ASARCO LLC—Mission Complex
South Mill Expansion Addendum

Significant Permit Revision Application
Permit No. 2026

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PIMA COUNTY

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DEPARTMENT OF
ENVIRONMENTAL QUALITY

Submitted to:
Pima County Department of Environmental Quality
Air Quality Division

April 25, 2014

ASARCO LLC—Mission Complex
South Mill Expansion Addendum

Project Overview

In 2011, ASARCO LLC—Mission Complex (Asarco or Mission) proposed to increase the design capacity of the existing South Mill from a nominal 19,000 dry tons per day (tpd) of new mined ore to 31,000 tpd of new mined ore (annual average). The South Mill would have a short term capacity of up to 45,000 tpd new mined ore. The increase in capacity would be achieved by the addition of two new ball mills, rougher flotation banks, scavenger flotation row, and a fourth column flotation cell, concentrate storage building and tailings thickener. The Pima County Department of Environmental Quality (PDEQ) granted a permit revision authorizing this change on December 1, 2011. Mission installed the equipment in 2012 and commenced initial operation in late 2013.

At the time Asarco applied for the South Mill Expansion, it was believed that the existing South Crusher facility (primary crusher, conveyors and radial stacker) would not need to be modified, although throughput should increase to take advantage of the increased capacity in the South Mill. Accordingly, Asarco increased throughput in the 2011 application to full potential to emit (PTE) rates for the South Crusher as well as the South Mill.

Asarco has recently discovered that the South Crusher does not have the ability to achieve consistently the design throughput necessary to support the South Mill Expansion. This is due to the feeder under the primary crusher not having sufficient torque to move the increased tonnage without clogging the primary crusher. Asarco therefore proposes to replace the feeder drive with an upgraded drive that can achieve its design rates. There will be no change to the design maximum (tons/hour) or the annual throughput limit (which will remain at 12,500,000 tons/year). Because the crusher and its ancillary equipment are subject to the New Source Performance Standard (NSPS) for Metallic Mineral Processing, replacement of the feeder drive will subject the primary crusher and its ancillary control devices to the NSPS. Asarco already has cartridge filter controls in place that achieve better than NSPS levels of control.

Regulatory Applicability Analysis

Because the proposed feeder drive replacement is a modification that will increase the actual throughput through the crusher, it constitutes a modification of the primary crusher pursuant to the NSPS. Therefore, this application must be processed as a "significant permit revision" pursuant to P.C.C. 17.12.255(A)(5).

The proposed project is a subset of the South Mill Expansion and is not subject to PSD because the new equipment will not result in a significant emissions increase as outlined in the attached potential to emit analysis for the South Mill Expansion. This is due to the fact that new control equipment and throughput limitations on the South Crusher and South Mill (the only part of the facility affected) reduce potential emissions so that there is an overall emissions decrease from

the project. Based upon guidance provided by PDEQ during the May 13, 2011 meeting, all stack and process fugitive emissions were considered in this analysis. A more detailed discussion of the PSD applicability analysis is set forth in Attachment G of the 2011 South Mill Expansion application.

In addition, Asarco has reviewed other projects that have occurred at the mine since the 2011 South Mill Expansion application. These projects are primarily air pollution control equipment replacements and upgrades that do not affect the underlying emissions. The exception is the proposed addition of feeders in the South Mill omnicone and coarse ore circuits, which do not increase throughput (because feeder throughput is limited to the existing belt), and an increase in ventilation rate at the lime crusher, which resulted in about a 0.5 ton/year increase.

Attachment G net emission estimate from South Mill Expansion:

PM: -4.79 tons/yr
PM_{10}: -2.45 tons/yr
$PM_{2.5}$: -2.09 tons/yr

These values include an increase in emissions from the South primary crusher to its full potential to emit rate of 12,500,000 tons/year. *See* 2011 South Mill Expansion permit, Attachment C.

Contemporaneous emission increases/decreases within the past five years include:

Project Date/Description	PM	PM_{10}	$PM_{2.5}$
2011 South Mill Expansion	-4.79	-2.45	-2.09
2010-11 Air Pollution Control Upgrades (no change to underlying units)	0	0	0
2011 M309-E2/E6 Conveyor Upgrade[1]	7.01	3.51	0.99
2011 SSOPM-3 spare scrubber addition	0	0	0
2012 Moly Plant restart[2]	14.6	11.14	7.34
2012 SSOPM-4 scrubber change (like kind replacement, no change to process unit)	0	0	0
2012 North Mill Generator	0.00195	0.00195	0.00195
2013 M307-E13 spare drive replacement[3]	0	0	0
2013 South Mill lime silo dust collector air flow increase	0.17	0.17	0.17

[1] When initially submitted, Asarco did not have PM speciation data. In the South Mill Expansion permit, Asarco developed the following speciation factors for PM emissions from crushing and conveying, based on dry ore: PM = 0.12 lb/ton, PM_{10} = 0.06 lb/ton, $PM_{2.5}$ = 0.017 lb/ton or a ratio of 1:0.5:0.1417 to PM. The original value was 7.01 tons/year PM, giving 3.51 tons/yr PM_{10} and 0.99 tons/yr $PM_{2.5}$. See 2011 South Mill Expansion Application, Attachment C, Calculation Notes, at 2.
[2] Moly Plant Application, Attachment C
[3] The spare drive replacement replaced the drive on the backup motor that only operates when the primary motor is down. No emissions impact is anticipated from this project.

Project Date/Description	PM	PM_{10}	$PM_{2.5}$
2013 Wet Scrubber 20-256 flow air flow reduction	0	0	0
2013 Dispatch shack generator & North Mill thickener generator	0.00375	0.00375	0.00375
2013 South Mill coarse ore feeder addition[4]	0	0	0
2014 Mission secondary crusher air pollution control refurbishment	0	0	0
2014 Convert North Mill, Dispatch Shack, and North Mill Thickener generators to non-emergency with 500 hour operation limit	0.0227	0.0227	0.0227
Sum of Project + Contemporaneous Emissions Increases/Decreases	17.018	12.398	6.438
PSD Significant Threshold	25	15	10
PSD Review Triggered?	**No**	**No**	**No**

As can be seen from the table above, the project does not trigger PSD.

The modified crusher and its associated air pollution control device will be subject to NSPS Subpart LL – Metallic Mineral Processing.

No National Emission Standard for Hazardous Air Pollutants (NESHAPs) are directly applicable to the proposed facility change.

All of the proposed equipment will be subject to the requirements of P.C.C. 17.16.130, "Applicability," and 17.16.360, "Standards of Performance for Nonferrous Metals Industry Sources."

Asarco will otherwise comply with all existing requirements of its Air Quality Permit No. 2026 issued to the Mission Complex.

Testing

Asarco proposes to test the new dust collector at the primary crusher within 180 days of installation of the new feeder drive or 60 days of achieving maximum rated production, whichever comes first.

[4] The feeder addition added another feeder to improve material handling, but did not increase the total capacity of the receiving belt. Therefore, there is no increase in the total material that can be handled and no change in emissions.

Monitoring

Asarco proposes to continue to monitor all units pursuant to Air Quality Permit No. 2026. Asarco proposes several permit revisions to implement NSPS Subpart LL monitoring, recordkeeping and reporting for the modified crusher.

