/yr) * (10.65 lb/VMT) * (67%) * (ton/2000 lb) = 1.35 tons/yr (Uncontrolled Emissions)
Calculation: (377 VMT/yr) * (10.65 lb/VMT) * (67%) * (ton/2000 lb) * (1-50/100) = 0.67 tons/yr (Apply 50% control efficiency)

PM_{10} Emissions:

Predictive equation for emission factor for unpaved roads at industrial sites provided per AP 42, Ch. 13.2.2, 11/06.
Emission Factor = k * (s / 12)^a * (W / 3)^b = 2.71 lb/VMT
Where: k = constant = 1.5 lbs/VMT (Value for PM10, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content = 4.8 % (Mean value, sand/gravel processing, plant road, AP 42, Table 13.2.2-1, 11/06)
W = mean vehicle weight = 70 tons (Application Info)
a = constant = 0.9 (Value for PM10, AP 42, Table 13.2.2-2, 11/06)
b = constant = 0.45 (Value for PM10, AP 42, Table 13.2.2-2, 11/06)
Natural mitigation = 67% = (365 - 120) / 365 (AP-42, Section 13.2.2, Equation (2), 11/06)
Control Efficiency = 50% (Water spray or chemical dust suppressant)
Calculation: (377 VMT/yr) * (2.71 lb/VMT) * (67%) * (ton/2000 lb) = 0.34 tons/yr (Uncontrolled Emissions)
Calculation: (377 VMT/yr) * (2.71 lb/VMT) * (67%) * (ton/2000 lb) * (1-50/100) = 0.17 tons/yr (Apply 50% control efficiency)

$PM_{2.5}$ Emissions:

Predictive equation for emission factor for unpaved roads at industrial sites provided per AP 42, Ch. 13.2.2, 11/06.

Emission Factor = k * (s / 12)^a * (W / 3)^b = 0.27 lb/VMT
Where: k = constant = 0.15 lbs/VMT (Value for PM2.5, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content = 4.8 % (Mean value, sand/gravel processing, plant road, AP 42, Table 13.2.2-1, 11/06)
W = mean vehicle weight = 70 tons (Application Info)
a = constant = 0.9 (Value for PM2.5, AP 42, Table 13.2.2-2, 11/06)
b = constant = 0.45 (Value for PM2.5, AP 42, Table 13.2.2-2, 11/06)
Natural mitigation = 67% = (365 - 120) / 365 (AP-42, Section 13.2.2, Equation (2), 11/06)
Control Efficiency = 50% (Water spray or chemical dust suppressant)
Calculation: (377 VMT/yr) * (0.27 lb/VMT) * (67%) * (ton/2000 lb) = 0.03 tons/yr (Uncontrolled Emissions)
Calculation: (377 VMT/yr) * (0.27 lb/VMT) * (67%) * (ton/2000 lb) * (1-50/100) = 0.02 tons/yr (Apply 50% control efficiency)

EU008d – Waste rock tailings to embankment/storage:
Vehicle Miles Traveled (VMT) per Day = 56,638 VMT/yr (Application Info)
VMT per hour = (56,638 VMT/yr) / (8760 hrs/yr) = 6.47 VMT/hr
Hours of Operation = 8,760 hrs/yr
Number of days > 0.01 inches of rain = 120 days/yr (AP-42, Section 13.2.2, Figure 13.2.2-1, 11/06)

PM Emissions:
Predictive equation for emission factor for unpaved roads at industrial sites provided per AP 42, Ch. 13.2.2, 11/06.
Emission Factor = k * (s / 12)^a * (W / 3)^b = 10.65 lb/VMT
Where: k = constant = 4.9 lbs/VMT (Value for PM30/TSP, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content = 4.8 % (Mean value, sand/gravel processing, plant road, AP 42, Table 13.2.2-1, 11/06)
W = mean vehicle weight = 70 tons (Application Info)
a = constant = 0.7 (Value for PM30/TSP, AP 42, Table 13.2.2-2, 11/06)
b = constant = 0.45 (Value for PM30/TSP, AP 42, Table 13.2.2-2, 11/06)
Natural mitigation = 67% = (365 - 120) / 365 (AP-42, Section 13.2.2, Equation (2), 11/06)
Control Efficiency = 50% (Water spray or chemical dust suppressant)
Calculation: (56,638 VMT/yr) * (10.65 lb/VMT) * (67%) * (ton/2000 lb) = 202.39 tons/yr (Uncontrolled Emissions)
Calculation: (56,638 VMT/yr) * (10.65 lb/VMT) * (67%) * (ton/2000 lb) * (1-50/100) = 101.19 tons/yr (Apply 50% control efficiency)

PM_{10} Emissions:
Predictive equation for emission factor for unpaved roads at industrial sites provided per AP 42, Ch. 13.2.2, 11/06.
Emission Factor = k * (s / 12)^a * (W / 3)^b = 2.71 lb/VMT
Where: k = constant = 1.5 lbs/VMT (Value for PM10, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content = 4.8 % (Mean value, sand/gravel processing, plant road, AP 42, Table 13.2.2-1, 11/06)
W = mean vehicle weight = 70 tons (Application Info)
a = constant = 0.9 (Value for PM10, AP 42, Table 13.2.2-2, 11/06)
b = constant = 0.45 (Value for PM10, AP 42, Table 13.2.2-2, 11/06)
Natural mitigation = 67% = (365 - 120) / 365 (AP-42, Section 13.2.2, Equation (2), 11/06)
Control Efficiency = 50% (Water spray or chemical dust suppressant)
Calculation: (56,638 VMT/yr) * (2.71 lb/VMT) * (67%) * (ton/2000 lb) = 51.58 tons/yr (Uncontrolled Emissions)
Calculation: (56,638 VMT/yr) * (2.71 lb/VMT) * (67%) * (ton/2000 lb) * (1-50/100) = 25.79 tons/yr (Apply 50% control efficiency)

$PM_{2.5}$ Emissions:
Predictive equation for emission factor for unpaved roads at industrial sites provided per AP 42, Ch. 13.2.2, 11/06.
Emission Factor = k * (s / 12)^a * (W / 3)^b = 0.27 lb/VMT
Where: k = constant = 0.15 lbs/VMT (Value for PM2.5, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content = 4.8 % (Mean value, sand/gravel processing, plant road, AP 42, Table 13.2.2-1, 11/06)
W = mean vehicle weight = 70 tons (Application Info)
a = constant = 0.9 (Value for PM2.5, AP 42, Table 13.2.2-2, 11/06)

b = constant = 0.45 (Value for PM2.5, AP 42, Table 13.2.2-2, 11/06)
Natural mitigation = 67% = (365 - 120) / 365 (AP-42, Section 13.2.2, Equation (2), 11/06)
Control Efficiency = 50% (Water spray or chemical dust suppressant)
Calculation: (56,638 VMT/yr) * (0.27 lb/VMT) * (67%) * (ton/2000 lb) = 5.16 tons/yr (Uncontrolled Emissions)
Calculation: (56,638 VMT/yr) * (0.27 lb/VMT) * (67%) * (ton/2000 lb) * (1-50/100) = 2.58 tons/yr (Apply 50% control efficiency)

EU008e Haul Roads - Benbow Expansion

Vehicle Miles Traveled (VMT) per Day = 5,647 VMT/yr (Application Info)
VMT per hour = (5,647 VMT/yr) / (8760 hrs/yr) = 0.64 VMT/hr
Hours of Operation = 8,760 hrs/yr
Number of days > 0.01 inches of rain = 120 days/yr (AP-42, Section 13.2.2, Figure 13.2.2-1, 11/06)

PM Emissions:

Predictive equation for emission factor for unpaved roads at industrial sites provided per AP 42, Ch. 13.2.2, 11/06.
Emission Factor = k * (s / 12)^a * (W / 3)^b = 9.81 lb/VMT
Where: k = constant = 4.9 lbs/VMT (Value for PM30/TSP, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content = 4.8 % (Mean value, sand/gravel processing, plant road, AP 42, Table 13.2.2-1, 11/06)
W = mean vehicle weight = 58.3 tons (Application Info)
a = constant = 0.7 (Value for PM30/TSP, AP 42, Table 13.2.2-2, 11/06)
b = constant = 0.45 (Value for PM30/TSP, AP 42, Table 13.2.2-2, 11/06)
Natural mitigation = 67% = (365 - 120) / 365 (AP-42, Section 13.2.2, Equation (2), 11/06)
Control Efficiency = 50% (Water spray or chemical dust suppressant)
Calculation: (5,647 VMT/yr) * (9.81 lb/VMT) * (67%) * (ton/2000 lb) = 18.58 tons/yr (Uncontrolled Emissions)
Calculation: (5,647 VMT/yr) * (9.81 lb/VMT) * (67%) * (ton/2000 lb) * (1-50/100) = 9.29 tons/yr (Apply 50% control efficiency)

PM_{10} Emissions:

Predictive equation for emission factor for unpaved roads at industrial sites provided per AP 42, Ch. 13.2.2, 11/06.
Emission Factor = k * (s / 12)^a * (W / 3)^b = 2.50 lb/VMT
Where: k = constant = 1.5 lbs/VMT (Value for PM10, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content = 4.8 % (Mean value, sand/gravel processing, plant road, AP 42, Table 13.2.2-1, 11/06)
W = mean vehicle weight = 58.3 tons (Application Info)
a = constant = 0.9 (Value for PM10, AP 42, Table 13.2.2-2, 11/06)
b = constant = 0.45 (Value for PM10, AP 42, Table 13.2.2-2, 11/06)
Natural mitigation = 67% = (365 - 120) / 365 (AP-42, Section 13.2.2, Equation (2), 11/06)
Control Efficiency = 50% (Water spray or chemical dust suppressant)
Calculation: (5,647 VMT/yr) * (2.50 lb/VMT) * (67%) * (ton/2000 lb) = 4.74 tons/yr (Uncontrolled Emissions)
Calculation: (5,647 VMT/yr) * (2.50 lb/VMT) * (67%) * (ton/2000 lb) * (1-50/100) = 2.37 tons/yr (Apply 50% control efficiency)

$PM_{2.5}$ Emissions:

Predictive equation for emission factor for unpaved roads at industrial sites provided per AP 42, Ch. 13.2.2, 11/06.
Emission Factor = k * (s / 12)^a * (W / 3)^b = 0.25 lb/VMT
Where: k = constant = 0.15 lbs/VMT (Value for PM2.5, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content = 4.8 % (Mean value, sand/gravel processing, plant road, AP 42, Table 13.2.2-1, 11/06)
W = mean vehicle weight = 58.3 tons (Application Info)
a = constant = 0.9 (Value for PM2.5, AP 42, Table 13.2.2-2, 11/06)
b = constant = 0.45 (Value for PM2.5, AP 42, Table 13.2.2-2, 11/06)
Natural mitigation = 67% = (365 - 120) / 365 (AP-42, Section 13.2.2, Equation (2), 11/06)
Control Efficiency = 50% (Water spray or chemical dust suppressant)
Calculation: (5,647 VMT/yr) * (0.25 lb/VMT) * (67%) * (ton/2000 lb) = 0.47 tons/yr (Uncontrolled Emissions)
Calculation: (5,647 VMT/yr) * (0.25 lb/VMT) * (67%) * (ton/2000 lb) * (1-50/100) = 0.24 tons/yr (Apply 50% control efficiency)

EU008f – Light duty vehicle traffic on paved roads:

Vehicle Miles Traveled (VMT) per Day = 250,000 VMT/yr (Application Info)
VMT per hour = (250,000 VMT/yr) / (8760 hrs/yr) = 28.54 VMT/hr
Hours of Operation = 8,760 hrs/yr
Number of days > 0.01 inches of rain = 120 days/yr (AP-42, Section 13.2.2, Figure 13.2.2-1, 11/06)

PM Emissions:

Predictive equation for emission factor for unpaved roads at industrial sites provided per AP 42, Ch. 13.2.2, 11/06.
Emission Factor = k * (s / 12)^a * (S / 30)^d / (M/0.5)^c = 0.90 lb/VMT
Where: k = constant = 6 lbs/VMT (Value for PM30/TSP, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content = 4.8 % (Mean value, sand/gravel processing, plant road, AP 42, Table 13.2.2-1, 11/06)
S = mean vehicle speed (mph) = 15 mph (Application Info)
a = constant = 1 (Value for PM30/TSP, AP 42, Table 13.2.2-2, 11/06)
d = constant = 0.3 (Value for PM30/TSP, AP 42, Table 13.2.2-2, 11/06)
M = surface material moisture content = 6.49% (Average value, AP 42, Table 13.2.2-3, 11/06)
c = constant = 0.3 (Value for PM30/TSP, AP 42, Table 13.2.2-2, 11/06)
Natural mitigation = 67% = (365 - 120) / 365 (AP-42, Section 13.2.2, Equation (2), 11/06)
Control Efficiency = 50% (Water spray or chemical dust suppressant)
Calculation: (250,000 VMT/yr) * (0.90 lb/VMT) * (67%) * (ton/2000 lb) = 75.81 tons/yr (Uncontrolled Emissions)
Calculation: (250,000 VMT/yr) * (0.90 lb/VMT) * (67%) * (ton/2000 lb) * (1-50/100) = 37.90 tons/yr (Apply 50% control efficiency)

PM_{10} Emissions:

Predictive equation for emission factor for unpaved roads at industrial sites provided per AP 42, Ch. 13.2.2, 11/06.
Emission Factor = k * (s / 12)^a * (S / 30)^d / (M/0.5)^c = 0.25 lb/VMT
Where: k = constant = 1.5 lbs/VMT (Value for PM10, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content = 4.8 % (Mean value, sand/gravel processing, plant road, AP 42, Table 13.2.2-1, 11/06)
S = mean vehicle speed (mph) = 15 mph (Application Info)
a = constant = 1 (Value for PM10, AP 42, Table 13.2.2-2, 11/06)
d = constant = 0.5 (Value for PM10, AP 42, Table 13.2.2-2, 11/06)
M = surface material moisture content = 6.49% (Average value, AP 42, Table 13.2.2-3, 11/06)
c = constant = 0.2 (Value for PM10, AP 42, Table 13.2.2-2, 11/06)
Natural mitigation = 67% = (365 - 120) / 365 (AP-42, Section 13.2.2, Equation (2), 11/06)
Control Efficiency = 50% (Water spray or chemical dust suppressant)
Calculation: (250,000 VMT/yr) * (0.25 lb/VMT) * (67%) * (ton/2000 lb) = 21.32 tons/yr (Uncontrolled Emissions)
Calculation: (250,000 VMT/yr) * (0.25 lb/VMT) * (67%) * (ton/2000 lb) * (1-50/100) = 10.66 tons/yr (Apply 50% control efficiency)

$PM_{2.5}$ Emissions:

Predictive equation for emission factor for unpaved roads at industrial sites provided per AP 42, Ch. 13.2.2, 11/06.
Emission Factor = k * (s / 12)^a * (S / 30)^d / (M/0.5)^c = 0.03 lb/VMT
Where: k = constant = 0.15 lbs/VMT (Value for PM2.5, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content = 4.8 % (Mean value, sand/gravel processing, plant road, AP 42, Table 13.2.2-1, 11/06)
S = mean vehicle speed (mph) = 15 mph (Application Info)
a = constant = 1 (Value for PM2.5, AP 42, Table 13.2.2-2, 11/06)
d = constant = 0.5 (Value for PM2.5, AP 42, Table 13.2.2-2, 11/06)
M = surface material moisture content = 6.49% (Average value, AP 42, Table 13.2.2-3, 11/06)
c = constant = 0.2 (Value for PM2.5, AP 42, Table 13.2.2-2, 11/06)
Natural mitigation = 67% = (365 - 120) / 365 (AP-42, Section 13.2.2, Equation (2), 11/06)
Control Efficiency = 50% (Water spray or chemical dust suppressant)
Calculation: (250,000 VMT/yr) * (0.03 lb/VMT) * (67%) * (ton/2000 lb) = 2.13 tons/yr (Uncontrolled Emissions)
Calculation: (250,000 VMT/yr) * (0.03 lb/VMT) * (67%) * (ton/2000 lb) * (1-50/100) = 1.07 tons/yr (Apply 50% control efficiency)

EU008g Haul Roads - Screening Plant Haul Road Travel

Vehicle Miles Traveled (VMT) per Day = 9,828 VMT/yr (Application Info)
VMT per hour = (9,828 VMT/yr) / (8760 hrs/yr) = 1.12 VMT/hr
Hours of Operation = 8,760 hrs/yr
Number of days > 0.01 inches of rain = 120 days/yr (AP-42, Section 13.2.2, Figure 13.2.2-1, 11/06)

PM Emissions:

Predictive equation for emission factor for unpaved roads at industrial sites provided per AP 42, Ch. 13.2.2, 11/06.
Emission Factor = k * (s / 12)^a * (W / 3)^b = 10.78 lb/VMT
Where: k = constant = 4.9 lbs/VMT (Value for PM30/TSP, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content = 4.8 % (Mean value, sand/gravel processing, plant road, AP 42, Table 13.2.2-1, 11/06)
W = mean vehicle weight = 72 tons (Application Info)
a = constant = 0.7 (Value for PM30/TSP, AP 42, Table 13.2.2-2, 11/06)
b = constant = 0.45 (Value for PM30/TSP, AP 42, Table 13.2.2-2, 11/06)
Natural mitigation = 67% = (365 - 120) / 365 (AP-42, Section 13.2.2, Equation (2), 11/06)
Control Efficiency = 50% (Water spray or chemical dust suppressant)
Calculation: (9,828 VMT/yr) * (10.78 lb/VMT) * (67%) * (ton/2000 lb) = 35.57 tons/yr (Uncontrolled Emissions)
Calculation: (9,828 VMT/yr) * (10.78 lb/VMT) * (67%) * (ton/2000 lb) * (1-50/100) = 17.78 tons/yr (Apply 50% control efficiency)

PM_{10} Emissions:

Predictive equation for emission factor for unpaved roads at industrial sites provided per AP 42, Ch. 13.2.2, 11/06.
Emission Factor = k * (s / 12)^a * (W / 3)^b = 2.75 lb/VMT
Where: k = constant = 1.5 lbs/VMT (Value for PM10, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content = 4.8 % (Mean value, sand/gravel processing, plant road, AP 42, Table 13.2.2-1, 11/06)
W = mean vehicle weight = 72 tons (Application Info)
a = constant = 0.9 (Value for PM10, AP 42, Table 13.2.2-2, 11/06)
b = constant = 0.45 (Value for PM10, AP 42, Table 13.2.2-2, 11/06)
Natural mitigation = 67% = (365 - 120) / 365 (AP-42, Section 13.2.2, Equation (2), 11/06)
Control Efficiency = 50% (Water spray or chemical dust suppressant)
Calculation: (9,828 VMT/yr) * (2.75 lb/VMT) * (67%) * (ton/2000 lb) = 9.06 tons/yr (Uncontrolled Emissions)
Calculation: (9,828 VMT/yr) * (2.75 lb/VMT) * (67%) * (ton/2000 lb) * (1-50/100) = 4.53 tons/yr (Apply 50% control efficiency)

$PM_{2.5}$ Emissions:

Predictive equation for emission factor for unpaved roads at industrial sites provided per AP 42, Ch. 13.2.2, 11/06.
Emission Factor = k * (s / 12)^a * (W / 3)^b = 0.27 lb/VMT
Where: k = constant = 0.15 lbs/VMT (Value for PM2.5, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content = 4.8 % (Mean value, sand/gravel processing, plant road, AP 42, Table 13.2.2-1, 11/06)
W = mean vehicle weight = 72 tons (Application Info)
a = constant = 0.9 (Value for PM2.5, AP 42, Table 13.2.2-2, 11/06)
b = constant = 0.45 (Value for PM2.5, AP 42, Table 13.2.2-2, 11/06)
Natural mitigation = 67% = (365 - 120) / 365 (AP-42, Section 13.2.2, Equation (2), 11/06)
Control Efficiency = 50% (Water spray or chemical dust suppressant)
Calculation: (9,828 VMT/yr) * (0.27 lb/VMT) * (67%) * (ton/2000 lb) = 0.91 tons/yr (Uncontrolled Emissions)
Calculation: (9,828 VMT/yr) * (0.27 lb/VMT) * (67%) * (ton/2000 lb) * (1-50/100) = 0.45 tons/yr (Apply 50% control efficiency)

EU009 Diesel Use:

Operational Capacity of Facility = 50,690 MMBtu/yr (Application Info)

Total $PM/PM_{10}/PM_{2.5}$ Emissions:
Emission Factor = 0.31 lb/MMBtu (All PM < 1 mm, AP-42, Sec. 3.3, Table 3.3-1, 10/96)
Calculation: (50,690 MMBtu/yr) * (0.31 lb/MMBtu) * (ton/2000 lb) = 7.86 ton/yr

NO_x Emissions:
Emission Factor = 4.41 lb/MMBtu (AP-42, Sec. 3.3, Table 3.3-1, 10/96)
Calculation: (50,690 MMBtu/yr) * (4.41 lb/MMBtu) * (ton/2000 lb) = 111.77 ton/yr

CO Emissions:
Emission Factor = 0.95 lb/MMBtu (AP-42, Sec. 3.3, Table 3.3-1, 10/96)
Calculation: (50,690 MMBtu/yr) * (0.95 lb/MMBtu) * (ton/2000 lb) = 24.08 ton/yr

VOC Emissions:
Emission Factor = 0.36 lb/MMBtu (AP-42, Sec. 3.3, Table 3.3-1, TOC, Exhaust & Crankcase, 10/96)
Calculation: (50,690 MMBtu/yr) * (0.36 lb/MMBtu) * (ton/2000 lb) = 9.12 ton/yr

SO_2 Emissions:
Emission Factor = 0.29 lb/MMBtu (AP-42, Sec. 3.3, Table 3.3-1, 10/96)
Calculation: (50,690 MMBtu/yr) * (0.29 lb/MMBtu) * (ton/2000 lb) = 7.35 ton/yr

CO_2 Emissions:
Emission Factor = 164 lb/MMBtu (AP-42, Sec. 3.3, Table 3.3-1, 10/96)
Calculation: (50,690 MMBtu/yr) * (164 lb/MMBtu) * (ton/2000 lb) = 4,157 ton/yr

EU010 Gasoline Use:
Operational Capacity of Facility = 8,450 MMBtu/yr (Application Info)

