



Montana Department of
ENVIRONMENTAL **Q**UALITY

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July 22, 2010

Mr. Mark Thompson
Barrick Golden Sunlight
Golden Sunlight Mines Inc.
453 U.S. Highway 2 East
Whitehall, MT 59759

Dear Mr. Thompson:

Montana Air Quality Permit #1689-07 is deemed final as of June 30, 2010, by the Department of Environmental Quality (Department). This permit is for an open pit gold mine including ore processing operations. 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,

Vickie Walsh
Air Permitting Program Supervisor
Air Resources Management Bureau
(406) 444-9741

Deanne Fischer, PE
Environmental Engineer
Air Resources Management Bureau
(406) 444-3403

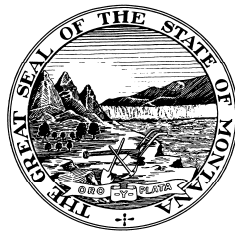
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Montana Department of Environmental Quality
Permitting and Compliance Division

Montana Air Quality Permit #1689-07

Barrick Golden Sunlight
Golden Sunlight Mines Inc.
Open Pit Gold Mine with Ore Processing Operations
453 U.S. Highway 2 East
Whitehall, MT 59759

June 30, 2010



Montana Air Quality Permit

Issued to: Barrick Golden Sunlight
Golden Sunlight Mines Inc.
453 U.S. Highway 2 East
Whitehall, MT 59759

MAQP #1689-07
Administrative Amendment (AA)
Requests Received: 02/26/10, 04/02/10
Department's Decision on AA: 06/14/2010
Final Permit Issued: 06/30/2010
AFS #043-0002

A Montana Air Quality Permit (MAQP), with conditions, is hereby granted to Barrick Golden Sunlight, (GSM) pursuant to Section 75-2-204 and 211 of the Montana Code Annotated (MCA), as amended, and Administrative Rules of Montana (ARM) 17.8.740, *et seq.*, as amended, for the following:

Section I: Permitted Facilities

A. Plant Location

GSM operates an open pit gold mine including ore processing operations, located at Township 2 North, Range 3 West, Jefferson County, Montana, near the southern end of the Bull Mountains, approximately 5 air miles northeast of Whitehall, Montana, at an elevation of 5,200 feet mean sea level MSL. The physical address is 453 U.S. Highway 2 East, Whitehall, MT.

B. Current Permit Action

The Department of Environmental Quality (Department) received a letter, dated February 25, 2010, from GSM requesting that MAQP #1689-06 be modified to include the construction and operation of a Fine Ore Processing (FOP) unit. The addition of the FOP unit results in the generation of particulate emissions of less than 15 tons per year. Therefore, the FOP unit is being added in accordance with ARM 17.8.745. In addition, the Department received a letter dated April 2, 2010, from GSM requesting that MAQP #1689-06 be modified to include changes to the crushing circuit that will eliminate or minimize emissions from the coarse ore stockpile. The current permit action will add the FOP equipment to the list of permitted equipment, modify the description of the crushing circuit, and update the permit to reflect the current permit language and rule references used by the Department.

Section II: Conditions and Limitations

A. Emission Limitations

GSM shall install, operate, and maintain the following emission control equipment and procedures, and all emission control equipment and procedures specified in their application for an alteration of their MAQP and subsequent revisions (ARM 17.8.749):

1. Fall distance shall be minimized during topsoil, overburden, ore and wastes removal, transfer, and dumping.
2. All topsoil stockpiles and disturbed or exposed areas shall be stabilized with chemicals, mulch, or revegetation.
3. Drilling shall be conducted with skirting and water sprays.

4. Blasting shall be conducted in such a way as to prevent overshooting.
5. GSM 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).
6. GSM shall treat all unpaved portions of the haul roads, access roads, parking lots, or general plant area with water and/or chemical dust suppressant as necessary to maintain compliance with the reasonable precautions limitation in Section II.A.5 (ARM 17.8.749).
7. The primary, secondary and tertiary crushers and all handling, conveying and storage areas shall be enclosed and vented to a scrubber unless otherwise noted (ARM 17.8.752).
8. Fine ore stockpile discharges and coarse ore discharges (to barricaded area) shall be controlled by water sprays (ARM 17.8.752).
9. The carbon regeneration unit and the refining furnace shall be totally enclosed and all emissions vented to a wet scrubber (ARM 17.8.752).
10. All conveyors and pick-up points in the fine crushing building shall be enclosed and vented to a wet scrubber (ARM 17.8.752).
11. The fine ore reclaim and conveyor area shall be enclosed and vented to a wet scrubber (ARM 17.8.752).
12. The FOP unit shall be enclosed and vented through a dust collector bag house (ARM 17.8.749).
13. Activity on all storage and waste dump piles shall be restricted to minimize agitation of fugitive dust.
14. GSM shall not cause or authorize to be discharged into the atmosphere from any crusher, screen, bucket, elevator, conveyor belt transfer point, dryer storage bin, storage area, refining furnace or carbon regeneration unit any stack emissions that:
 - a. Contain particulate matter in excess of 0.05 grains per dry standard cubic meter (g/dscm) (ARM 17.8.752).
 - b. Exhibit greater than 20% opacity (ARM 17.8.304).
15. GSM shall not cause or authorize emissions to be discharged into the outdoor atmosphere from any sources installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes (ARM 17.8.304).

B. Testing Requirements

1. GSM has conducted performance source tests on the primary, secondary and tertiary crushers, the carbon regeneration unit and the refinery furnace showing compliance with the applicable emission standards. GSM shall test the listed sources on a rotating basis so that each source is tested at a minimum of once every 4 years. All source tests shall be performed at over 90% of the maximum rated capacity of the affected facility or source. These tests shall include determination of total mass particulate and particulate matter with an aerodynamic diameter of ten microns or less (PM₁₀). The source tests shall be conducted in accordance with the applicable test methods listed in 40 CFR Part 60, General Provisions, Appendix A (Total Particulate), Part 51 Method 201 or 201A (PM₁₀) (ARM 17.8.105 and

- ARM 17.8.749).
2. All compliance source tests shall conform to the requirements of the Montana Source Test Protocol and Procedures Manual (ARM 17.8.106).
 3. The Department may require further testing (ARM 17.8.105).

C. Operational Reporting Requirements

1. GSM 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). GSM shall submit the following information annually to the Department by March 1 of each year; the information may be submitted along with the annual emission inventory (ARM 17.8.505).

- a. Tons of ore removed (detailed by month)
 - b. Tons of waste removed (detailed by month)
 - c. Vehicle miles traveled on haul roads
 - d. Vehicles miles traveled on access roads
 - e. Number of holes drilled
 - f. Number of blasts
 - g. Tons of ore through primary crusher
 - h. Tons of ore through secondary crusher
 - i. Tons of ore through tertiary crusher
 - j. Current acreage of disturbed area
 - k. Current acreage of tailings pond (and percent of tailings pond exposed)
 - l. Tons through refinery
 - m. Tons through carbon regeneration unit
 - n. Tons through fine ore processor, and
 - n. Gallons of diesel burned
2. GSM shall notify the Department of any construction or improvement project conducted pursuant to ARM 17.8.745, that would include ***the addition of a new emissions unit***, a change in control equipment, stack height, stack diameter, stack flow, stack gas temperature, source location or fuel specifications, or would result in an increase in source capacity above its permitted operation. The notice must be submitted to the Department, in writing, 10 days prior to 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(l)(d) (ARM 17.8.745).
 3. All records compiled in accordance with this permit must be maintained by GSM as a permanent business record for at least 5-years following the date of the measurement, must be available at the plant site for inspection by the Department, and must be submitted to the Department upon request (ARM 17.8.710).