Recordkeeping and Reporting

Pursuant to P.C.C. 17.16.490.A.43, 40 C.F.R. § 60.380 *et seq.*, Asarco will maintain records of the performance tests on the NSPS dust collector, records of the differential pressure during the performance test, and records of weekly observations of differential pressure.

Pursuant to P.C.C. 17.16.360, Asarco will maintain daily throughput records of materials process through the South Crusher circuit,

Pursuant to CAM, Asarco will maintain records of the daily differential pressure observations, Method 9 observations (when required), and inspection and corrective action records.

Supporting Materials

The following materials are submitted in support of this application.

Attachment A	Standard Permit Application Forms
Attachment B	Standard Application Filing Questions
Attachment C	Emission calculations (an Excel spreadsheet on disk)[5]
Attachment D	Vendor data

Additional information on the PSD analysis for the entire South Mill Expansion permit is found in the 2011 permit application.

The signed certification by the Mission Complex Responsible Official is found in Attachment A. It is our understanding that PDEQ will invoice Mission Complex for fees.

Contact Information

Please contact the following individuals if there are questions on this application:

Jamie Ekholm
ASARCO LLC—Mission Complex
520-393-4671
jekholm@asarco.com

Eric Hiser
Jorden Bischoff & Hiser, PLC
480-505-3927
ehiser@jordenbischoff.com

[5] This is the same emission calculation presented in the 2011 South Mill Expansion application. Additional supporting materials, if needed, can be found in that application.

A copy of this application was also submitted to:

Air Permitting
U.S. EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

ATTACHMENT "A"
STANDARD PERMIT APPLICATION

PIMA COUNTY DEPARTMENT OF ENVIRONMENTAL QUALITY
Air Program
33 N. Stone Avenue ▪ Suite 700 ▪ Tucson, AZ 85701 ▪ Phone: (520) 243-7400

STANDARD PERMIT APPLICATION FORM FOR CLASS I SOURCES

(As required by A.R.S. § 49-480, and Title 17 of the Pima County Code)

1. **Permit to be issued to (Arizona Corporate Commission Registered Name):** ASARCO LLC

2. **Mailing Address:** 4201 West Pima Mine Road

   City: Sahuarita **State:** AZ **ZIP:** 85629

3. **Plant Name (if different than item #1):** Mission Complex

4. **Name (or names) of Owner or Operator:** ASARCO LLC

   FAX #: (520) 625-0802 **Phone:** (520) 648-2500

   Email: NA

5. **Name of Owner's Agent:** Tom Phillips, General Manager

   FAX #: (520) 625-9632 **Phone:** (520) 648-4528

6. **Plant/Site Manager/Contact Person:** Jamie Ekholm, Environmental Engineer

   FAX #: (520) 648-0802 **Phone:** (520) 393-4671

   Email: jekholm@asarco.com

7. **Proposed Equipment/Plant Location Address:** 4201 W. Pima Mine Rd

   City: Sahuarita **State:** AZ **ZIP:** 85269

   Indian Reservation (if applicable): NA **T/R/S, Lat/Long, Elev:** 31 58' 38.79"N, 111 3'36.82"W, elev3302

8. **General Nature of Business:** Copper mining and concentrating

   Standard Industrial Classification Code: 1021 **State Permit Class:** Class 1

9. **Type of Organization:** ☐ **Corporation** ☐ **Individual Owner** ☐ **Partnership** ☐ **Government Entity** ☒ **Other** LLC

10. **Permit Application Basis** ***(Check all that apply):*** ☐ **New Source** ☐ **General Permit**

    ☐ **Renewal** ***Revision:*** ☐ **Administrative** ☐ **Minor** ☒ **Significant** **Existing Permit #** 2026

    Date of Commencement of Construction or Modification: as soon as possible

    Is any of the equipment to be leased to another individual or entity? ☐ **Yes** ☒ **No**

11. **Signature of Responsible Official of Organization:**

    Official Title of Signer: General Manager, Mission Complex

12. **Typed or Printed Name & E-mail of Signer:** Tom Phillips TPhillips@asarco.com

    Date: 4-25-14 **Telephone Number:** (520) 648-4528

EQUIPMENT LIST

The following table should include all equipment utilized at the facility and be complete with all data requested. The date of manufacture must be included in order to determine if portions of the facility are subject to NSPS. Make additional copies of this form if necessary.

Type of Equipment	Maximum Rated Capacity	Make	Model	Serial Number	Equipment ID Number	Date of Manufacture
CR-3 Feeder Drive	50 HP;3300 tph 12,500,000 tpy	Falk Gear Drive WEG Motor	M163VRC3-A-126.11 05018EP3E326T	TBD TBD	CR-3	2014

Certification of Compliance with all Applicable Requirements

Permit Number (If existing source) 2026

This certification must be signed by a Responsible Official. Applications without a signed certification will be deemed incomplete.

> *The responsible official is defined as a person who is in charge of principal business functions or who performs policy or decision making functions for the business. This may also include an authorized representative for such persons. For a complete definition, see Pima County Air Quality Control, Title 17, Section 17.04.340(A)(186).*

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Pima County Department of Environmental Quality (PDEQ) as public record. I also attest that I am in compliance with the applicable requirements and will continue to comply with such requirements and any future requirements that become effective during the life of my permit. I will present a certification of compliance to PDEQ no less than annually and more frequently if specified by PDEQ. I further state that I will assume responsibility for the construction, modification, or operation of the source in accordance with the requirements of Title 17 of the Pima County Code and any permit issued thereof.

Name (Print/Type): Tom Phillips Title: General Manager

(Signature): Date: 4-25-14

Certification of Truth, Accuracy, and Completeness

17.12.160(H) - Certification of Truth, Accuracy, and Completeness. Any application form, report, or compliance certification submitted pursuant to this Chapter shall contain certification by a responsible official of truth, accuracy, and completeness. This certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the documents are true, accurate, and complete.

By my signature I,(Name) Tom Phillips, hereby certify that based on information and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete.

Signature of Responsible Official of Organization:

Title: General Manager Date: 4-25-14

ATTACHMENT "B"
RESPONSE TO STANDARD PERMIT APPLICATION FILING INSTRUCTION QUESTIONS

ADDITIONAL INFORMATION IN SUPPORT OF PERMIT APPLICATION

This Attachment provides responses to the questions presented on pages 2 through 7 of the Application Filing Instructions. These responses are provided for the South Mill Expansion, including the South Crusher Addendum. Changed information is indicated by ***bold italic*** lettering.