Total $PM/PM_{10}/PM_{2.5}$ Emissions:
Emission Factor = 0.1 lb/MMBtu (All PM < 1 mm, AP-42, Sec. 3.3, Table 3.3-1, 10/96)
Calculation: (8,450 MMBtu/yr) * (0.1 lb/MMBtu) * (ton/2000 lb) = 0.42 ton/yr

NO_x Emissions:
Emission Factor = 1.63 lb/MMBtu (AP-42, Sec. 3.3, Table 3.3-1, 10/96)
Calculation: (8,450 MMBtu/yr) * (1.63 lb/MMBtu) * (ton/2000 lb) = 6.89 ton/yr

CO Emissions:
Emission Factor = 0.99 lb/MMBtu (AP-42, Sec. 3.3, Table 3.3-1, 10/96)
Calculation: (8,450 MMBtu/yr) * (0.99 lb/MMBtu) * (ton/2000 lb) = 4.18 ton/yr

VOC Emissions:
Emission Factor = 3.03 lb/MMBtu (AP-42, Sec. 3.3, Table 3.3-1, TOC, Exhaust & Crankcase, 10/96)
Calculation: (8,450 MMBtu/yr) * (3.03 lb/MMBtu) * (ton/2000 lb) = 12.80 ton/yr

SO_2 Emissions:
Emission Factor = 0.084 lb/MMBtu (AP-42, Sec. 3.3, Table 3.3-1, 10/96)
Calculation: (8,450 MMBtu/yr) * (0.084 lb/MMBtu) * (ton/2000 lb) = 0.35 ton/yr

CO_2 Emissions:
Emission Factor = 154 lb/MMBtu (AP-42, Sec. 3.3, Table 3.3-1, 10/96)
Calculation: (8,450 MMBtu/yr) * (154 lb/MMBtu) * (ton/2000 lb) = 651 ton/yr

EU011 – Diesel-Fired Engine Paste Plant Flush Pump:

Operational Capacity of Engine = 225 bhp
Hours of Operation = 500.00 hrs/yr

Total $PM/PM_{10}/PM_{2.5}$ Emissions:

Emission Factor = 0.0022 lbs/hp-hr (All PM < 1 mm, AP-42, Sec. 3.3, Table 3.3-1, 10/96)
Calculation: (500 hrs/yr) * (225 bhp) * (0.0022 lbs/hp-hr) * (ton/2000 lb) = 0.12 ton/yr

NO_x Emissions:

Emission Factor = 0.031 lbs/hp-hr (AP-42, Sec. 3.3, Table 3.3-1, 10/96)
Calculation: (500 hrs/yr) * (225 bhp) * (0.031 lbs/hp-hr) * (ton/2000 lb) = 1.74 ton/yr

CO Emissions:

Emission Factor = 0.00668 lbs/hp-hr (AP-42, Sec. 3.3, Table 3.3-1, 10/96)
Calculation: (500 hrs/yr) * (225 bhp) * (0.00668 lbs/hp-hr) * (ton/2000 lb) = 0.38 ton/yr

VOC Emissions:

Emission Factor = 0.00247 lbs/hp-hr (AP-42, Sec. 3.3, Table 3.3-1, 10/96)
Calculation: (500 hrs/yr) * (225 bhp) * (0.00247 lbs/hp-hr) * (ton/2000 lb) = 0.14 ton/yr

SO_2 Emissions:

Emission Factor = 0.00205 lbs/hp-hr (AP-42, Sec. 3.3, Table 3.3-1, 10/96)
Calculation: (500 hrs/yr) * (225 bhp) * (0.00205 lbs/hp-hr) * (ton/2000 lb) = 0.115 ton/yr

CO_2 Emissions:

Emission Factor = 1.15 lbs/hp-hr (AP-42, Sec. 3.3, Table 3.3-1, 10/96)
Calculation: (500 hrs/yr) * (225 bhp) * (1.15 lbs/hp-hr) * (ton/2000 lb) = 64.69 ton/yr

EU012 - Concrete Batch Plant:

EU012a – Concrete Batch Plant Operations:

Maximum Process Rate = 28 ton/day (Supplied info) aggregate
Maximum Process Rate = 32 ton/day (Supplied info) sand
Maximum Hours of Operation = 365 days/yr
Number of aggregate and sand transfers to hopper = 3 transfers (Application Info)

Aggregate Delivery to Ground Storage

Filterable PM Emissions:

Emission Factor = 0.0069 lb/ton (AP 42, Table 11.12-5, 06/06)
Calculation: (28 ton/day) * (3 transfers) * (365 days/yr) * (0.0069 lb/ton) * (ton/2000 lb) = 0.106 ton/yr

Filterable PM_{10} Emissions:

Emission Factor = 0.0033 lb/ton (AP 42, Table 11.12-5, 06/06)
Calculation: (28 ton/day) * (3 transfers) * (365 days/yr) * (0.0033 lb/ton) * (ton/2000 lb) = 0.051 ton/yr

Filterable $PM_{2.5}$ Emissions:

Emission Factor = 0.001035 lb/ton (AP 42, Appendix B.2, Table B.2.2, Category 3, PM2.5 = 15% of PM, 09/90)

Calculation: (28 ton/day) * (3 transfers) * (365 days/yr) * (0.001035 lb/ton) * (ton/2000 lb) = 0.016 ton/yr

Sand Delivery to Ground Storage

Filterable PM Emissions:

Emission Factor = 0.0021 lb/ton (AP 42, Table 11.12-5, 06/06)

Calculation: (32 ton/day) * (3 transfers) * (365 days/yr) * (0.0021 lb/ton) * (ton/2000 lb) = 0.037 ton/yr

Filterable PM_{10} Emissions:

Emission Factor = 0.00099 lb/ton (AP 42, Table 11.12-5, 06/06)

Calculation: (32 ton/day) * (3 transfers) * (365 days/yr) * (0.00099 lb/ton) * (ton/2000 lb) = 0.017 ton/yr

Filterable $PM_{2.5}$ Emissions:

Emission Factor = 0.000315 lb/ton (AP 42, Appendix B.2, Table B.2.2, Category 3, PM2.5 = 15% of PM, 09/90)

Calculation: (32 ton/day) * (3 transfers) * (365 days/yr) * (0.000315 lb/ton) * (ton/2000 lb) = 0.006 ton/yr

Aggregate Transfer to Hopper

Filterable PM Emissions:

Emission Factor = 0.0048 lb/ton (AP 42, Table 11.12-5, 06/06)

Calculation: (60 ton/day) * (365 days/yr) * (0.0048 lb/ton) * (ton/2000 lb) = 0.053 ton/yr

Filterable PM_{10} Emissions:

Emission Factor = 0.0028 lb/ton (AP 42, Table 11.12-5, 06/06)

Calculation: (60 ton/day) * (365 days/yr) * (0.0028 lb/ton) * (ton/2000 lb) = 0.031 ton/yr

Filterable $PM_{2.5}$ Emissions:

Emission Factor = 0.00072 lb/ton (AP 42, Appendix B.2, Table B.2.2, Category 3, PM2.5 = 15% of PM, 09/90)

Calculation: (60 ton/day) * (365 days/yr) * (0.00072 lb/ton) * (ton/2000 lb) = 0.008 ton/yr

EU012b – Concrete Batch Plant Silo operations:

Maximum Process Rate = 12.00 tons/day (Supplied info)

Maximum Hours of Operation = 365 days/yr

Soda Ash Storage/Loading

Filterable PM Emissions:

Emission Factor = 0.00099 lb/ton (AP 42, Table 11.12-2, MDEQ assumes PM=PM10=PM2.5, 07/93)

Calculation: (12 tons/day) * (365 days/yr) * (0.00099 lb/ton) * (ton/2000 lb) = 0.002 ton/yr