D. Ambient Monitoring

GSM shall operate an ambient air quality monitoring network as described in Attachment 1 of

this permit (ARM 17.8.749).

E. Continuous Monitoring

1. GSM shall install, calibrate, maintain, and operate monitoring devices for the continuous measurement of the change in pressure of the gas stream through each wet scrubber. These monitoring devices must be certified by the manufacturer to be accurate within ± 1 " of water H₂O gauge pressure and must be calibrated on an annual basis in accordance with the manufacturer's instructions (ARM 17.8.749).
2. GSM shall install, calibrate, maintain and operate monitoring devices for the continuous measurement of the scrubbing liquid flow rate to each wet scrubber. These monitoring devices must be certified by the manufacturer to be accurate within $\pm 5\%$ of design liquid scrubbing flow rate and must be calibrated on at least an annual basis in accordance with the manufacturer's instructions (ARM 17.8.749).
3. GSM shall maintain a file of all measurements from the scrubber liquid flow rate and pressure differential monitoring devices, and performance testing measurements; monitoring device calibration checks and audits; adjustments and maintenance performed on these systems or devices recorded in a permanent form suitable for inspection. The file shall be retained on site for at least 3-years following the date of such measurements and reports. GSM shall supply these records to the Department upon request. Visual observation and recording of the pressure differential and scrubbing liquid flow rate shall be done twice each day (once during each 12-hour shift) by mill personnel (ARM 17.8.749).

F. Notification

GSM shall provide the Department with notification of the particulate source performance tests at least 30 days prior to the scheduled tests (ARM 17.8.106).

Section III: General Conditions

- A. Inspection – GSM 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 (CEMS, 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 GSM fails to appeal as indicated below.
- C. Compliance with Statutes and Regulations - Nothing in this permit shall be construed as relieving GSM of the responsibility for complying with any applicable federal or Montana statute, rule or standard, except as specifically provided in ARM 17.8.740, *et seq.* (ARM 17.8.756).
- D. Enforcement - Violations of limitations, conditions and requirements contained herein may constitute grounds for permit revocation, penalties or other enforcement action as specified in Section 75-2-401, *et seq.*, MCA.
- E. Appeals - Any person or persons jointly or severally adversely affected by the Department's decision may request, within 15 days after the Department renders its decision, upon affidavit setting forth the grounds 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 Fees - Pursuant to Section 75-2-220, MCA, failure to pay the annual operation fee by GSM may be grounds for revocation of this permit, as required by that section and rules adopted thereunder by the Board.
- H. Duration of Permit – Construction or installation must begin or contractual obligations entered into that would constitute substantial loss within 3 years of permit issuance and proceed with due diligence until the project is complete or the permit shall expire (ARM 17.8.762).

Attachment 1

Ambient Air Monitoring Plan
Barrick Golden Sunlight
Golden Sunlight Mines, Inc.
MAQP #1689-07

1. PM₁₀ data was collected at the GSM mine from 1991-2000. During the 1991-2000 period, the annual means at both sites were less than 60% of the annual standard. For the 24-hour concentrations, three of the annual, maximum 24-hour values fell into the category of 60-80% of the 24-hour standard, with the remainder of the annual, maximum 24-hour values less than 60% of the 24-hour standard. Therefore, in accordance with the October 9, 1998, monitoring guidance statement developed by the Department, GSM discontinued operation of their ambient PM₁₀ monitors.
2. The Department may require GSM to conduct additional ambient monitoring, if necessary.

Montana Air Quality Permit (MAQP) Analysis
Barrick Golden Sunlight
Golden Sunlight Mines Inc.
MAQP #1689-07

I. Introduction/Project Description

Barrick Golden Sunlight (GSM) operates an existing open pit gold mine and ore processing facility for the beneficiation of gold bearing ore located at Township 2 North, Range 3 West, Jefferson County, Montana at an elevation of 5200 feet mean sea level MSL. The mine and related facilities are located approximately 5 air miles northeast of Whitehall, Montana near the southern end of the Bull Mountains. The nearest PSD Class I areas are the Anaconda Pintlar Wilderness 55 miles to the west and Yellowstone National Park 80 miles to the southeast. The closest sensitive area is the Deer Lodge National Forest 3 miles to the north and west.

A. Permitted Equipment

MAQP #1689-07 covers the operations of the GSM gold mine and ore processing facility. Operations include blasting, drilling, crushing, screening, and conveying of material. Emissions are also generated from bulk loading, stockpiles, diesel vehicle exhaust, and haul and access roads.

B. Source Description

GSM operates an open pit gold mine and ore processing facility for the beneficiation of gold bearing ore. Ore is extracted from the mine using conventional open pit mining methods involving drilling, blasting, loading and hauling. The ore is delivered to the mill crushing area where it undergoes 3 stages of crushing, using gyratory and cone crushers followed by wet grinding in rod and ball mills. The ore passes through a leaching process where ore slurry is contacted with dilute sodium cyanide solution to obtain the optimum extraction of gold. The resulting gold bearing solution is sent through a washing circuit. GSM proposes to improve gold recovery through the construction and operation of a Fine Ore Processing unit (FOP). It has been determined that a recoverable quantity of gold remains in the wet slurry tailings generated by the current processing facilities at GSM.

Permit History

MAQP #1499 was originally issued to Placer Amex for the Golden Sunlight Mine by the Montana Department of Health and Environmental Sciences, Air Quality Bureau on November 13, 1980. Placer Dome US, successor in interest to Placer Amex, transferred the permit to Golden Sunlight Inc. (Golden Sunlight) in early 1982.

MAQP #1689 was issued on July 1, 1982, as an alteration to Golden Sunlight's existing permit. **MAQP #1689 replaced MAQP #1499.** The permit alteration consisted of the following:

- The primary crusher changed from a jaw to a gyratory. The gyratory crusher had a higher ore feed rate; however, Golden Sunlight did not propose to increase production. Therefore, potential uncontrolled emissions for this replacement were unchanged. The gyratory crusher operated fewer hours per day to crush the same amount of ore. This allowed for less handling of stockpiled ore that reduced emissions.
- The coarse screen location was moved within the enclosed secondary crushing building that

- added another conveyor discharge point to the circuit.
- A coarse ore stockpile was included in the circuit. The material was pre-screened to remove fines.
- Ducon-Mikropul dust collectors were used instead of Jay Turbulaire. Configuration of some of the dust collection was changed. Manufacturer's literature indicated that the dust collection efficiency was improved.
- Natural gas was used rather than propane in the process boiler, carbon reactivation furnace and the bullion furnace. This fuel change had a negligible effect on the emission estimates.

Estimates of potential, uncontrolled particulate matter (PM) emissions increased by 3.7 tons per year (tpy), while estimates of actual, controlled PM emissions decreased by 25.7 tpy, as a result of these alterations.

MAQP #1689A was issued on May 26, 1987. Golden Sunlight applied for a permit alteration to increase ore and waste production above the previous permit limit. This alteration was based on a projected ore production and mill throughput of 2,600,000 tpy and a waste production level of 14,900,000 tpy. The previous totals were 1,750,000 tpy of ore and 2,275,000 tpy of waste. The ore production increase was primarily due to a gradual decrease in ore hardness that in turn allowed for an increase in mill throughput using the existing equipment. Waste production also increased due to increases in the overburden stripping ratio. The PM emission inventory was updated using new emission factors. The increase in production and mill throughput resulted in an increase in uncontrolled PM emissions of 378 tpy. The majority of these PM emissions were fugitives, with stack emissions only increasing from 1.6 to 2.3 tpy.

MAQP #1689A-3 was issued on July 20, 1990, for an increase in the ore and waste production limits.