1. Description of the process to be carried out by each unit.

Mission proposes to increase the design capacity of the existing South Mill from a nominal 19,000 dry tons per day (tpd) of new mined ore to 31,000 tpd of new mined ore (annual average). The South Mill would have a short term capacity of up to 45,000 tpd of new mined ore. The increase in capacity would be achieved as follows:

The addition of:

- Two new 16½' x 19' ball mills (3,000 HP each) within a new extension of the South Mill Building. The feed to the new ball mills will be the vibrating screen undersize from the north SAG mill.
- Downstream of the ball mills, the existing rougher flotation banks consist of three 1,500 ft^3 Wemco cells and a mixture of 300 ft^3 and 400 ft^3 cells. This modification will remove all of the 300 ft^3 and 400 ft^3 cells and replace them with 1,500 ft^3 Wemco cells. The result of the modification would be three banks of eight 1,500 ft^3 cell arranged 3-3-2 in the existing South Mill building.
- After the rougher flotation circuit modifications have been completed, there should be sufficient room on the north side of the flotation deck to install a second scavenger flotation row consisting of 300 ft^3 cells in the existing South Mill building.
- A fourth column flotation cell will be installed on the existing pad adjacent to the current column cells. At the design capacity 31,000 tpd, three column cells will be in operation and the fourth would be a spare.
- Tailing from the flotation circuit is thickened. Thickener underflow will flow by gravity to the tailing ponds and thickener overflow is recycled to the mill water system. A new 120' high rate thickener will be installed for the increased production rate.

The existing South Crusher facility (primary crusher, conveyors and radial stacker) is ***being modified by increasing the horsepower on the feeder drive to ensure that the Crusher can achieve its design production rate in support of this modification. Potential to emit production rates were used for both the original South Mill Expansion permit and this addendum.***

The existing South Mill reclaim and omnicone circuits are not being modified, although throughput should increase to take advantage of the increased capacity in the South Mill.

Some control improvements at the South Crusher, South Mill and ancillary operations are proposed.

2. Description of raw materials, intermediates and products.

Copper concentrate. Asarco can also produce molybdenum concentrate and that operation is not affected by the proposed modification.

3. Description of alternating operating scenario.

Asarco reserves the option of using this equipment in any configuration to maintain the 31,000 dry tpd of new mined ore design rate (annual average) and 45,000 dry tpd of new mined ore (daily maximum).

4. Description of alternate operating scenario product(s), if applicable.

Not applicable.

5. Flow Diagram for All Processes

There is no change to the existing South Crusher and South Mill process flow diagrams. Additional equipment is being added, but it follows the same process principles.

6. A material balance for all processes (optional, only if emissions calculations are based on a material balance)

Not applicable.

7. Emissions Related Information

See Attachment C, which includes an Excel spreadsheet detailing all the calculations and extensive notes explaining the emissions approach used.

8. Citation and description of all applicable requirements as defined in 17.04.340.A.25.

The increase in the horsepower of the South Crusher feeder increases short term throughput on the crusher, although annual throughput remains capped. Therefore, it constitutes a "modification" under NSPS and subjects the South Crusher and its associated air pollution control equipment to NSPS Subpart LL.

No ***other*** federal, state or county standards are directly implicated by the proposed change, which mostly adds to the wet grinding circuit at the South Mill. There will be increases in throughput (debottlenecking) of the South Crusher and the omnicone

crushing and SAG reclaim circuits at the South Mill. Some of this equipment is subject to NSPS Subpart LL, Metallic Mineral Processing Plants, and PCC 17.16.360, Mining.

The emissions units and associated air pollution control devices are currently regulated under Asarco's Title V permit no. 2026 and the replacement units will be regulated under the same provisions.

Asarco has proposed to replace two existing scrubbers with a more efficient canister filters, control more points in the SAG reclaim and omnicone circuits, take voluntarily accepted emission limits that are closer to tested air pollution control device efficiencies, and add additional controls on the lime circuit so that this project will net out of PSD review.

An explanation of why PSD does not apply is included in the cover of this application.

9. An explanation of any proposed exemptions from otherwise applicable requirements.

Not applicable.

10. The following information to the extent it is needed to determine or regulate emissions:
a. Maximum annual process rate (actual) for each piece of equipment that generates air emissions.

This information is presented in the ***revision to the*** equipment list, which is included in Attachment A.

b. Maximum annual process rate (actual) for the whole plant.

Same.

c. Maximum rated hourly process rate (potential) for each piece of equipment that generates air emissions

Same.

d. Maximum rated hourly process rate (potential) for the whole plant.

Asarco has proposed a circuit throughput limit for the South Crusher and South Mill of 12,500,000 dry tons/year of new mined ore each, to be tracked on a rolling 12 month-basis. This corresponds to a daily design rate of just under 34,250 dry tpd of new mined ore and is in addition to the existing 2000 tph limit on the South Primary Crusher and 200

tph limit on each omnicone crusher when all of the following are in operation: Mission Primary Crusher, Mission Secondary/Tertiary Crushing, and North Crusher.

e-g. Not applicable.

h. Limitations on source operations and any work practice standards affecting emissions.

For purposes of the South Crusher drive replacement, the 12,500,000 throughput limitation on the Crusher Circuit remains in place. Short term peak rates remain limited by the gyratory crusher.

Asarco has proposed a circuit throughput limit for the South Crusher and South Mill of 12,500,000 tons/year each, to be tracked on a rolling 12 month-basis. This corresponds to a daily design rate of just under 34,250 tpd and is in addition to the existing 2000 tph limit on the South Primary Crusher and 200 tph limit on each omnicone crusher when all of the following are in operation: Mission Primary Crusher, Mission Secondary/Tertiary Crushing, and North Crusher.

Asarco is proposing to replace the Ducon wet scrubber 10-108 with a replacement Farr canister filter rated at 21,000 scf/min and achieving a controlled emission rate of 0.003 gr/scf.

Asarco is proposing to replace the Ducon wet scrubber 30-150 with a replacement Farr canister filter rated at 25,000 scf/min and achieving a controlled emission rate of 0.003 gr/scf.

Asarco is proposing to duct presently uncontrolled emission points at Conveyor Transfer 20-244/245 to 20-266/268 and 20-266/268 to 30-134/136 to the new Farr canister filter 30-150.

Asarco is proposing to move the displaced Ducon wet scrubber (formerly 30-150) to control the intermediate ore stockpile feeders and the 20-251 to 20-255 conveyor transfer point. This is a 13,000 scf/min unit and Asarco proposes a 0.01 gr/scf limit.

Asarco is proposing to add a baghouse rated at 500 scf/min and achieving a controlled emission rate of 0.003 gr/scf to control the lime circuit emissions at the Lime Silo discharge, feeder, conveyor transfer, and transfer to lime ball mill.

Asarco will improve the capture efficiency of the 10-114 scrubber from 0.90 to 0.95 percent.

Asarco will add enhanced "fogging" style water sprays at the South Crusher ore dump. The new sprays are estimated to be 80% efficient and replace the existing system, which is estimated to be only approximately 50% efficient.

Asarco is proposing to accept voluntarily accepted emission limits on all remaining South Crusher and South Mill wet scrubbers (10-114 and 20-270) to 0.01 gr/scf, reduced from the present PCC process weight rate limit or NSPS Subpart LL limit of 0.022 gr/scf.

11. Description of all process and control equipment for which permits are required

See the cover to this application. Also see the equipment list in Attachment A.

12. Stack Information

Not applicable.

13. Site Diagram

Unchanged.

14. Air Pollution Control Equipment

The following air pollution control device changes are being made (in process order):

Asarco is replacing the existing water sprays at the South Crusher ore dump (formerly HFOPS-1, now PFOPS-0) with an enhanced water fogging system. The new system, which uses higher pressure water to create a finer mist of water for dust control, should achieve 80% control efficiency. The former system achieved approximately 50% control efficiency.