Filterable PM_{10} Emissions:

Emission Factor = 0.00099 lb/ton (AP 42, Table 11.12-2, MDEQ assumes PM=PM10=PM2.5, 07/93)

Calculation: (12 tons/day) * (365 days/yr) * (0.00099 lb/ton) * (ton/2000 lb) = 0.002 ton/yr

Filterable $PM_{2.5}$ Emissions:

Emission Factor = 0.00099 lb/ton (AP 42, Table 11.12-2, MDEQ assumes PM=PM10=PM2.5, 07/93)

Calculation: (12 tons/day) * (365 days/yr) * (0.00099 lb/ton) * (ton/2000 lb) = 0.002 ton/yr

Truck Loading (truck mix)

Filterable PM Emissions:

Emission Factor = 0.098 lb/ton (AP 42, Table 11.12-2, MDEQ assumes PM=PM10=PM2.5, 07/93)

Calculation: (12 tons/day) * (365 days/yr) * (0.098 lb/ton) * (ton/2000 lb) = 0.215 ton/yr

Filterable PM_{10} Emissions:

Emission Factor = 0.098 lb/ton (AP 42, Table 11.12-2, MDEQ assumes PM=PM10=PM2.5, 07/93)

Calculation: (12 tons/day) * (365 days/yr) * (0.098 lb/ton) * (ton/2000 lb) = 0.215 ton/yr

Filterable $PM_{2.5}$ Emissions:

Emission Factor = 0.098 lb/ton (AP 42, Table 11.12-2, MDEQ assumes PM=PM10=PM2.5, 07/93)

Calculation: (12 tons/day) * (365 days/yr) * (0.098 lb/ton) * (ton/2000 lb) = 0.215 ton/yr

EU015 - 50-ton Soda Ash Silo:

Maximum Process Rate = 8.00000 tons/day (Supplied info)

Maximum Hours of Operation = 365 days/yr

Soda Ash Storage/Loading

Filterable PM Emissions:

Emission Factor = 0.0051 lb/ton (AP 42, Table 8.12-2, MDEQ assumes PM=PM10=PM2.5, 07/93)

Calculation: (8 tons/day) * (365 days/yr) * (0.0051 lb/ton) * (ton/2000 lb) = 0.007 ton/yr

Filterable PM_{10} Emissions:

Emission Factor = 0.0051 lb/ton (AP 42, Table 8.12-2, MDEQ assumes PM=PM10=PM2.5, 07/93)

Calculation: (8 tons/day) * (365 days/yr) * (0.0051 lb/ton) * (ton/2000 lb) = 0.007 ton/yr

Filterable $PM_{2.5}$ Emissions:

Emission Factor = 0.0051 lb/ton (AP 42, Table 8.12-2, MDEQ assumes PM=PM10=PM2.5, 07/93)

Calculation: (8 tons/day) * (365 days/yr) * (0.0051 lb/ton) * (ton/2000 lb) = 0.007 ton/yr

Soda Ash Transfer (discharge to mill apron feeder)

Filterable PM Emissions:

Emission Factor = 0.0002 lb/ton (AP 42, Table 8.12-2, MDEQ assumes PM=PM10=PM2.5, 07/93)

Calculation: (8 tons/day) * (365 days/yr) * (0.0002 lb/ton) * (ton/2000 lb) = 0.000 ton/yr

Filterable PM_{10} Emissions:

Emission Factor = 0.0002 lb/ton (AP 42, Table 8.12-2, MDEQ assumes PM=PM10=PM2.5, 07/93)

Calculation: (8 tons/day) * (365 days/yr) * (0.0002 lb/ton) * (ton/2000 lb) = 0.000 ton/yr

Filterable $PM_{2.5}$ Emissions:

Emission Factor = 0.0002 lb/ton (AP 42, Table 8.12-2, MDEQ assumes PM=PM10=PM2.5, 07/93)

Calculation: (8 tons/day) * (365 days/yr) * (0.0002 lb/ton) * (ton/2000 lb) = 0.000 ton/yr

EU016 - Propane-fired combustion

Maximum Process Rate = 3,000,000 gal/yr (requested permit allowable limit)

PM Emissions:

Emission Factor = 0.7 lb/10^3 gal (AP 42, Table 1.5-1, Commercial boiler, all PM<10um, 07/08)

Calculation: (0.7 lb/10^3 gal) * (3000000 gal/yr) * (0.0005 ton/lb) = 1.05 ton/yr

PM_{10} Emissions:

Emission Factor = 0.7 lb/10^3 gal (AP 42, Table 1.5-1, Commercial boiler, all PM<10um, 07/08)

Calculation: (0.7 lb/10^3 gal) * (3000000 gal/yr) * (0.0005 ton/lb) = 1.05 ton/yr

$PM_{2.5}$ Emissions:

Emission Factor = 0.7 lb/10^3 gal (AP 42, Table 1.5-1, Commercial boiler, MDEQ assumes all PM<2.5um, 07/08)

Calculation: (0.7 lb/10^3 gal) * (3000000 gal/yr) * (0.0005 ton/lb) = 1.05 ton/yr

CO Emissions:

Emission Factor = 27.32 lb/10^3 gal (Vendor Guarantee - 50E Portal Heater)

Calculation: (27.32 lb/10^3 gal) * (3000000 gal/yr) * (0.0005 ton/lb) = 40.98 ton/yr

NO_x Emissions:

Emission Factor = 13 lb/10^3 gal (AP 42, Table 1.5-1, Commercial boiler, 07/08)

Calculation: (13 lb/10^3 gal) * (3000000 gal/yr) * (0.0005 ton/lb) = 19.50 ton/yr

SO_2 Emissions:

Emission Factor = 0.10S lb/10^3 gal (AP 42, Table 1.5-1, S = Sulfur content of fuel in gr/100 ft3, Commercial boiler, 07/08)

S = 15 gr/100 ft3 (Based on information historically submitted by Stillwater for propane)

Emission Factor = 1.5 lb/10^3 gal

Calculation: (1.5 lb/10^3 gal) * (3000000 gal/yr) * (0.0005 ton/lb) = 2.25 ton/yr

VOC Emissions:

Emission Factor = 0.8 lb/10^3 gal (AP 42, Table 1.5-1, Commercial boiler, 07/08, VOC = TOC - CH4)

Calculation: (0.8 lb/10^3 gal) * (3000000 gal/yr) * (0.0005 ton/lb) = 1.20 ton/yr

CH_4 Emissions:

Emission Factor = 0.2 lb/10^3 gal (AP 42, Table 1.5-1, Commercial boiler, 07/08)

Calculation: (0.2 lb/10^3 gal) * (3000000 gal/yr) * (0.0005 ton/lb) = 0.30 ton/yr

CO2e = (0.3 ton/yr) * (21 GWP) = 6.3 ton/yr

N_2O Emissions:

Emission Factor = 0.9 lb/10^3 gal (AP 42, Table 1.5-1, Commercial boiler, 07/08)

Calculation: (0.9 lb/10^3 gal) * (3000000 gal/yr) * (0.0005 ton/lb) = 1.35 ton/yr

CO2e = 1.350 * (310 GWP) = 418.500 ton/yr

CO_2 Emissions:

Emission Factor = 12500 lb/10^3 gal (AP 42, Table 1.5-1, Commercial boiler, 07/08)

Calculation: (12500 lb/10^3 gal) * (3000000 gal/yr) * (0.0005 ton/lb) = 18,750.00 ton/yr

CO_2e Emissions:

$CO_2e(Total) = CO_2 + CO_2e(CH_4) + CO_2e(N_2O)$

CO2e(Total) = 18,750 + 6 + 419 = 19,175 ton/yr

EU017 – Diesel-Fired Engine Shaft Generator:

Operational Capacity of Engine = 947 bhp
Hours of Operation = 500.00 hours

Total $PM/PM_{10}/PM_{2.5}$ Emissions:

Emission Factor = 0.0007 lbs/hp-hr (All PM < 1 mm, AP-42, Sec. 3.4, Table 3.4-1, 10/96)
Calculation: (500 ton/yr) * (947 lbs/hp-hr) * (0.0007 lbs/hp-hr) * (ton/2000 lb) = 0.17 ton/yr

NO_x Emissions:

Emission Factor = 0.024 lbs/hp-hr (AP-42, Sec. 3.4, Table 3.4-1, 10/96)
Calculation: (500 ton/yr) * (947 lbs/hp-hr) * (0.024 lbs/hp-hr) * (ton/2000 lb) = 5.68 ton/yr

CO Emissions:

Emission Factor = 0.0055 lbs/hp-hr (AP-42, Sec. 3.4, Table 3.4-1, 10/96)
Calculation: (500 ton/yr) * (947 lbs/hp-hr) * (0.0055 lbs/hp-hr) * (ton/2000 lb) = 1.30 ton/yr

VOC Emissions:

Emission Factor = 0.00064155 lbs/hp-hr (AP-42, Sec. 3.4, Table 3.4-1, 10/96)
Calculation: (500 ton/yr) * (947 lbs/hp-hr) * (0.00064155 lbs/hp-hr) * (ton/2000 lb) = 0.15 ton/yr

SO_2 Emissions:

Emission Factor = 0.0004045 lbs/hp-hr (AP-42, Sec. 3.4, Table 3.4-1, S=500ppm, 10/96)
Calculation: (500 ton/yr) * (947 lbs/hp-hr) * (0.0004045 lbs/hp-hr) * (ton/2000 lb) = 0.096 ton/yr

CO_2 Emissions:

Emission Factor = 1.16 lbs/hp-hr (AP-42, Sec. 3.4, Table 3.4-1, 10/96)
Calculation: (500 ton/yr) * (947 lbs/hp-hr) * (1.16 lbs/hp-hr) * (ton/2000 lb) = 274.63 ton/yr

EU018 - Blitz Generator Set [SCC 2-02-001-02]

Operational Capacity of Engine (USEPA Interim Tier 4 Certified Engine - Genset > 900 kW):
4,022 bhp (not to exceed)
2,999 kW (not to exceed)
Fuel Input - Heat Capacity = 28 MMBtu/hr
Fuel Input = 205 gal/hr
Fuel Input = 1,459 lb/hr
Fuel Sulfur Content = 0.0015 %
Hours of Operation = 6,500.00 hrs/yr

$PM/PM_{10}/PM_{2.5}$ Emissions:

Emission Factor = 0.10 g/kW-hr (USEPA 40 CFR 1039-102 - Table 7)
Calculation: (6,500 hrs/yr) * (2,999 kW) * (0.1 g/kW-hr) * (0.002205 lb/g) * 1 ton/2000 lb) = 2.15 ton/yr

NO_x Emissions:

Emission Factor = 0.67 g/kW-hr (USEPA 40 CFR 1039-102 - Table 7)
Calculation: (6,500 hrs/yr) * (2,999 kW) * (0.67 g/kW-hr) * (0.002205 lb/g) * (1 ton/2000 lb) = 14.40 ton/yr

CO Emissions:
Emission Factor = 3.5 g/kW-hr (USEPA 40 CFR 1039-102 - Table 7)
Calculation: (6,500 hrs/yr) * (2,999 kW) * (3.5 g/kW-hr) * (0.002205 lb/g) * (1 ton/2000 lb) = 75.22 ton/yr

VOC Emissions:
Emission Factor = 0.4 g/kW-hr (USEPA 40 CFR 1039-102 - Table 7)
Calculation: (6,500 hrs/yr) * (2,999 kW) * (0.4 g/kW-hr) * (0.002205 lb/g) * (1 ton/2000 lb) = 8.60 ton/yr

SO_2 Emissions:
Emission Factor = (1,458.76 lb/hr) * (0.0015%/ 100) * (1 lb-mol S/32.1 lb S) * (64.1 lb SO2/1 lb-mol SO2) = 0.044 lbs/hr
Calculation: (6,500 hrs/yr) * (0.044 lbs/hr) * (ton/2000 lb) = 0.14 ton/yr

CO_2 Emissions:
Emission Factor = 163.0818 lb/MMbtu (USEPA 40 CFR 98, Subpart C - Table C-1)
Calculation: (6,500 hrs/yr) * (28.15 MMBtu/hr) * (163.08 lb/MMbtu) * (1 ton/2000 lb) = 14,922.07 ton/yr

CH_4 Emissions:
Emission Factor = 0.006615 lb/MMbtu (USEPA 40 CFR 98, Subpart C - Table C-2)
Calculation: (6,500 hrs/yr) * (28.15 MMBtu/hr) * (0.0066 lb/MMbtu) * (1 ton/2000 lb) = 0.61 ton/yr

N_2O Emissions:
Emission Factor = 0.001323 lb/MMbtu (USEPA 40 CFR 98, Subpart C - Table C-2)
Calculation: (6,500 hrs/yr) * (28.15 MMBtu/hr) * (0.0013 lb/MMbtu) * (1 ton/2000 lb) = 0.12 ton/yr

CO_2e Emissions:

CO2e(CH4) = (0.61 ton/yr) * (21 GWP) = 13 ton/yr (USEPA 40 CFR 98, Subpart A - Table A-1)
CO2e(N2O) = (0.12 ton/yr) * (310 GWP) = 38 ton/yr (USEPA 40 CFR 98, Subpart A - Table A-1)
CO2e(Total) = 12.71 + 37.53 + 14,922.07 = 14,972 ton/yr

EU019 - Benbow Generator Set [SCC 2-02-001-02]:

Operational Capacity of Engine (USEPA Interim Tier 4 Certified Engine - Genset > 900 kW):
4,022 bhp (not to exceed)
2,999 kW (not to exceed)
Fuel Input - Heat Capacity = 28 MMBtu/hr
Fuel Input = 205 gal/hr
Fuel Input = 1,459 lb/hr
Fuel Sulfur Content = 0 %
Hours of Operation = 8,760.00 hrs/yr

$PM/PM_{10}/PM_{2.5}$ Emissions:
Emission Factor = 0.10 g/kW-hr (USEPA 40 CFR 1039-102 - Table 7)
Calculation: (8,760 hrs/yr) * (2,999 kW) * (0.1 g/kW-hr) * (0.002205 lb/g) * (1 ton/2000 lb) = 2.90 ton/yr

NO_x Emissions:
Emission Factor = 0.67 g/kW-hr (USEPA 40 CFR 1039-102 - Table 7)
Calculation: (8,760 hrs/yr) * (2,999 kW) * (0.67 g/kW-hr) * (0.002205 lb/g) * (1 ton/2000 lb) = 19.41 ton/yr

CO Emissions:
Emission Factor = 3.5 g/kW-hr (USEPA 40 CFR 1039-102 - Table 7)
Calculation: (8,760 hrs/yr) * (2,999 kW) * (3.5 g/kW-hr) * (0.002205 lb/g) * (1 ton/2000 lb) = 101.39 ton/yr

VOC Emissions:
Emission Factor = 0.4 g/kW-hr (USEPA 40 CFR 1039-102 - Table 7)
Calculation: (8,760 hrs/yr) * (2,999 kW) * (0.4 g/kW-hr) * (0.002205 lb/g) * (1 ton/2000 lb) = 11.59 ton/yr