MAQP #1689-04 was issued on June 11, 1993, to increase production limits from 17.5 million tons per year (waste - 14.9 million, ore - 2.6 million) to 39.2 million tons per year (waste - 36.7 million, ore - 2.5 million). The acreage of the disturbed areas also increased. The additional disturbed acres were used as sites for tailings, ore storage, and mine waste rock disposal. All other existing equipment, facilities and procedures remained the same. Also, the ambient monitoring requirement for analysis of trace metals was deleted.

MAQP #1689-05 was issued on June 21, 1998. Golden Sunlight, in a letter dated April 27, 1998, requested a determination on the need for a permit alteration for the installation and operation of an INCO SO₂/AIR Cyanide Destruction System. Golden Sunlight identified minimal emissions from the INCO system. The INCO system is a single stage, slurry treatment that uses ammonium bisulfide (NH₄HSO₃) to destroy cyanide during a retention cycle of approximately 3 hours. The INCO system emits approximately 2.6 ton/day of ammonium (NH₃). However, NH₃ is not a regulated air pollutant. The INCO system was designed to destroy 223 lb/hour of weak-acid, dissociable cyanide in the mine's tailings slurry stream (at a discharge rate of 1,897 gallons/minute with 50% solids by weight). The INCO system removes over 99% of the cyanide from the gold plant's tailings slurry leaving a final cyanide concentration in the treated effluent of about 2 ppm.

On May 6, 1998, the Department of Environmental Quality (Department) determined that the INCO Cyanide Destruction System would not require an alteration to MAQP #1689-04 because the proposed changes would not cause any increase in regulated air pollutants. However, the Department modified MAQP #1689-04 and included a description of the INCO system so that the permit would include a complete and accurate account of the mine operations. Also, the

Department updated the rule references in the permit. **MAQP #1689-05 replaced MAQP #1689-04.**

The Department received a letter, dated December 28, 2000, from Golden Sunlight requesting termination of the ambient air monitoring network. The Department reviewed the ambient air monitoring data following the October 9, 1998, permitting guidance statement. In a letter dated February 28, 2001, the Department agreed to Golden Sunlight's request to terminate the ambient monitoring program, effective April 1, 2001. The permit action updated the monitoring requirements to reflect the termination of the ambient air monitoring network. Also, the permit was updated to reflect the latest organizational format. **MAQP #1689-06 replaced MAQP #1689-05.**

D. Current Permit Action

The current permit action is an administrative amendment to MAQP #1689-06 for the following purposes:

1. Include the construction and operation of a Fine Ore Processing (FOP) unit. The Department received a letter, dated February 25, 2010, from GSM requesting that MAQP #1689-06 be updated to include the construction and operation of a FOP unit.
2. Change the permittee name from Golden Sunlight Mines, Inc. to Barrick Golden Sunlight. The Department received a letter on March 12, 2010, to change the permittee name from Golden Sunlight Mines, Inc. to Barrick Golden Sunlight.
3. Increase the ore process rate at GSM. On November 9, 2005, the Department received additional information regarding a proposed increase in the ore process rate at GSM. On November 17, 2005, the Department approved the change as a de minimis action. This permit includes the increase in the ore process rate from 2.5 million tons per year (mty) to 3.0 mty.
4. Include changes to the crushing circuit that will eliminate or minimize emissions from the coarse ore stockpile. The Department received a letter dated April 2, 2010, from GSM requesting that MAQP #1689-06 be updated to include changes to the crushing circuit that will eliminate or minimize emissions from the coarse ore stockpile.

In addition to accounting for the above mentioned changes, the current permit action updates the permit to reflect current permit language and rule references used by the Department. **MAQP #1689-07 replaces MAQP #1689-06.**

E. Additional Information

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

II. Applicable Rules and Regulations

The following are partial quotations of some applicable rules and regulations that apply to the facility. The complete rules are stated in the Administrative Rules of Montana (ARM) and are available upon request from the Department. 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 includes a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.
2. ARM 17.8.105 Testing Requirements. Any person or persons responsible for the emission of any air contaminant into the outdoor atmosphere shall, upon written request of the Department, provide the facilities and necessary equipment (including instruments and sensing devices) and shall conduct tests, emission or ambient, for such periods of time as may be necessary using methods approved by the Department.
3. ARM 17.8.106 Source Testing Protocol. The requirements of this rule apply to any emission source testing conducted by the Department, any source, or other entity as required by any rule in this chapter, or any permit or order issued pursuant to this chapter, or the provisions of the Clean Air Act of Montana, 75-2-101, *et seq.*, Montana Code Annotated (MCA).

GSM shall comply with the requirements contained in the Montana Source Test Protocol and Procedures Manual, including, but not limited, 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 which 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
3. ARM 17.8.211 Ambient Air Quality Standards for Nitrogen Dioxide
4. ARM 17.8.212 Ambient Air Quality Standards for Carbon Monoxide
5. ARM 17.8.213 Ambient Air Quality Standard for Ozone
6. ARM 17.8.214 Ambient Air Quality Standard for Hydrogen Sulfide
7. ARM 17.8.220 Ambient Air Quality Standard for Settled Particulate Matter
8. ARM 17.8.221 Ambient Air Quality Standard for Visibility
9. ARM 17.8.222 Ambient Air Quality Standard for Lead, and
10. ARM 17.8.223 Ambient Air Quality Standard for PM₁₀.

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

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

1. ARM 17.8.304 Visible Air Contaminants. This rule requires that no person may cause or authorize emissions to be discharged into the outdoor atmosphere from any source installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes.
2. ARM 17.8.308, Particulate Matter Airborne. (1) This rule requires an opacity limitation of 20% for all fugitive emission sources and that reasonable precautions be taken to control emissions of airborne particulate matter. (2) Under this rule, GSM shall not cause or authorize the use of any street, road or parking lot without taking reasonable precautions to

control emissions of airborne particulate matter.

3. ARM 17.8.309 Particulate Matter Fuel Burning Equipment. This rule requires that no person shall cause, allow or permit to be discharged into the atmosphere particulate matter caused by the combustion of fuel in excess of the amount determined by this rule.
 4. ARM 17.8.310 Particulate Matter Industrial 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 shown in this rule.
 5. ARM 17.8.322, Sulfur Oxide Emissions-Sulfur in Fuel. This rule requires that no person shall cause, allow or permit to be discharged into the atmosphere particulate matter in excess of the amount set forth in this rule
 6. ARM 17.8.324 Hydrocarbon Emissions--Petroleum Products. (3) No person shall load or permit the loading of gasoline into any stationary tank with a capacity of 250 gallons or more from any tank truck or trailer, except through a permanent submerged fill pipe, unless such tank is equipped with a vapor loss control device as described in (1) of this rule
 7. ARM 17.8.340 Standard of Performance for New Stationary Sources. This rule incorporates, by reference, 40 CFR 60, Standards of Performance for New Stationary Sources (NSPS). GSM is not considered an NSPS affected facility under 40 CFR 60 and is not subject to the requirements of the following subparts.
 - a. 40 CFR Part 60, Subpart A, General Provisions.
 - b. 40 CFR Part 60, Subpart LL, Metallic Mineral Processing Plants. This subpart requires affected facilities with any stack emissions containing particulate matter to not exceed 0.05 grams per dry standard cubic meter nor to exhibit greater than 7 % opacity, unless the stack emissions are discharged from an affected facility using a wet scrubbing emission control device. Also, any process fugitive emissions are limited to not greater than 10 % opacity. Process operations at this facility do not meet the definition of affected facilities and Subpart LL is not applicable. Even though the modifications to the facility permitted under MAQP #1689-04 (in 1993) did increase emissions, they were exempted because the production rate increase at the existing facility occurred without a capital expenditure by Golden Sunlight. The discovery of 'softer' ore reserves allowed for a production increase (and associated air emissions increase) using the existing equipment.
 8. ARM 17.8.341, Emissions Standards for Hazardous Air Pollutants. This source shall comply with the standards and provisions of 40 CFR Part 61, as appropriate.
- D. ARM 17.8, Subchapter 5 - Air Quality Permit Application, Operation, and Open Burning Fees, including, but not limited to:
1. ARM 17.8.504 Air Quality Permit Application Fees. This rule requires that an applicant submit an air quality permit application fee concurrent with the submittal of an air quality permit application. A permit application is incomplete until the proper application fee is paid to the Department. The current permit change is an administrative action; therefore, a permit application and fee were not required.
 2. ARM 17.8.505 Air Quality Operation Fees. An annual air quality operation fee must, as a condition of continued operation, be submitted to the Department by each source of air contaminants holding an air quality permit (excluding an open burning permit) issued by the

Department. The air quality operation fee is based on the actual or estimated actual amount of air pollutants emitted during the previous calendar-year.