Asarco is proposing to replace the Ducon wet scrubber 10-108 with a replacement Farr canister filter rated at 21,000 scf/min and achieving a controlled emission rate of 0.003 gr/scf. The new Farr unit will retain the same equipment number. ***This is the unit that controls the South Crusher, including the new drive. It has demonstrated capability of achieving NSPS Subpart LL level of control.***

Asarco is proposing to replace the Ducon wet scrubber 30-150 with a replacement Farr canister filter rated at 25,000 scf/min and achieving a controlled emission rate of 0.003 gr/scf. The new Farr unit will retain the same equipment number.

Asarco is proposing to duct presently uncontrolled emission points at Conveyor Transfer 20-244/245 to 20-266/268 and 20-266/268 to 30-134/136 to the new Farr canister filter 30-150.

Asarco is adding a water spray to the intermediate ore stacker 20-250, which is presently uncontrolled. Asarco is claiming a 70% control efficiency for this unit, based on standard engineering principles.

Asarco is proposing to move the existing Ducon wet scrubber 30-150 to control emissions from the intermediate ore stockpile feeders 20-252, 20-253 and 20-254 and the conveyor transfer point 20-251 to 20-255. This unit is rated at 13,000 scf/min and is proposed to achieve a limit of 0.01 gr/scf.

Asarco is proposing to add a Farr canister filter or bin vent rated at 500 scf/min and achieving a controlled emission rate of 0.003 gr/scf to control the lime circuit emissions at the Lime Silo discharge, feeder, conveyor transfer, and transfer to lime ball mill.

15. Not Applicable

16. Compliance Plan and Schedule

Asarco is currently in compliance with all requirements applicable to the South Crusher and South Mill. Asarco will continue to meet all applicable regulations. Asarco will timely comply with any new applicable requirements that come into effect during the permit term.

17. Compliance certification

Asarco will meet all compliance certification requirements set forth in its existing Class I permit or the requested permit revision at least annually, which satisfies this requirement. Asarco's responsible corporate official has certified this application as required. A compliance certification is enclosed in Attachment A, page 5.

18. Not Applicable

19. New major source or major modification requirements

Based on ASARCO's emission calculations contained in Attachment C and in the Application Narrative, PSD is not triggered by this project.

20. Calculations on which all information requested in this application are based

See Attachment C.

ATTACHMENT "C"
EMISSIONS CALCULATIONS

Mission South Mill Expansion
Equipment and values changed as a result of permit application are highlighted in yellow

SOUTH CRUSHER
SOUTH CRUSHER PROPOSED POTENTIAL TO EMIT

Equip#	Description	EPN	PM lb/hr	PM10 lb/hr	PM2.5 lb/hr	Class	PM tpy	PM10 tpy	PM2.5 tpy	Stack Emissions SCFM	Gr/SCF	Throughput TPH	TPY	Emission Factors EF-PM	EF-PM10	EF-PM2.5	Uncontrolled PM lb/hr	PM10 lb/hr	PM2.5 lb/hr	PM tpy	PM10 tpy	PM2.5 tpy	Control Efficiency	Controlled PM lb/hr	PM10 lb/hr	Controlled PM tpy	PM10 tpy	PM2.5 tpy	EF Source	Notes	Control Type
HFOPS-1	Ore Unloading	PFOPS-0				Process	112.5	56.3	15.9			3300	12500000	0.12	0.06	0.017	396	198	56.1	750.0	375.0	106.3	0.85	59.40	29.70	112.5	56.3	15.9	11.24-2 (1/95)	1,2,4,5	Enclosure (0.25) + Water Spray (0.80)
10-101	Gyratory Crusher	PFOPS-1				Process	46.9	4.7	0.9			3300	12500000	0.5	0.05	0.0093	1650	165	30.69	3125.0	312.5	58.1	0.985	24.75	2.48	46.9	4.7	0.9	11.24-2 (1/95)	1,2,4,6	Enclosure + Farr Dust Collector
10-102	Apron Feeder	PFOPS-1				Process																									
10-108	Farr Dust Collector	SSOPS-1	0.54	0.54	0.15	Stack	2.4	2.4	2.4	21000	0.003	NA	NA	NA	NA	NA							NA			2.4	2.4	2.4	Vendor	3,6	Farr Dust Collector
10-103/105	Transfer	PFOPS-2				Process	37.5	18.8	5.3			3300	12500000	0.12	0.06	0.017	396	198		750.0	375.0	106.1	0.95	19.80	9.90	37.5	18.8	5.3	11.24-2 (1/95)	1,2,4,7	Water Spray and Ducon Wet Scrubber
10-114	Ducon Wet Scrubber	SSOPS-2	0.41	0.41	0.12	Stack	1.8	1.8	1.8	4800	0.01	NA	NA	NA	NA	NA							NA			1.8	1.8	1.8	Vendor	3,7	Ducon Wet Scrubber
10-105	Radial Stacker	HFOPS-2				Fugitive	225.0	112.5	31.9			3300	12500000	0.12	0.06	0.017	396	198		750.0	375.0	106.1	0.7	118.80	59.40	225.0	112.5	31.9	11.24-2 (1/95)	1,2,4,8	Water sprays
WFOPS-1	Coarse Ore Stockpile	WFOPS-1				Fugitive	0.1	0.1	0.1			3300	12500000	0.000016	0.000016	0.000016							0	0.00	0.00	0.1	0.1	0.1	11.19.2-2	9	No controls

	PM lb/hr	PM10 lb/hr	PM tpy	PM10 tpy	PM2.5 tpy
Calculated Non-Fugitive PTE	0.95	0.95	201.04	83.85	26.29

	Uncontrolled PM tpy	PM10 tpy	PM2.5 tpy	Controlled PM tpy	PM10 tpy	PM2.5 tpy
Calculated Non-Fugitive PTE	4625.00	1062.50	270.50	201.04	83.85	26.29