SO_2 Emissions:
Emission Factor = (1,458.76 lb/hr) * (0.0015%/100) * (1 lb-mol S/32.1 lb S) * (64.1 lb SO2/1 lb-mol SO2) = 0.044 lbs/hr
Calculation: (8,760 hrs/yr) * (0.044 lbs/hr) * (ton/2000 lb) = 0.19 ton/yr

CO_2 Emissions:
Emission Factor = 163.0818 lb/MMbtu (USEPA 40 CFR 98, Subpart C - Table C-1)
Calculation: (8,760 hrs/yr) * (28.15 MMBtu/hr) * (163.08 lb/MMbtu) * (1 ton/2000 lb) = 20,110.35 ton/yr

CH_4 Emissions:
Emission Factor = 0.006615 lb/MMbtu (USEPA 40 CFR 98, Subpart C - Table C-2)
Calculation: (8,760 hrs/yr) * (28.15 MMBtu/hr) * (0.0066 lb/MMbtu) * (1 ton/2000 lb) = 0.82 ton/yr

N_2O Emissions:
Emission Factor = 0.001323 lb/MMbtu (USEPA 40 CFR 98, Subpart C - Table C-2)
Calculation: (8,760 hrs/yr) * (28.15 MMBtu/hr) * (0.0013 lb/MMbtu) * (1 ton/2000 lb) = 0.16 ton/yr

CO_2e Emissions:

$CO2e(CH_4)$ = 0.82ton/yr * (21 GWP) = 164 ton/yr (USEPA 40 CFR 98, Subpart A - Table A-1)

$CO2e(N_2O)$ = 0.00 * (310 GWP) = 20,110 ton/yr

CO2e(Total) = 20,110.35 + 0.82 + 0.16 = 20,111 ton/yr

EU020 Screening Plant Material Handling [SCC 3-03-024-08]

Maximum Process Rate = 285,000 ton/yr (Application information, max mine production)
Maximum Hours of Operation = 8,760 hrs/yr
Number of Transfers = 10 transfers

PM Emissions:

Emission Factor = 0.01 lb/ton (Material handling & transfer (non-bauxite) - high moisture ore, AP 42, Table 11.24.2-2, 8/82)

Calculation: (285,000 ton/yr) * (0.01 lb/ton) * (1 - 0/100) * (10 transfers) * (ton/2000 lb) = 14.25 ton/yr

PM_{10} Emissions:
Emission Factor = 0.004 lb/ton (Material handling & transfer (non-bauxite) - high moisture ore, AP 42, Table 11.24.2-2, 8/82)
Calculation: (285,000 ton/yr) * (0.004 lb/ton) * (1 - 0/100) * (10 transfers) * (ton/2000 lb) = 5.70 ton/yr

$PM_{2.5}$ Emissions:
Emission Factor = 0.0015 lb/ton (PM2.5 = PM * 15%, AP 42, Appendix B.2, Category 3, 9/90)
Calculation: (285,000 ton/yr) * (0.0015 lb/ton) * (1 - 0/100) * (10 transfers) * (ton/2000 lb) = 2.14 ton/yr

EU021a Screening Plant [SCC 3-05-020-21]

Maximum Process Rate = 285,000 ton/yr (Application information - requested limit)
Maximum Hours of Operation = 2,400 hrs/yr (Application information - requested limit)

PM Emissions:

Emission Factor = 0.0036 lb/ton (Fines Screening - controlled), AP 42, Table 11.19.2-2, 8/04)

Calculation: (285,000 ton/yr) * (0.0036 lb/ton) * (1 - 0/100) * (ton/2000 lb) = 0.51 ton/yr

PM_{10} Emissions:
Calculation: (285,000) * ( ) * (1 - /100) * (ton/2000 lb) = 0.00 lb/ton (Fines Screening - controlled), AP 42, Table 11.19.2-2, 8/04)
Calculation: (285,000 ton/yr) * (0.0022 lb/ton) * (1 - 0/100) * (ton/2000 lb) = 0.31 ton/yr

$PM_{2.5}$ Emissions:
Emission Factor = 0.00054 lb/ton (PM2.5 = PM * 15%, AP 42, Appendix B.2, Category 3, 9/90)
Calculation: (285,000 lb/ton) * (0.00054 lb/ton) * (1 - 0/100) * (ton/2000 lb) = 0.08 ton/yr

EU021b - Screening Plant Diesel Drive Engine [SCC 2-02-001-02]

Operational Capacity of Engine (USEPA Tier 2 Certified Engine (37 ≤ kW < 75):
100 bhp (Engine Specification)
75 kW (Engine Specification)
Fuel Input - Heat Capacity = 1 MMBtu/hr (BSFC→7000 Btu/hp-hr)
Fuel Input = 5 gal/hr (19300 Btu/lb - 7.1 lbs/gal)
Fuel Input = 36 lb/hr (7.1 lbs/gal)
Fuel Sulfur Content = 0.0015 % (Ultra Low Sulfur Diesel)
Hours of Operation = 2,400.00 hrs/yr

$PM/PM_{10}/PM_{2.5}$ Emissions:
Emission Factor = 0.40 g/kW-hr (40 CFR Part 89.112 - Table 1)
Calculation: (2,400 hrs/yr) * (75 kW) * (0.4 g/kW-hr) * (0.002205 lb/g) * (1 ton/2000 lb) = 0.08 ton/yr

NOx Emissions:
Emission Factor = 7.50 g/kW-hr (40 CFR Part 89.112 - Table 1)
Calculation: (2,400 hrs/yr) * (75 kW) * (7.5 g/kW-hr) * (0.002205 lb/g) * (1 ton/2000 lb) = 1.48 ton/yr

CO Emissions:
Emission Factor = 5 g/kW-hr (40 CFR Part 89.112 - Table 1)
Calculation: (2,400 hrs/yr) * (75 kW) * (5 g/kW-hr) * (0.002205 lb/g) * (1 ton/2000 lb) = 0.99 ton/yr

VOC Emissions:
Emission Factor = 0.0025141 lbs/hp-hr (AP-42 Table 3.3-1, 10/96)
Calculation: (2,400 hrs/yr) * (100 bhp) * (0.0025141 lbs/hp-hr) * (1 ton/2000 lb) = 0.302 ton/yr

SO_x Emissions:
Emission Factor = (36.27 lb/hr) * (0.0015%/ 100) * (1 lb-mol S/32.1 lb S) * (64.1 lb SO2/1 lb-mol SO2) = 0.001 lbs/hr
Calculation: (2,400 hrs/yr) * (0.001 lbs/hr) * (ton/2000 lb) = 0.001 ton/yr

CO_2 Emissions:
Emission Factor = 163.08 lb/MMbtu (USEPA 40 CFR 98, Subpart C - Table C-1)
Calculation: (2,400 hrs/yr) * (0.70 MMBtu/hr) * (163.08 lb/MMbtu) * (1 ton/2000 lb) = 136.99 ton/yr

CH_4 Emissions:
Emission Factor = 0.0066 lb/MMbtu (USEPA 40 CFR 98, Subpart C - Table C-2)
Calculation: (2,400 hrs/yr) * (0.70 MMBtu/hr) * (0.0066 lb/MMbtu) * (1 ton/2000 lb) = 0.01 ton/yr

N_2O Emissions:
Emission Factor = 0.0013 lb/MMbtu (USEPA 40 CFR 98, Subpart C - Table C-2)
Calculation: (2,400 hrs/yr) * (0.70 MMBtu/hr) * (0.0013 lb/MMbtu) * (ton/2000 lb) = 0.00 ton/yr