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

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

1. ARM 17.8.740 Definitions. This rule is a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.
2. ARM 17.8.743 Montana Air Quality Permits--When Required. This rule requires a person to obtain an air quality permit or permit modification to construct, modify, or use any air contaminant sources that have the potential to emit (PTE) greater than 25 tons per year of any pollutant. GSM has a PTE greater than 25 tons per year of PM; therefore, an air quality permit is required.
3. ARM 17.8.744 Montana Air Quality Permits--General Exclusions. This rule identifies the activities that are not subject to the Montana Air Quality Permit program.
4. ARM 17.8.745 Montana Air Quality Permits--Exclusion for De Minimis Changes. This rule identifies the de minimis changes at permitted facilities that do not require a permit under the Montana Air Quality Permit Program.
5. ARM 17.8.748 New or Modified Emitting Units--Permit Application Requirements. (1) This rule requires that a permit application be submitted prior to installation, modification, or use of a source. 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 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 GSM of the responsibility for complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.740, *et seq.*
 10. ARM 17.8.759 Review of Permit Applications. This rule describes the Department's responsibilities for processing permit applications and making permit decisions on those permit applications that do not require the preparation of an environmental impact statement.
 11. ARM 17.8.760 Additional Review of Permit Applications. This rule describes the Department's responsibilities for processing permit applications and making permit decisions on those applications that require an environmental impact statement.
 12. ARM 17.8.762 Duration of Permit. An air quality permit shall be valid until revoked or modified, as provided in this subchapter, except that a permit issued prior to construction of a new or modified source may contain a condition providing that the permit will expire unless construction is commenced within the time specified in the permit, which in no event may be less than 1 year after the permit is issued.
 13. ARM 17.8.763 Revocation of Permit. An air quality permit may be revoked upon written request of the permittee, or for violations of any requirement of the Clean Air Act of Montana, rules adopted under the Clean Air Act of Montana, the FCAA, rules adopted under the FCAA, or any applicable requirement contained in the Montana State Implementation Plan (SIP).
 14. ARM 17.8.764 Administrative Amendment to Permit. An air quality permit may be amended for changes in any applicable rules and standards adopted by the Board of Environmental Review (Board) or changed conditions of operation at a source or stack that do not result in an increase of emissions as a result of those changed conditions. The owner or operator of a facility may not increase the facility's emissions beyond permit limits unless the increase meets the criteria in ARM 17.8.745 for a de minimis change not requiring a permit, or unless the owner or operator applies for and receives another permit in accordance with ARM 17.8.748, ARM 17.8.749, ARM 17.8.752, ARM 17.8.755, and ARM 17.8.756, and with all applicable requirements in ARM Title 17, Chapter 8, Subchapters 8, 9, and 10.
 15. ARM 17.8.765 Transfer of Permit. This rule states that an air quality permit may be transferred from one person to another if written notice of intent to transfer, including the names of the transferor and the transferee, is sent to the Department.
- F. ARM 17.8, Subchapter 8 - Prevention of Significant Deterioration of Air Quality (PSD), 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 17.8.827 shall apply to any major stationary source and any major modification, with respect to each pollutant subject to the Federal Clean Air Act (FCAA) that it would emit, except as this subchapter would otherwise allow.

This facility is not a major stationary source since this facility is not a listed source and the

source's PTE is below 250 tons per year of any pollutant (excluding fugitive emissions).

G. ARM 17.8. Subchapter 12 - Operating Permit Program Applicability, including, but not limited to:

1. ARM 17.8.1201 Definitions. (23) Major Source under Section 7412 of the FCAA is defined as any source having:
 - a. Potential to emit (PTE) > 10 ton/year of any one Hazardous Air Pollutant (HAP), PTE > 25 ton/year of a combination of all HAPs, or lesser quantity as the Department may establish by rule;
 - b. PTE > 100 ton/year of any pollutant; or
 - c. Sources with the PTE > 70 ton/year of PM₁₀ in a serious PM₁₀ non-attainment area.

2. ARM 17.8.1204 Air Quality Operating Permit Program. (1) Title V of the FCAA amendments of 1990 requires that all sources, as defined in ARM 17.8.1204(1), obtain a Title V Operating Permit. In reviewing and issuing MAQP #1689-07 for GSM, the following conclusions were made:
 - a. The facility's PTE is less than 100 ton/year for any pollutant, excluding fugitives.
 - b. The facility's PTE is less than 10 ton/year for any one HAP and less than 25 ton/year of all HAPs.
 - c. This source is not located in a serious PM₁₀ non-attainment area.
 - d. This facility is not subject to any current NSPS.
 - e. This facility is not subject to any current NESHAP standards.
 - 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 these facts, the Department has determined that GSM is a minor source of emissions with respect to Title V. Therefore, a Title V operating permit is not required.

III. BACT Determination

A BACT determination is required for each new or modified source. GSM shall install on the new or modified source the maximum air pollution control capability which is technically practicable and economically feasible, except that best available control technology shall be utilized. A BACT determination was not required because the permit change is considered an administrative permit change.

IV. Emission Inventory

Particulate Matter (PM) Emissions (tons/year)				
Activity	Uncontrolled PM	Control Measure	% Control	Controlled PM

Topsoil Removal ^a	2.32	None	0	2.32
Topsoil Dumping ^a	2.32	None	0	2.32
Topsoil Stockpiles ^a	17.25	Revegetation	75	4.31
Disturbed Areas ^a	27.55	None	0	27.55
Ore & Waste Drilling ^a	19.50	Water Injection	90	1.95
Ore & Waste Blasting ^a	8.75	Min. Area & Overshoot	0	8.75
Ore & Waste Removal ^a	196	Minimize Fall Distance	0	196.00
Ore & Waste Dumping ^a	196	Minimize Fall Distance	0	196.00
Haul Roads ^a	2,197.22	Watering	50	1,098.61
Access Roads ^a	41.31	Chemical Stabilizer	85	6.20
Coarse Ore Stockpile Discharge ^{b, c}	181.70	Water Spray	50	85.94
Fine Ore Stockpile Discharge ^c	181.70	Water Spray	50	85.94
Fugitive Emissions Subtotal	3,071.62	--	--	1,725.71
Primary Crushing	29.96	Wet Scrubber	99	0.30
Secondary Crushing	41.17	Wet Scrubber	99	0.41
Tertiary Crushing	27.33	Wet Scrubber	99	0.27
Fine Ore Mill Process ^d	15.13	Water spray/bag filters	50/98	7.49
Fine Ore Processing Unit (FOP)	11.43	Filter bag house	98	1.71
Carbon Regeneration Scrubber Stack	6.60	Wet Scrubber	99	0.90
Refining Furnace Scrubber Stack	1.90	Wet Scrubber	99	0.40
Process Emissions Subtotal	133.53	--	--	11.49
Total PM – Fugitive & Process	3205.15	--	--	1737.20

- Sources not affected by proposed increases or process modifications.
- The proposed modification to the crusher circuit includes the addition of a transfer chute to direct the coarse ore directly to the secondary crusher, eliminating the coarse ore stockpile. If the crushing circuit is modified to eliminate the coarse ore stockpile, it is estimated that a maximum of 10% of the coarse ore may still be diverted into the barricaded area resulting in estimated uncontrolled PM emissions = 18.17 ton/yr rather than 181.7 tpy and uncontrolled PM₁₀ emissions = 8.59 ton/yr rather than 85.9 tpy.
- Coarse ore stockpile and fine ore stockpile emissions were calculated using the predictive equation from AP 42, Sec. 13.2.4. *Aggregate Handling and Storage Piles*, 11/06. Calculated emissions are greater than indicated in previous permit versions. It is assumed that emission factors from AP 42, Table 11.24-2 were utilized to calculate emissions for the stockpiles, resulting in significantly lower rates.
- The Fine Ore Mill Process appears to have been inadvertently omitted in the previous permit MAQP#1689-06.