2009 SOUTH CRUSHER ACTUAL EMISSIONS

Equip#	Description	EPN	PM lb/hr	PM10 lb/hr	PM2.5 lb/hr	Class	PM tpy	PM10 tpy	PM2.5 tpy	Stack Emissions SCFM	Gr/SCF	Throughput TPH	TPY	Emission Factors EF-PM	EF-PM10	EF-PM2.5	Uncontrolled PM lb/hr	PM10 lb/hr	PM tpy	PM10 tpy	PM2.5 tpy	Control Efficiency	Controlled PM lb/hr	PM10 lb/hr	PM tpy	PM10 tpy	PM2.5 tpy	EF Source	Notes	Control Type
HFOPS-1	Ore Unloading	PFOPS-0				Fugitive	157.7	78.8	22.3			800	7008000	0.12	0.06	0.017	96	48	420.5	210.2	38.9	0.625	36.00	18.00	157.7	78.8	22.3	11.24-2 (1/95)	1,2,4,5,10	Enclosure (0.25) + Water Spray (0.50)
10-101	Gyratory Crusher	PFOPS-1				Process	87.6	8.8	1.6			800	7008000	0.5	0.05	0.0093	400	40	1752.0	175.2	32.4	0.95	20.00	2.00	87.6	8.8	1.6	11.24-2 (1/95)	1,2,4,6,10	Wet Scrubber
10-102	Apron Feeder	PFOPS-1				Process																								
10-108	Ducon Wet Scrubber	SSOPS-1	0.16	0.16	0.05	Stack	0.7	0.7	0.2	9082	0.0021	NA	NA	NA	NA	NA						NA			0.7	0.7	0.7	Vendor	3,6,11	Ducon Wet Scrubber
10-103/105	Transfer	PFOPS-2				Process	42.0	21.0	6.0			800	7008000	0.12	0.06	0.017	96	48	420.5	210.2	59.5	0.9	9.60	4.80	42.0	21.0	6.0	11.24-2 (1/95)	1,2,4,7,10	Water sprays
10-114	Ducon Wet Scrubber	SSOPS-2	0.05	0.05	0.01	Stack	0.2	0.2	0.1	4701	0.0012	NA	NA	NA	NA	NA						NA			0.2	0.2	0.2	Vendor	3,7,12	Ducon Wet Scrubber
10-105	Radial Stacker	HFOPS-2				Fugitive	126.1	63.1	17.9			800	7008000	0.12	0.06	0.017	96	48	420.5	210.2	59.5	0.7	28.80	14.40	126.1	63.1	17.9	11.24-2 (1/95)	1,2,4,8,10	Water sprays
WFOPS-1	Coarse Ore Stockpile	WFOPS-1				Fugitive	0.1	0.1	0.1			800	7008000	0.000016	0.000016	0.000016							0	0.00	0.00	0.1	0.1	0.1	11.19.2-2	9,10	No controls

	PM lb/hr	PM10 lb/hr	PM tpy	PM10 tpy	PM2.5 tpy
2009 Actual Emissions	0.21	0.21	288.26	109.55	30.19

	Uncontrolled PM tpy	PM10 tpy	PM2.5 tpy	Controlled PM tpy	PM10 tpy	PM2.5 tpy
2009 Actual Emissions	2592.96	595.68	130.80	288.26	109.55	30.85

2010 SOUTH CRUSHER ACTUAL EMISSIONS

Equip#	Description	EPN	PM lb/hr	PM10 lb/hr	PM2.5 lb/hr	Class	PM tpy	PM10 tpy	PM2.5 tpy	Stack Emissions ACFM	Gr/DSCF	Throughput TPH	TPY	Emission Factors EF-PM	EF-PM10	EF-PM2.5	Uncontrolled PM lb/hr	PM10 lb/hr	PM tpy	PM10 tpy	PM2.5 tpy	Control Efficiency	Controlled PM lb/hr	PM10 lb/hr	PM tpy	PM10 tpy	PM2.5 tpy	EF Source	Notes	Control Type
HFOPS-1	Ore Unloading	PFOPS-0				Fugitive	157.7	78.8	22.3			800	7008300	0.12	0.06	0.017	96	48	420.5	210.2	38.9	0.625	36.00	18.00	157.7	78.8	22.3	11.24-2 (1/95)	1,2,4,5,13	Enclosure (0.25) + Water Spray (0.50)
10-101	Gyratory Crusher	PFOPS-1				Process	87.6	8.8	1.6			800	7008300	0.5	0.05	0.0093	400	40	1752.1	175.2	32.4	0.95	20.00	2.00	87.6	8.8	1.6	11.24-2 (1/95)	1,2,4,6,13	Wet Scrubber
10-102	Apron Feeder	PFOPS-1				Process																								
10-108	Ducon Wet Scrubber	SSOPS-1	0.16	0.16	0.05	Stack	0.7	0.7	0.2	9082	0.0021	NA	NA	NA	NA	NA						NA			0.7	0.7	0.7	Vendor	3,6,11	Ducon Wet Scrubber
10-103/105	Transfer	PFOPS-2				Process	42.0	21.0	6.0			800	7008300	0.12	0.06	0.017	96	48	420.5	210.2	59.5	0.9	9.60	4.80	42.0	21.0	6.0	11.24-2 (1/95)	1,2,4,7,13	Ducon Wet Scrubber
10-114	Ducon Wet Scrubber	SSOPS-2	0.05	0.05	0.01	Stack	0.2	0.2	0.1	4701	0.0012	NA	NA	NA	NA	NA						NA			0.2	0.2	0.2	Vendor	3,7,12	Ducon Wet Scrubber
10-105	Radial Stacker	HFOPS-2				Fugitive	126.1	63.1	17.9			800	7008300	0.12	0.06	0.017	96	48	420.5	210.2	59.5	0.7	28.80	14.40	126.1	63.1	17.9	11.24-2 (1/95)	1,2,4,8,13	Water sprays
WFOPS-1	Coarse Ore Stockpile	WFOPS-1				Fugitive	0.1	0.1	0.1			800	7008300	0.000016	0.000016	0.000016							0	0.00	0.00	0.1	0.1	0.1	11.19.2-2	9,13	No controls

	PM lb/hr	PM10 lb/hr	PM tpy	PM10 tpy	PM2.5 tpy
2010 Actual Emissions	0.21	0.21	288.27	109.56	30.19

	Uncontrolled PM tpy	PM10 tpy	PM2.5 tpy	Controlled PM tpy	PM10 tpy	PM2.5 tpy
2010 Actual Emissions	2593.07	595.71	130.81	288.27	109.56	30.85