CO_2e Emissions:

CO2e(CH4) = (0.01 ton/yr * (21 GWP) = 0 ton/yr (USEPA 40 CFR 98, Subpart A - Table A-1)
CO2e(N2O) = 0.001 ton/yr * (310 GWP) = 0 ton/yr (USEPA 40 CFR 98, Subpart A - Table A-1)
CO2e(Total) = 0.12 + 0.34 + 136.99 = 137.45 ton/yr

EU022 - Emergency Fire Water Pump Diesel-Fired Engine [SCC 2-02-001-02]

Operational Capacity of Engine (USEPA Interim Tier 2 Certified Engine (75 ≤ kW < 130):
152 bhp (Engine Specification)
113 kW (Engine Specification)
Fuel Input - Heat Capacity = 1 MMBtu/hr (BSFC→7000 Btu/hp-hr)
Fuel Input = 8 gal/hr (19300 Btu/lb - 7.1 lbs/gal)
Fuel Input = 55 lb/hr (7.1 lbs/gal)
Fuel Sulfur Content = 0.0015 % (Ultra Low Sulfur Diesel)
Hours of Operation = 500.00 hrs/yr

$PM/PM_{10}/PM_{2.5}$ Emissions:

Emission Factor = 0.00 lbs/hp-hr (AP-42 Table 3.3-1, 10/96)
Calculation: (500 hrs/yr) * (113 kW) * (0.0022 lbs/hp-hr) * (0.002205 lb/g) * (1 ton/2000 lb) = 0.08 ton/yr

NO_x Emissions:

Emission Factor = 0.03 lbs/hp-hr (AP-42 Table 3.3-1, 10/96)
Calculation: (500 hrs/yr) * (113 kW) * (0.031 lbs/hp-hr) * (0.002205 lb/g) * (1 ton/2000 lb) = 1.18 ton/yr

CO Emissions:

Emission Factor = 0.00668 lbs/hp-hr (AP-42 Table 3.3-1, 10/96)
Calculation: (500 hrs/yr) * (113 kW) * (0.00668 lbs/hp-hr) * (0.002205 lb/g) * (1 ton/2000 lb) = 0.25 ton/yr

VOC Emissions:

Emission Factor = 0.0025141 lbs/hp-hr (AP-42 Table 3.3-1, 10/96)
Calculation: (500 hrs/yr) * (152 bhp) * (0.0025141 lbs/hp-hr) * (1 ton/2000 lb) = 0.10 ton/yr

SO_x Emissions:

Emission Factor = (55.13 lb/hr) * (0.0015%/ 100) * (1 lb-mol S/32.1 lb S) * (1 lb mol S/1 lb mol SO2) * (64.1 lb SO2/1 lb-mol SO2) = 0.002 lbs/hr
Calculation: (500 hrs/yr) * (0.002 lbs/hr) * (1 ton/2000 lb) = 0.00 ton/yr

CO_2 Emissions:

Emission Factor = 163.08 lb/MMbtu (USEPA 40 CFR 98, Subpart C - Table C-1)
Calculation: (500 hrs/yr) * (1.06 MMBtu/hr) * (163.08 lb/MMbtu) * (1 ton/2000 lb) = 43.38 ton/yr

CH_4 Emissions:

Emission Factor = 0.0066 lb/MMbtu (USEPA 40 CFR 98, Subpart C - Table C-2)
Calculation: (500 hrs/yr) * (1.06 MMBtu/hr) * (0.0066 lb/MMbtu) * (1 ton/2000 lb) = 0.00 ton/yr

N_2O Emissions:

Emission Factor = 0.0013 lb/MMbtu (USEPA 40 CFR 98, Subpart C - Table C-2)
Calculation: (500 hrs/yr) * (1.06 MMBtu/hr) * (0.0013 lb/MMbtu) * (1 ton/2000 lb) = 0.00 ton/yr

CO_2e Emissions:

CO2e(CH4) = (0.002 ton/yr) * (21 GWP) = 0.04 ton/yr (USEPA 40 CFR 98, Subpart A - Table A-1)

CO2e(N2O) = (0.0004 ton/yr) * (310 GWP) = 0.55 ton/yr (USEPA 40 CFR 98, Subpart A - Table A-1)

CO2e(Total) = 0.04 + 0.55 + 43.38 = 43.38 ton/yr

IEU06 - Paste Plant Operations:

Maximum Process Rate = 4,400 ton/yr (Supplied info) cement

Maximum Hours of Operation = 365 days/yr

Aggregate Delivery to Ground Storage

Filterable PM Emissions:

Emission Factor = 0.73 lb/ton (AP 42, Table 11.12-5, 06/06)

Calculation: (4,400 ton/yr) * (0.73 lb/ton) * (ton/2000 lb) = 1.606 ton/yr

Filterable PM_{10} Emissions:

Emission Factor = 0.47 lb/ton (AP 42, Table 11.12-5, 06/06)

Calculation: (4,400 ton/yr) * (0.47 lb/ton) * (ton/2000 lb) = 1.034 ton/yr

Filterable $PM_{2.5}$ Emissions:

Emission Factor = 0.1095 lb/ton (AP 42, Appendix B.2, Table B.2.2, Category 3, PM2.5 = 15% of PM, 09/90)

Calculation: (4,400 ton/yr) * (0.1095 lb/ton) * (ton/2000 lb) = 0.241 ton/yr

IEU07 - Open burning:

Operational Capacity of Facility = 40 ton/yr (Application Info)

Total $PM/PM_{10}/PM_{2.5}$ Emissions:

Emission Factor = 17 lb/ton (Assume PM = PM10 = PM2.5, Unspecified Forest Residue, AP-42, Sec. 2.5, Table 2.5-5, 10/92)

Calculation: (40 ton/yr) * (17 lb/ton) * (ton/2000 lb) = 0.34 ton/yr

CO Emissions:

Emission Factor = 140 lb/ton (Assume PM = PM10 = PM2.5, Unspecified Forest Residue, AP-42, Sec. 2.5, Table 2.5-5, 10/92)

Calculation: (40 ton/yr) * (140 lb/ton) * (ton/2000 lb) = 2.80 ton/yr

VOC Emissions:

Emission Factor = 19 lb/ton (Assume PM = PM10 = PM2.5, Unspecified Forest Residue, AP-42, Sec. 2.5, Table 2.5-5, 10/92)

Calculation: (40 ton/yr) * (19 lb/ton) * (ton/2000 lb) = 0.38 ton/yr

V. Existing Air Quality

The Nye Mine is located in Sections 1, 2, 10, 11, 15, 16, 21, and 23, Township 5 South, Range 15 East, in Stillwater County, Montana. The air quality of this area is classified as unclassifiable/attainment for National Ambient Air Quality Standards (NAAQS) pollutants, including particulate matter ($PM_{10}/PM_{2.5}$).

VI. Ambient Air Quality Impact Analysis

The current permit action is an administrative action to update the MAQP to reflect a recently added waste rock crusher and CRF plant via ARM 17.8.745, also referred to as the "de minimis rule." These emission units will be located underground and contribute a minimal amount of fugitive particulate emissions to the mine ventilation exhaust. Emissions of $PM_{2.5}$ and PM_{10} are below de minimis levels; therefore, the consequence of this permit action would not likely result in a significant degradation in ambient air quality.

VII. Taking or Damaging Implication Analysis

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

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

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

VIII. Environmental Assessment

This permitting action will not result in an increase of emissions from the facility in excess of de minimis levels and is considered an administrative action; therefore, an environmental assessment is not required.

Analysis Prepared By: Ed Warner
Date: June 14, 2017