Primary Crushing process

Crushing (SCC 3-03-024-05) (in acc w/Guidance statement 5/6/94) The emission factors in Tables 11.24-1 and 11.24-2 are for the process operations as a whole.

Maximum Process Rate = 342 ton/hr (Application information)
Maximum Hours of Operation = 8760 hrs/yr

PM Emissions: *Based on AP-42*

Emission Factor = 0.02 lb/ton (crushing, AP 42, Table 11.24-2,8/82, high moist. ore)
Control Efficiency = 99 % Wet Scrubber
Calculation: (342 ton/hr) * (8760 hrs/yr) * (0.02 lb/ton) * (ton/2000 lb) = **29.96** ton/yr
Calculation: (342 ton/hr)* (8760 hrs/yr)* (0.02 lb/ton) * (ton/2000 lb) * (1 - 99/100) = **0.30** ton/yr

PM₁₀ Emissions: *Based on AP-42*

Emission Factor = 0.009 lb/ton (crushing, AP 42, Table 11.24-2,8/82, high moist. ore)
Control Efficiency = 99 % Wet Scrubber
Calculation: (342 ton/hr) * (8760 hrs/yr) * (0.009 lb/ton) * (ton/2000 lb) = **13.48** ton/yr
Calculation: (342 ton/hr)* (8760 hrs/yr)* (0.009 lb/ton)* (ton/2000 lb)* (1 - 99/100) = **0.13** ton/yr

Secondary Crushing Process

Crushing (SCC 3-03-024-06) (in acc w/Guidance statement 5/6/94) The emission factors in Tables 11.24-1 and 11.24-2 are for the process operations as a whole.

Maximum Process Rate = 188 ton/hr (Application information)
Maximum Hours of Operation = 8,760 hrs/yr

PM Emissions: *Based on AP-42*

Emission Factor = 0.05 lb/ton (crushing, AP 42, Table 11.24-2,8/82, high moist. ore)
Control Efficiency = 99 % Wet Scrubber
Calculation: (188 ton/hr) * (8760 hrs/yr) * (0.05 lb/ton) * (ton/2000 lb) = **41.17** ton/yr
Calculation: (188 ton/hr)* (8760 hrs/yr)* (0.05 lb/ton)* (ton/2000 lb)* (1 - 99/100) = **0.41** ton/yr

PM₁₀ Emissions:

Based on AP-42

Emission Factor = 0.02 lb/ton (crushing, AP 42, Table 11.24-2,8/82, high moist. ore)
Control Efficiency = 99 % Wet Scrubber
Calculation: (188 ton/hr) * (8760 hrs/yr) * (0.02 lb/ton) * (ton/2000 lb) = **16.47** ton/yr
Calculation: (188 ton/hr)* (8760 hrs/yr)* (0.02 lb/ton)* (ton/2000 lb)* (1 - 99/100) = **0.16** ton/yr

Tertiary Crushers

Crushing (SCC 3-03-024-06) (in acc w/Guidance statement 5/6/94) The emission factors in Tables 11.24-1 and 11.24-2 are for the process operations as a whole

Maximum Process Rate = 104 ton/hr (Application information)
 Maximum Hours of Operation = 8,760 hrs/yr

PM Emissions: *Based on AP-42*

Emission Factor = 0.06 lb/ton (crushing, AP 42, Table 11.24-2,8/82, high moist. ore)
 Control Efficiency = 99 % Wet Scrubber
 (104 ton/hr) * (8760 hrs/yr) * (0.06 lb/ton) * (ton/2000 lb) = **27.33** ton/yr
 (104 ton/hr) * (8760 hrs/yr) * (0.06 lb/ton) * (ton/2000 lb) * (1 - 99/100) = **0.27** ton/yr

PM₁₀ Emissions: *Based on AP-42*

Emission Factor = 0.02 lb/ton (crushing, AP 42, Table 11.24-2,8/82, high moist. ore)
 Control Efficiency = 99 % Wet Scrubber
 Calculation: (104 ton/hr) * (8760 hrs/yr) * (0.02 lb/ton) * (ton/2000 lb) = **9.11** ton/yr
 Calculation: (104 ton/hr) * (8760 hrs/yr) * (0.02 lb/ton) * (ton/2000 lb) * (1 - 99/100) = **0.09** ton/yr

Coarse Ore Stockpile

Maximum Process Rate = 342 ton/hr (Company information)
 Maximum Hours of Operation = 8,760 hrs/yr
 Number of Piles = 1 pile

PM Emissions:

Predictive equation for emission factor provided per AP 42, Sec. 13.2.4.3, 11/06.

$$\text{Emission Factor} = k (0.0032) * (U/5)^{1.3} * (M / 2)^{-1.4} = 0.121 \text{ lb/ton}$$

Where: k = particle size multiplier = 0.74
 U = mean wind speed = 11 mph

M = material moisture content = 0.25 %
 Control Efficiency = 50 %

(Value for PM < 30 microns per AP 42, Sec. 13.2.4.3, 11/06)
 (application info ltr dated April 2, 2010)
 (Applicant says moisture is low ltr dated April 2, 2010. Value provided in AP 42, Sec. 13.2.4.3, 11/06)
 (Water or chemical spray)

$$\text{Calculation: } (342 \text{ ton/hr}) * (8760 \text{ hrs/yr}) * (0.121 \text{ lb/ton}) * (\text{ton}/2000 \text{ lb}) = \mathbf{181.70} \text{ ton/yr}$$

$$\text{Calculation: } (342 \text{ ton/hr}) * (8760 \text{ hrs/yr}) * (0.121 \text{ lb/ton}) * (\text{ton}/2000 \text{ lb}) * (1 - 50/100) = \mathbf{90.85} \text{ ton/yr}$$

Coarse Ore Stockpile (cont.)