SOUTH MILL

SOUTH MILL FUTURE POTENTIAL TO EMIT

Equip#	Description	EPN	PM lb/hr	PM10 lb/hr	PM2.5 lb/hr	Class	PM tpy	PM10 tpy	PM2.5 tpy	Stack Emissions ACFM	Gr/DSCF	Throughput TPH	TPY	Emission Factors EF-PM	EF-PM10	EF-PM2.5	Uncontrolled PM lb/hr	PM10 lb/hr	PM tpy	PM10 tpy	PM2.5 tpy	Control Efficiency	Controlled PM lb/hr	PM10 lb/hr	PM tpy	PM10 tpy	PM2.5 tpy	EF Source	Notes	Control Type
10-130/134	Apron Feeders 30-130/131/132/133 to Conveyors 30-134/136	PFOPS-3				Process	11.3	5.6	1.6			2000	12500000	0.12	0.06	0.017	240	120	750.0	375.0	106.1	0.985	3.60	3.60	11.3	5.6	1.6	11.24-2 (1/95)	1,2,4,14	Enclosure (0.7) + Ducon (0.95)
30-134 / 30-136	Conveyor 30-134/136 to SAG Mills 30-201/202	PFOPS-4				Process	11.3	5.6	1.6			2000	12500000	0.12	0.06	0.017	240	120	750.0	375.0	106.1	0.985	3.60	3.60	11.3	5.6	1.6	11.24-2 (1/95)	1,2,4,15	Enclosure (0.7) + Ducon (0.95)
30-201 / 30-202	SAG Mills (2)	PFOPS-5				Process	0.0	0.0	0.0			2000	12500000				0	0	0.0	0.0	0.0		0.00	0.00						
30-203 / 30-204	Double Deck Screens (2) to Conveyors 20-238/241	PFOPS-5				Process	0.0	0.0	0.0			2000	12500000	0	0	0						0.985			0.0	0.0	0.0	11.24-2 (1/95)	1,2,4,16	Wet + Enclosure (0.:
	Double Deck Screens 20-203/204 to Ball Mills etc.	PFOPS-5				Process	0.0	0.0	0.0																					
20-244 / 20-245	Conveyor 20-238/241 to 20-244/245	PFOPS-5				Process	0.0	0.0	0.0			800	7008000																	
20-266 / 20-268	Conveyor 20-244/245 to 20-266/268	PFOPS-6				Process	1.8	0.7	0.2			800	7008000	0.01	0.004	0.0011	8	3.2	35.0	14.0	4.0	0.95	0.40	0.40	1.8	0.7	0.2	11.24-2 (1/95)	1,2,4,17	Wet ore and wet scrubber capture (0.95 capture eff, 90% control eff).
	20-266/268 to 30-134/136	PFOPS-7				Process	1.8	0.7	0.2			800	7008000	0.01	0.004	0.0011	8	3.2	35.0	14.0	4.0	0.95	0.40	0.40	1.8	0.7	0.2	11.24-2 (1/95)	1,2,4,17	Wet ore and wet scrubber capture (0.95 capture eff, 90% control eff).
30-150	Farr Dust Collector	SSOPS-3	0.64	0.64	0.2	Stack	2.8	2.8	2.8	25000	0.003														2.8	2.8	2.8		3,18	
20-249 / 20-246	Conveyors 20-238/241 to Conveyor 20-250	PFOPS-8				Process	13.1	5.3	1.4			1000	8760000	0.01	0.004	0.0011	SAG	SAG	SAG	SAG	SAG	0.7	SAG	SAG	13.1	5.3	1.4	11.24-2 (1/95)	1,2,4,19	Wet process + Enclosure (0.7)
20-250	Stacking	HFOPS-3				Fugitive	13.1	5.3	1.4			1000	8760000	0.01	0.004	0.0011	10	4	43.8	17.5	5.0	0.7	3.00	3.00	13.1	5.3	1.4	11.24-2 (1/95)	1,2,4,8	Wet process
	Intermediate Stockpile	WFOPS-2				Fugitive	0.1	0.1	0.1			800	7008300	0.000016	0.000016	0.000016						0	0.00	0.00	0.1	0.1	0.1	11.19.2-2	9	No controls
20-252 / 20-253 / 20-254	Vibratory feeders 20-252/253/254 to Conveyor 20-251	PFOPS-9				Process	9.5	4.7	1.3			600	5256000	0.12	0.06	0.017	72	36	315.4	157.7	44.6	0.97	2.16	2.16	9.5	4.7	1.3	11.24-2 (1/95)	1,2,4,20	Enclosure (0.7) + Wet Scrubber (0.9)
20-251 to 20-255	Transfer	PFOPS-10				Process	31.5	15.8	4.5			600	5256000	0.12	0.06	0.017	72	36	315.4	157.7	44.6	0.9	7.20	7.20	31.5	15.8	4.5	11.24-2 (1/95)	1,2,4,21	Wet Scrubber (0.9)
20-256	Ducon Wet Scrubber	SSOPS-4A					5.6	5.6	5.6	14800	0.01			NA	NA	NA						NA			5.6	5.6	5.6		3,22	
20-262 / 20-263	Omnicone incl: 20-255, 20-258, 20-259, 20-262, 20-263, and transfer to 20-265	PFOPS-11				Process	43.8	4.4	0.8			400	3504000	0.5	0.05	0.0093	200	20	876.0	87.6	24.8	0.95	10.00	10.00	43.8	4.4	0.8	11.24-2 (1/95)	1,2,4,23	Enclosure (0.5) + Ducon Wet Scrubber (0.90)
20-270	Ducon Wet Scrubber	SSOPS-4	1.11	1.11	0.3	Stack	4.9	4.9	4.9	13000	0.01			NA	NA	NA						NA			4.9	4.9	4.9		3,24	
20-285	Omnicone bypass: 20-255 to 20-285 to 20-265	PFOPS-12				Process	10.5	5.3	1.5			400	3504000	0.12	0.06	0.017	48	24	210.2	105.1	29.7	0.95	2.40	2.40	10.5	5.3	1.5	11.24-2 (1/95)	1,2,4,25	Enclosure (0.5) + Ducon Wet Scrubber (0.90)
20-265 to 20-244/245	Transfer	PFOPS-13				Process	10.5	5.3	1.5			400	3504000	0.12	0.06	0.017	48	24	210.2	105.1	29.7	0.95	2.40	2.40	10.5	5.3	1.5	11.24-2 (1/95)	1,2,4,26	Controlled by water sprays and ducted to SSOPS-3
	Concentrate Filter Press to Conveyor	PFOPS-14				Process	0.0	0.0	0.0			650	450000	0.01	0.004	0.0011	6.5	2.6	2.3	0.9	0.3	1	0.00	0.00	0.0	0.0	0.0	11.24-2 (1/95)	1,2,4,27	Semi-wet process fully enclosed at bottom
	Conveyor to Concentrate Stacking	HFOPS-4				Process	0.7	0.3	0.1			650	450000	0.01	0.004	0.0011	6.5	2.6	2.3	0.9	0.3	0.7	1.95	1.95	0.7	0.3	0.1	11.24-2 (1/95)	1,2,4,27	Semi-wet process + enclosure
	Concentrate Loading	HFOPS-5				Fugitive	1.7	0.7	0.2			650	450000	0.01	0.004	0.0011	6.5	2.6	2.3	0.9	0.3	0.25	4.88	4.88	1.7	0.7	0.2	11.24-2 (1/95)	1,2,4,27	Enclosure
	Concentrate Wind Erosion	WFOPS-3				Fugitive	0.0	0.0	0.0			650	450000	0.000016	0.000016	0.000016						0.25	0.00	0.00	0.0	0.0	0.0	11.19.2-2	9,27	Enclosure
60-500	Lime pneumatic loading to lime bin 60-500	PFOPS-16				Process	0.1	0.1	0.1			100	20000	0.61	0.61	0.61	61	61	6.1	6.1	1.7	0.99	0.61	0.61	0.1	0.1	0.1	11.17-4 (2/98)	1,2,4,28	Pneumatic + baghouse
60-502	Farr Bin Vent	SSOPS-6	0.01	0.01	0.0	Stack	0.1	0.1	0.1	500	0.003														0.06	0.06	0.06		3,29	
60-601	Lime bin to feeder 60-601 to Belt60-600	PFOPS-17				Process	0.6	0.6	0.6			100	20000	2.2	2.2	2.2	220	220	22.0	22.0	6.2	0.975	5.50	5.50	0.6	0.6	0.6	11.17-4 (2/98)	1,2,4,28	Box enclosure (0.5) + baghouse (0.95)
60-600	Belt drop to ball mill	PFOPS-18				Process	0.6	0.6	0.6			100	20000	2.2	2.2	2.2	220	220	22.0	22.0	6.2	0.975	5.50	5.50	0.6	0.6	0.6	11.17-4 (2/98)	1,2,4,28	Box enclosure (0.5) + baghouse (0.95)
60-505	Lime ball mill	PFOPS-19				Process	1.1	1.1	1.1			100	20000	2.2	2.2	2.2	220	220	22.0	22.0	6.2	0.95	11.00	11.00	1.1	1.1	1.1	11.17-4 (2/98)	1,2,4,28	Wet process + baghouse (0.95)
	Concentrator: Ball mills, flotation, thickening, various conveyors, all wet	PFOPS-20				Process	0.0	0.0				2000	12500000	0	0	0	0	0	0.0	0.0	0.0	0.7	0.00	0.00	0.0	0.0	0.0	11.24-2 (1/95)	30	Wet process

	PM lb/hr	PM10 lb/hr	PM2.5 lb/hr	PM tpy	PM10 tpy	PM2.5 tpy
Total Stack and Process Potential to Emit	1.77	1.77	0.50	161.21	69.14	30.26

	Uncontrolled PM tpy	Uncontrolled PM10 tpy	Uncontrolled PM2.5 tpy	Controlled PM tpy	Controlled PM10 tpy	Controlled PM2.5 tpy
Total Stack and Process Potential to Emit	3619.93	1483.55	419.85	176.10	75.13	31.95

SOUTH MILL ACTUAL 2009

Equip#	Description	EPN	PM lb/hr	PM10 lb/hr	PM2.5 lb/hr	Class	PM tpy	PM10 tpy	PM2.5 tpy	ACFM	Gr/DSCF	TPH	TPY	EF-PM	EF-PM10	EF-PM2.5	PM lb/hr	PM10 lb/hr	PM tpy	PM10 tpy	PM2.5 tpy	Efficiency	PM lb/hr	PM10 lb/hr	PM tpy	PM10 tpy	PM2.5 tpy	EF Source	Notes	Type
10-130/134	Apron Feeders 30-130/131/132/133 to Conveyors 30-134/136	PFOPS-3				Process	6.3	3.2	0.9				800	7008000	0.12	0.06	0.017	96	48	420.5	210.2	59.5	0.985	1.44	1.44	6.3	3.2	0.9	11.24-2 (1/95)	1,2,4,10,14	Enclosure (0.7) + Ducon (0.95)
30-134 / 30-136	Conveyor 30-134/136 to SAG Mills 30-201/202	PFOPS-4				Process	6.3	3.2	0.9				800	7008000	0.12	0.06	0.017	96	48	420.5	210.2	59.5	0.985	1.44	1.44	6.3	3.2	0.9	11.24-2 (1/95)	1,2,4,10,15	Enclosure (0.7) + Ducon (0.95)
30-201 / 30-202	SAG Mills (2)	PFOPS-5				Process	0.0	0.0	0.0				800	7008000				0	0	0.0	0.0	0.0		0.00	0.00					
30-203 / 30-204	Double Deck Screens (2) to Conveyors 20-238/241	PFOPS-5				Process	0.0	0.0	0.0				800	7008000	0	0							0.985			0.00	0.00	0.0	11.24-2 (1/95)	1,2,4,10,16	Enclosure (0.7) + Duco
	Double Deck Screens 20-203/204 to Ball Mills etc.	PFOPS-5				Process	0.0	0.0	0.0																					
20-244 / 20-245	Conveyor 20-238/241 to 20-244/245	PFOPS-5				Process	0.0	0.0	0.0				800	7008000																
20-266 / 20-268	Conveyor 20-244/245 to 20-266/268	PFOPS-6				Process	35.0	14.0	3.9				800	7008000	0.01	0.004	0.0011	8	3.2	35.0	14.0	4.0	0	8.00	8.00	35.0	14.0	3.9	11.24-2 (1/95)	1,2,4,10,17	Wet process
	20-266/268 to 30-134/136	PFOPS-7				Process	17.5	7.0	1.9				800	3504000	0.01	0.004	0.0011	8	3.2	17.5	7.0	2.0	0	8.00	8.00	17.5	7.0	1.9	11.24-2 (1/95)	1,2,4,10,17	Semi-wet process
30-150	Ducon Wet Scrubber	SSOPS-3	0.21	0.21	0.06	Stack	0.9	0.9	0.9	11215	0.0022	NA	NA	NA	NA	NA						NA				0.9	0.9	0.9	Stack test	3,18,31	
20-249 / 20-246	Conveyors 20-238/241 to Conveyor 20-250	PFOPS-8				Process	0.0	0.0	0.0				1000	10000	0	0	0 SAG	SAG	SAG	SAG	SAG	SAG	0.7 SAG	SAG		0.0	0.0	0.0	11.24-2 (1/95)	1,2,4,10,19	Wet process + enclosure
20-250	Stacking	HFOPS-A				Fugitive	0.1	0.0	0.0				1000	10000	0.01	0.004	0.0011	10	4	0.1	0.0	0.0	0	10.00	10.00	0.1	0.0	0.0	11.24-2 (1/95)	1,2,4,8,10	Semi-wet process
	Intermediate Stockpile	WFOPS-2				Fugitive	0.0	0.0	0.0				800	10000	0.000016	0.000016	0.000016						0	0.00	0.00	0.0	0.0	0.0	11.19.2-2	9,10	No controls
20-252 / 20-253 / 20-254	Vibratory feeders 20-252/253/254 to Conveyor 20-251	PFOPS-9				Process	0.1	0.0	0.0				600	10000	0.12	0.06	0.017	72	36	0.6	0.3	0.1	0.85	10.80	10.80	0.1	0.0	0.0	11.24-2 (1/95)	1,2,4,10,20	Enclosure (0.7)
20-251 / 20-255	Transfer	PFOPS-10				Process	0.6	0.3	0.1				600	10000	0.12	0.06	0.017						0			0.6	0.3	0.1	11.24-2 (1/95)	1,2,4,10,21	Box enclosure (0.5)
20-262 / 20-263	Omnicone incl: 20-258, 20-259, 20-262, 20-263, and transfer to 20-265	PFOPS-11				Process	0.2	0.0	0.0				400	10000	0.5	0.05	0.0093	200	20	2.5	0.3	0.1	0.925	15.00	15.00	0.2	0.0	0.0	11.24-2 (1/95)	1,2,4,10,21	Enclosure (0.5) + Ducon Wet Scrubber (0.85
20-270	Ducon Wet Scrubber	SSOPS-4	0.91	0.91	0.26	Stack	4.0	4.0	4.0	16891	0.0063	NA	NA	NA	NA	NA						NA				4.0	4.0	4.0	Vendor	3,24	
	Omnicone bypass: 20-255 to 20-285 to 20-265	PFOPS-12					0.0	0.0	0.0				400	0	0.12	0.06	0.017	48	24	0.0	0.0	0.0	0.925	3.60	3.60	0.0	0.0	0.0	11.24-2 (1/95)	1,2,4,10,25	Enclosure (0.5) + Ducon Wet Scrubber (0.85
20-285	Conveyor 20-265 to 20-244/245	PFOPS-13					0.6	0.3	0.1				400	10000	0.12	0.06	0.017	48	24	0.6	0.3	0.1	0	48.00	48.00	0.6	0.3	0.1	11.24-2 (1/95)	1,2,4,10,26	Water sprays (0.7)
	Concentrate Filter Press to Conveyor	PFOPS-14					0.0	0.0	0.0				650	99,280	0.01	0.004	0.0011	6.5	2.6	0.5	0.2	0.1	1	0.00	0.00	0.0	0.0	0.0	11.24-2 (1/95)	1,2,4,10,27	Wet process plus fully enclosed
	Conveyor to Concentrate Storage	PFOPS-15					0.2	0.1	0.0				650	99,280	0.01	0.004	0.0011	6.5	2.6	0.5	0.2	0.1	0.5	3.25	3.25	0.2	0.1	0.0	11.24-2 (1/95)	1,2,4,10,27	Semi-wet process plus partial enclosure (0.7)
	Concentrate Loading	HFOPS-B					0.5	0.2	0.1				650	99,280	0.01	0.004	0.0011	6.5	2.6	0.5	0.2	0.1	0	6.50	6.50	0.5	0.2	0.1	11.24-2 (1/95)	1,2,4,10,27	Semi-wet process
	Concentrate Wind Erosion	WFOPS-					0.0	0.0	0.0				650	99,280	0.000016	0.000016	0.000016						0	0.00	0.00	0.0	0.0	0.0	11.19.2-2	1,2,4,10,27	No controls
60-500	Lime pneumatic loading to lime bin 60-500	PFOPS-16					0.0	0.0	0.0				100	7665	0.61	0.61		61	61	2.3	2.3	0.7	0.99	0.61	0.61	0.0	0.0	0.0	11.17-4 (2/98)	1,2,4,10,28	Pneumatic + baghouse
60-502	Mikro-Pulsaire	SSOPS-6	0.09	0.09	0.03		0.4	0.4	0.4	105	0.1	NA	NA	NA	NA	NA						NA				0.4	0.4	0.4	Vendor	3,29	
	Lime Bin to Feeder to 60-600 Belt	PFOPS-17					8.4	8.4	8.4				100	7665	2.2	2.2	2.2	220	220	8.4	8.4	2.4	0	220.00	220.00	8.4	8.4	8.4	11.17-4 (2/98)	1,2,4,10,28	No controls
60-600	Transfer to Ball Mill	PFOPS-18					8.4	8.4	8.4				100	7665	2.2	2.2	2.2	220	220	8.4	8.4	2.4	0	220.00	220.00	8.4	8.4	8.4	11.17-4 (2/98)	1,2,4,10,28	No controls
60-505	Lime ball mill	PFOPS-19					0.0	0.0	0.0				100	7665	0	0	0	0	0	0.0	0.0	0.0	0	0.00	0.00	0.0	0.0	0.0	11.17-4 (2/98)	1,2,4,10,28	Wet process
	Concentrator: Ball mills, flotation, thickening, various conveyors, all wet	PFOPS-20					0.0	0.0	0.0				2000	17520000	0	0	0	0	0	0.0	0.0	0.0	0.7	0.00	0.00	0.0	0.0	0.0	11.24-2 (1/95)	30	Wet process