PM₁₀ Emissions:

Predictive equation for emission factor provided per AP 42, Sec. 13.2.4.3, 11/06.

$$\text{Emission Factor} = k (0.0032) * (U/5)^{1.3} * (M / 2)^{-1.4} = 0.05737 \text{ lb/ton}$$

Where:	k = particle size multiplier =	0.35	(Value for PM < 10 microns per AP 42, Sec. 13.2.4.3, 11/06)
	U = mean wind speed =	11 mph	(application info, ltr dated April 2, 2010)
	M = material moisture content =	0.25 %	(Applicant says moisture is low ltr dated April 2, 2010. Value provided in AP 42, Sec. 13.2.4.3, 11/06)
	Control Efficiency =	50 %	(Water or chemical spray)
	Calculation: (324) * (0.05737 lb/ton) * (0.05737 lb/ton) * (ton/2000 lb) =	85.94	ton/yr
	Calculation: (324) * (0.05737 lb/ton) * (0.05737 lb/ton)* (ton/2000 lb) * (1 - 50/100) =	42.97	ton/yr

Fine Ore Stockpile

Maximum Process Rate = 342 ton/hr (Company information)	342	ton/hr	(Company information)
Maximum Hours of Operation =	8,760	hrs/yr	
Number of Piles = 1 piles	1	pile	

PM Emissions:

Predictive equation for emission factor provided per AP 42, Sec. 13.2.4.3, 11/06.

$$\text{Emission Factor} = k (0.0032) * (U/5)^{1.3} * (M / 2)^{-1.4} = 0.12130 \text{ lb/ton}$$

Where:	k = particle size multiplier =	0.74	(Value for PM < 30 microns per AP 42, Sec. 13.2.4.3, 11/06)
	U = mean wind speed =	11 mph	(application info)
	M = material moisture content =	0.25 %	(Applicant says moisture is low. Used value provided in AP 42, Sec. 13.2.4,11/06)
	Control Efficiency =	50 %	(Water or chemical spray)

$$\text{Calculation: } (342 \text{ ton/hr}) * (8760 \text{ hrs/yr}) * (0.107 \text{ lb/ton}) * (\text{ton}/2000 \text{ lb}) = \mathbf{181.70} \text{ ton/yr}$$

$$\text{Calculation: } (342 \text{ ton/hr}) * (8760 \text{ hrs/yr}) * (0.107 \text{ lb/ton}) * (\text{ton}/2000 \text{ lb}) * (1 - 50/100) = \mathbf{90.85} \text{ ton/yr}$$

Fine Ore Stockpile (cont.)

PM10 Emissions:

Predictive equation for emission factor provided per AP 42, Sec. 13.2.4.3, 11/06.

$$\text{Emission Factor} = k (0.0032) * (U/5)^{1.3} * (M / 2)^{-1.4} = 0.05069 \text{ lb/ton}$$

Where: k = particle size multiplier = 0.35

U = mean wind speed = 10 mph

M = material moisture content = 0.25 %

Control Efficiency = 50 %

Calculation: (342 ton/hr) *(8760 hr/yr) * (0.05069 lb/ton) * (ton/2000 lb) = **85.94** ton/yr

Calculation: (342 ton/hr)*(8760 hr/yr) * (0.05069 lb/ton) * (ton/2000 lb) * (1 - 50/100) = **42.97** ton/yr

(Value for PM < 10 microns per AP 42, Sec. 13.2.4.3, 11/06)

(Average from values provided in AP 42, Sec. 13.2.4.3, 11/06)

(Applicant says moisture is low. Used value provided in AP 42, Sec. 13.2.4,11/06)

(Water or chemical spray)

Fine Ore Mill Process	Uncontrolled		Controlled	
	PM	PM10	PM	PM10
Conveyor Discharge	14.98	5.99	7.49	3.00
Lime Silo 1 - Load	0.11	0.007	0.002	0.0001
Lime Silo 2 - Load	0.05	0.003	0.001	0.0001
Lime Silo 1 - Unload	7.64E-04	3.60E-04	1.53E-05	7.19E-06
Lime Silo 2 - Unload	3.28E-04	1.55E-04	6.57E-06	3.09E-06
Total	15.13	6.00	7.49	3.00

Fine Ore Mill - Conveyor discharge - to Fine Ore Mill (SCC30-03-024-08)

Maximum Process Rate = 342 ton/hr (Company information.)
Maximum Hours of Operation = 8,760 hrs/yr

PM Emissions:

Emission Factor = 0.01 lb/ton mat'l handling, AP 42, Table 11.24-2,8/82, high moist ore)
Control Efficiency = 50 % (Water or chemical spray)
Calculation: (8,760 hrs/yr) * (342 ton/hr) * (ton/2000 lb) * (0.01 lb/ton) = **14.98** ton/yr
Calculation: (8,760 hrs/yr) * (342 ton/hr) * (ton/2000 lb) * (0.01 lb/ton) * (1 - 50/100) = **7.49** ton/yr

PM10 Emissions:

Emission Factor = 0.004 lb/ton mat'l handling, AP 42, Table 11.24-2,8/82, high moist. ore)
Control Efficiency = 50 % (Water or chemical spray)
Calculation: (8,760 hrs/yr) * (342 ton/hr) * (ton/2000 lb) * (0.004 lb/ton) = **5.99** ton/yr
Calculation: (8,760 hrs/yr) * (342 ton/hr) * (ton/2000 lb) * (0.004 lb/ton) * (1 - 50/100) = **3.00** ton/yr

Fine Ore Mill - Silo Load (SCC 3-05-002-13) Silo 1

Maximum Process Rate = 0.0342 ton/hr (from applicant)

Maximum Hours of Operation = 8,760 hrs/yr

Total PM Emissions:

Emission Factor = 0.72 lb/ton (AP-42, Table 11.12-2, 6/06, Cement unloading/pneum.)

Control Efficiency = 98 % from applicant, bag filters

Calculation: (8,760 hrs/yr) * (0.0342 ton/hr) * (0.72 lb/ton) * (ton/2000 lb) = **0.108** ton/yr

Calculation: (8,760 hrs/yr) * (0.0342 ton/hr) * (0.72 lb/ton) * (ton/2000 lb) * (1 - 98/100) = **0.002** ton/yr

Total PM10 Emissions:

Emission Factor = 0.046 lb/ton (AP-42, Table 11.12-2, 6/06, Cement unloading/pneum.)

Control Efficiency = 98 %

Calculation: (8,760 hrs/yr) * (0.0342 ton/hr) * (0.046 lb/ton) * (ton/2000 lb) = **0.007** ton/yr

Calculation: (8,760 hrs/yr) * (0.0342 ton/hr) * (0.046 lb/ton) * (ton/2000 lb) * (1 - 98/100) = **0.0001** ton/yr

Fine Ore Mill - Silo Load (SCC 3-05-002-13) Silo 2

Maximum Process Rate = 0.0147 ton/yr (from applicant)

Maximum Hours of Operation = 8,760 hrs/yr

Total PM Emissions:

Emission Factor = 0.72 lb/ton (AP-42, Table 11.12-2, 6/06, Cement unloading/pneum.)

Control Efficiency = 98 % from applicant, bag filters

Calculation: (8,760 hrs/yr) * (0.0147 ton/yr) * (0.72 lb/ton) * (ton/2000 lb) = **0.046** ton/yr

Calculation: (8,760 hrs/yr) * (0.0147 ton/yr) * (0.72 lb/ton) * (ton/2000 lb) * (1 - 98/100) = **0.001** ton/yr

Total PM10 Emissions:

Emission Factor = 0.046 lb/ton (AP-42, Table 11.12-2, 6/06, Cement unloading/pneum.)

Control Efficiency = 98 %

Calculation: (8,760 hrs/yr) * (0.0147 ton/yr) * (0.046 lb/ton) * (ton/2000 lb) = **0.003** ton/yr

Calculation: (8,760 hrs/yr) * (0.0147 ton/yr) * (0.046 lb/ton) * (ton/2000 lb) * (1 - 98/100) = **0.0001** ton/yr

Fine Ore Mill - Silo discharge (SCC 3-05-002-13) Silo 1

Maximum Process Rate = 0.0342 ton/hr (from applicant)

Maximum Hours of Operation = 8,760 hrs/yr

Total PM Emissions:

(AP-42, Table 11.12-2, 6/06. Weigh Hopper loading. Applicant states lime is a gravelly mat'l. Not as light and dusty as cement)

Emission Factor = 0.0051 lb/ton
Control Efficiency = 98 %

Calculation: $(0.0342 \text{ ton/hr}) * (8760 \text{ hrs/yr}) * (0.0051 \text{ lb/ton}) * (\text{ton}/2000 \text{ lb}) = 0.00076 \text{ ton/yr}$

Calculation: $(8,760 \text{ hrs/yr}) * (0.0147 \text{ ton/yr}) * (0.0051 \text{ lb/ton}) * (\text{ton}/2000 \text{ lb}) * (1 - 98/100) = 1.53E-05 \text{ ton/yr}$

Total PM10 Emissions:

Emission Factor = 0.0024 lb/ton (AP-42, Table 11.12-2, 6/06. Weigh Hopper loading.
Control Efficiency = 98 %

Calculation: $(0.0342 \text{ ton/hr}) * (8760 \text{ hrs/yr}) * (0.0024 \text{ lb/ton}) * (\text{ton}/2000 \text{ lb}) = 0.00036 \text{ ton/yr}$

Calculation: $(8,760 \text{ hrs/yr}) * (0.0147 \text{ ton/yr}) * (0.0024 \text{ lb/ton}) * (\text{ton}/2000 \text{ lb}) * (1 - 98/100) = 7.19E-06 \text{ ton/yr}$

Fine Ore Mill - Silo discharge (SCC 3-05-002-13) Silo 2

Maximum Process Rate = 0.0147 ton/yr (from applicant)

Maximum Hours of Operation = 8,760 hrs/yr

Total PM Emissions:

Emission Factor = 0.0051 lb/ton (AP-42, Table 11.12-2, 6/06. Weigh Hopper loading.
Control Efficiency = 98 %

Calculation: $(8,760 \text{ hrs/yr}) * (0.0147 \text{ ton/yr}) * (0.0051 \text{ lb/ton}) * (\text{ton}/2000 \text{ lb}) = 0.0003 \text{ ton/yr}$

Calculation: $(8,760 \text{ hrs/yr}) * (0.0147 \text{ ton/yr}) * (0.0051 \text{ lb/ton}) * (\text{ton}/2000 \text{ lb}) * (1 - 98/100) = 6.57E-06 \text{ ton/yr}$

Total PM10 Emissions:

Emission Factor = 0.0024 lb/ton (AP-42, Table 11.12-2, 6/06. Weigh Hopper loading.
Control Efficiency = 98 %

Calculation: $(8,760 \text{ hrs/yr}) * (0.0147 \text{ ton/yr}) * (0.0024 \text{ lb/ton}) * (\text{ton}/2000 \text{ lb}) = 0.0002 \text{ ton/yr}$

Calculation: $(8,760 \text{ hrs/yr}) * (0.0147 \text{ ton/yr}) * (0.0024 \text{ lb/ton}) * (\text{ton}/2000 \text{ lb}) * (1 - 98/100) = 3.09E-06 \text{ ton/yr}$

Fine Ore Processing Unit (FOP)

Calculated using the emission factors from AP42 Chapter 13, Miscellaneous Sources. Assuming controlled emissions with filter baghouse (99% eff)

Maximum Process Rate: 30 tons/hr

Maximum Hours of Operation: 8,760 hrs/yr
 Output: 262,800 tons

Non-Fugitive Sources	tons/yr		tons/yr	
	PM (unctrl'd)	PM (ctrl'd)	PM10 (unctrl'd)	PM10 (ctrl'd)
Fine Ore Concentrate Piles within building	1.51E-02	3.03E-04	7.16E-03	1.43E-04
Truck loading within building	1.51E-02	3.03E-04	7.16E-03	1.43E-04
Haul Roads	11.40	1.71	2.94	0.44
Total Emissions	11.43	1.71	2.96	0.44

FOP Piles

Process: Fugitive emissions from fine ore concentrate storage piles. Calculated using the emission factors from AP42 Chapter 13, Miscellaneous Sources.

Maximum Process Rate =	30	ton/hr	(Maximum plant process rate)
Maximum Hours of Operation =	8,760	hrs/yr	
Number of Piles =	1	pile	
PM Emissions:			
Predictive equation for emission factor provided per AP 42, Sec. 13.2.4.3, 11/06.			
Emission Factor = $k (0.0032) * (U/5)^{1.3} * (M / 2)^{-1.4}$ =	0.00012	lb/ton	Value for PM < 30 microns per AP 42, Sec. 13.2.4.3, 11/06 (Inside building) (10% Provided by company. Assume some drying in piles to 7.4%.) (Filter bag house)
k = particle size multiplier =	0.74		
U = mean wind speed =	2	mph	
M = material moisture content =	7.4	%	
Control Efficiency = 98%	98	%	
Calculation: $(30 \text{ ton/hr}) * (8760 \text{ hrs/yr}) * (0.00012 \text{ lb/ton}) * (\text{ton}/2000 \text{ lb}) * (1 \text{ pile})$ =	1.51E-02	ton/yr	
Calculation: $(30 \text{ ton/hr}) * (8760 \text{ hrs/yr}) * (0.00012 \text{ lb/ton}) * (\text{ton}/2000 \text{ lb}) * (1 - 98/100)$ =	3.03E-04	ton/yr	

FOP Piles (cont.)

PM10 Emissions:			
Predictive equation for emission factor provided per AP 42, Sec. 13.2.4.3, 11/06.			
Emission Factor = $k (0.0032) * (U/5)^{1.3} * (M / 2)^{-1.4}$ =	0.00005	lb/ton	Value for PM < 10 microns per AP 42, Sec. 13.2.4.3, 11/06
k = particle size multiplier =	0.35		

U = mean wind speed =	2	mph	(Provided by company for average Butte windspeed)
M = material moisture content =	7.4	%	(10% Provided by company. Assume some drying in piles to 7.4%.)
Control Efficiency =	98	%	(Filter bag house)
Calculation: (30 ton/hr) * (8760 hrs/yr) * (0.00005 lb/ton) * (ton/2000 lb) * (1 pile) =	7.16E-03	ton/yr	
Calculation: (30 ton/hr)* (8760 hrs/yr)* (0.00005 lb/ton)* (ton/2000 lb)* (1 - 98/100) =	1.43E-04	ton/yr	

FOP Concentrate truck loading			
Maximum Process Rate =	30	ton/hr	(Company Information)
Maximum Hours of Operation =	8,760	hrs/yr	
Total PM Emissions: Predictive equation for emission factor provided per AP 42, Table 13.2.4.3, 11/06. Emission Factor = $k * 0.0032 * [(U/5)^{1.3} / ((M/2)^{1.4})]$ =	0.00012	lb/ton	
k = particle size multiplier =	0.74		(PM<30 µm value per AP-42, 13.2.4-4, 11/06)
U = mean wind speed =	2	mph	(Inside building)
M = material moisture content =	7.4	%	(10% Provided by company. Assume some drying in piles to 7.4%.)
Control Efficiency =	98	%	(assumed) (Filter bag house)
Calculation: (30 ton/hr) * (8760 hrs/yr) * (0.00012 lb/ton) * (ton/2000 lb) =	1.51E-02	ton/yr	
Calculation: (30 ton/hr)* (8760 hrs/yr)* (0.00012 lb/ton)* (ton/2000 lb)* (1 - 98/100) =	3.03E-04	ton/yr	
Total PM10 Emissions: Predictive equation for emission factor provided per AP 42, Table 13.2.4.3, 11/06. Emission Factor = $k * 0.0032 * [(U/5)^{1.3} / ((M/2)^{1.4})]$ =	0.00005	lb/ton	
k = particle size multiplier =	0.35		(PM<30 um value per AP-42, 13.2.4-4, 11/06)
U = mean wind speed =	2	mph	(Inside building)
M = material moisture content =	7.4	%	Assume some drying in piles to 7.4%
Control Efficiency = 98%	98	%	(assumed) (Filter bag house)
Calculation: (30 ton/hr) * (8760 hrs/yr) * (0.00005 lb/ton) * (ton/2000 lb) =	7.16E-03	ton/yr	
Calculation: (30 ton/hr)* (8760 hrs/yr)* (0.00005 lb/ton)* (ton/2000 lb)* (1 - 98/100) =	1.43E-04	ton/yr	

FOP Haul Roads - (Empty Truck)			
Vehicle Miles Traveled (VMT) per Day =	10	VMT/day	(company information. 1/2 mi road, 10 loads/day)
VMT per year = (10 VMT/day) * 365 days/yr * 0.5 =	1,825	VMT/yr	(half the trips with empty truck)
PM Emissions:	Predictive equation for emission factor, unpaved roads, industrial sites per AP 42, Ch. 13.2.2, 11/06.		

Emission Factor = $k * (s / 12)^a * (W / 3)^b =$	3.39	lb/VMT	
k = constant =	4.9	lbs/VMT	(Value for PM30/TSP, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content =	5.1	%	(company information)
W = mean vehicle weight =	5	tons	(company information)
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)
Control Efficiency =	85	%	(Company info - Water spray w/ chemical dust suppressant)
Calculation: $(1,825 \text{ VMT/yr}) * (3.39 \text{ lb/VMT}) * (\text{ton}/2000 \text{ lb}) =$	3.09	tons/yr	(Uncontrolled Emissions)
Calculation: $(1,825 \text{ VMT/yr}) * (3.38766 \text{ lb/VMT}) * (\text{ton}/2000 \text{ lb}) * (1 - 85/100) =$	0.46	tons/yr	(Apply 85% control efficiency)
PM10 Emissions:			
Predictive equation for emission factor, unpaved roads, industrial sites per AP 42, Ch. 13.2.2, 11/06.			
Emission Factor = $k * (s / 12)^a * (W / 3)^b =$	0.87	lb/VMT	
k = constant =	1.5	lbs/VMT	(Value for PM10, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content =	5.1	%	(company information)
W = mean vehicle weight =	5	tons	(company information)
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)
Control Efficiency =	85	%	(Company info - Water spray w/ chemical dust suppressant)
Calculation: $(1,825 \text{ VMT/yr}) * (0.87 \text{ lb/VMT}) * (\text{ton}/2000 \text{ lb}) =$	0.80	tons/yr	(Uncontrolled Emissions)
Calculation: $(1,825 \text{ VMT/yr}) * (0.87 \text{ lb/VMT}) * (\text{ton}/2000 \text{ lb}) * (1 - 85/100) =$	0.12	tons/yr	(Apply 85% control efficiency)

FOP Haul Roads -(Full Truck)

Vehicle Miles Traveled (VMT) per Day = 10 VMT/day (company information. 1/2 mi road, 10 loads/day)
VMT per year = $(10 \text{ VMT/day}) * 365 \text{ days/yr} * 0.5 = 1,825 \text{ VMT/yr}$ (half the trips with full truck)

PM Emissions:

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

Emission Factor = $k * (s / 12)^a * (W / 3)^b =$	9.11	lb/VMT	
k = constant =	4.9	lbs/VMT	(Value for PM30/TSP, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content =	5.1	%	(company information)
W = mean vehicle weight =	45	tons	(company information)
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)
Control Efficiency =	85	%	(Company info - Water spray w/ chemical dust suppressant)
Calculation: $(1,825 \text{ VMT/yr}) * (9.11 \text{ lb/VMT}) * (\text{ton}/2000 \text{ lb}) =$	8.31	tons/yr	(Uncontrolled Emissions)
Calculation: $(1,825 \text{ VMT/yr}) * (9.11 \text{ lb/VMT}) * (\text{ton}/2000 \text{ lb}) * (1 - 85/100) =$	1.25	tons/yr	(Apply 85% control efficiency)
PM10 Emissions:			
Predictive equation for emission factor, unpaved roads, industrial sites per AP 42, Ch. 13.2.2, 11/06			
Emission Factor = $k * (s / 12)^a * (W / 3)^b = 2.35 \text{ lb/VMT}$	2.35	lb/VMT	
k = constant =	1.5	lbs/VMT	(Value for PM10, AP 42, Table 13.2.2-2, 11/06)
s = surface silt content =	5.1	%	(company information)
W = mean vehicle weight =	45	tons	(company information)
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)
Control Efficiency =	85	%	(Company info - Water spray w/ chemical dust suppressant)
Calculation: $(1,825 \text{ VMT/yr}) * (2.35 \text{ lb/VMT}) * (\text{ton}/2000 \text{ lb}) =$	2.14	tons/yr	(Uncontrolled Emissions)
Calculation: $(8 \text{ tons/yr}) * (2.35 \text{ lb/VMT}) * (\text{ton}/2000 \text{ lb}) * (1 - 85/100) =$	0.32	tons/yr	(Apply 85% control efficiency)
sub-total HAUL ROADS			
PM uncontrolled	11.40	tons/yr	
PM controlled	1.71	tons/yr	
PM10 uncontrolled	2.94	tons/yr	
PM10 controlled	0.44	tons/yr	

V. Existing Air Quality

MAQP #1689A required ambient monitoring for total suspended particulate matter (TSP) and metals (lead, cadmium, arsenic, zinc). However, one TSP sample exceeded the 24-hour PM₁₀ standard (150 µg/m³). Based on Department policy, sampling changed from TSP to PM₁₀ samplers in 1991 under the conditions of MAQP #1689A-3. The metals concentrations were below the Department's guideline values and the metals analysis requirement was deleted in MAQP #1689-04.

Prior to this permitting action, the Department reviewed GSM's request, dated December 28, 2000, to terminate the ambient PM₁₀ monitoring program. The review followed the Department's October 1998 Monitoring Requirements Guidance Statement and covered the PM₁₀ data collected since the TSP sampler changeover in 1991 through the third quarter of 2000.

During the 1991-2000 period, the annual means at both sites were less than 60% of the annual standard (50 µg/m³). For the 24-hour concentrations, three of the annual, maximum 24-hour values fell into the category of 60-80% of the 24-hour standard, with the remainder of the annual, maximum 24-hour values less than 60% of the 24-hour standard. For the three 24-hour maximum concentrations that fell into the 60-80% category, two of them were measured during the forest fires of 2000. Data collected at PM-2.5 monitoring sites in the region on the same date (8/7/00) as the two elevated PM₁₀ samples from GSM revealed very high concentrations of fine particles. This strongly indicates that there were substantial effects from forest fire smoke on the GSM PM₁₀ samples on August 7, 2000. Therefore, these two samples could not reasonably be attributed to emission sources at GSM. The third, maximum 24-hour sample in the 60-80% category was collected in 1991. Given the lack of historical records and the length of time that elapsed since this sample was collected, the Department could not positively identify the emission sources that contributed to this elevated sample. Therefore, due to the relatively low concentrations of PM₁₀ in the ambient air around the mine, the Department agreed to GSM's request to terminate the ambient air-monitoring network.

VI. Air Quality Impact Analysis

GSM previously submitted dispersion modeling analyses of the impacts from the changes proposed for MAQP #1689-04 and discussed the results from their ambient monitoring network. These analyses showed compliance with the applicable ambient air quality standard.

The Department believes the increase in emissions for the current permit changes will not cause or contribute to a violation of any ambient air quality standard. The current permit change did not trigger a permit modification. Changes in emissions were either associated with approved de minimis changes or were associated with changing emission factors, not actual process/emitting unit changes; therefore, modeling is not required for the current permitting action.

VII. Taking or Damaging Implication Analysis

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

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

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

VIII. Environmental Assessment

This permitting action is considered an administrative action; therefore, an environmental assessment is not required.

Permit Analysis Prepared by: Deanne Fischer
Date: April 16, 2010