	PM lb/hr	PM10 lb/hr	PM2.5 lb/hr	PM tpy	PM10 tpy	PM2.5 tpy
Actual Emissions 2009:	1.21	1.21	0.34	89.10	50.30	29.96

	Uncontrolled			Controlled		
	PM tpy	PM10 tpy	PM2.5 tpy	PM tpy	PM10 tpy	PM2.5 tpy
Actual Emissions 2009:	917.41	461.95	130.73	89.10	50.30	29.96

SOUTH MILL Actual 2010

Equip#	Description	EPN	PM lb/hr	PM10 lb/hr	PM2.5 lb/hr	Class	PM tpy	PM10 tpy	PM2.5 tpy	Stack Emissions ACFM	Gr/DSCF	Throughput TPH	TPY	Emission Factors EF-PM	EF-PM10	Uncontrolled PM lb/hr	PM10 lb/hr	PM tpy	PM10 tpy	PM2.5 tpy	Control Efficiency	Controlled PM lb/hr	PM10 lb/hr	PM tpy	PM10 tpy	PM2.5 tpy	EF Source	Notes	Control Type
10-130/134	Apron Feeders 30-130/131/132/133 to Conveyors 30-134/136	PFOPS-3				Process	6.3	3.2	0.9			2000	7008300	0.12	0.06	0.017	240	120	420.5	210.2	59.5	0.985	3.60	3.60	6.3	3.2	0.9 11.24-2 (1/95)	1,2,4,13,14	Enclosure (0.7) + Ducon (0.95)
30-134 / 30-136	Conveyor 30-134/136 to SAG Mills 30-201/202	PFOPS-4				Process	6.3	3.2	0.9			2000	7008300	0.12	0.06	0.017	240	120	420.5	210.2	59.5	0.985	3.60	3.60	6.3	3.2	0.9 11.24-2 (1/95)	1,2,4,13,15	Enclosure (0.7) + Ducon (0.95)
30-201 / 30-202	SAG Mills (2)	PFOPS-5				Process	0.0	0.0	0.0			2000	7008300				0	0	0.0	0.0	0.0		0.00	0.00					
30-203 / 30-204	Double Deck Screens (2) to Conveyors 20-238/241	PFOPS-5				Process	0.0	0.0	0.0			2000	7008300	0	0							0.985			0.00	0.00	0.0 11.24-2 (1/95)	1,2,4,13,16	
	Double Deck Screens 20-203/204 to Ball Mills etc.	PFOPS-5				Process	0.0	0.0	0.0																				
20-244 / 20-245	Conveyor 20-238/241 to 20-244/245	PFOPS-5				Process	0.0	0.0	0.0			800	7008300																
20-266 / 20-268	Conveyor 20-244/245 to 20-266/268	PFOPS-6				Process	17.5	7.0	1.9			800	3504000	0.01	0.004	0.0011	8	3.2	17.5	7.0	2.0	0	8.00	8.00	17.5	7.0	1.9 11.24-2 (1/95)	1,2,4,13,17	Wet process
	20-266/268 to 30-134/136	PFOPS-7				Process	17.5	7.0	1.9			800	3504000	0.01	0.004	0.0011	8	3.2	17.5	7.0	2.0	0	8.00	8.00	17.5	7.0	1.9 11.24-2 (1/95)	1,2,4,13,17	Semi-wet process
30-150	Ducon Wet Scrubber	SSOPS-3	0.21	0.21	0.06	Stack	0.9	0.9	0.9	11215	0.0022			NA	NA	NA					NA				0.9	0.9	0.9	3,18,31	
20-249 / 20-246	Conveyors 20-238/241 to Conveyor 20-250	PFOPS-5				Process	0.0	0.0	0.0			1000	1000	0	0	0 SAG	SAG		SAG	SAG	SAG	0.7 SAG	SAG		0.0	0.0	0.0 11.24-2 (1/95)	1,2,4,13,19	Wet process plus Enclosure (0.7)
20-250	Stacking	HFOPS-A				Fugitive	0.0	0.0	0.0			1000	1000	0.01	0.004	0.0011	10	4	0.0	0.0	0.0	0	10.00	10.00	0.0	0.0	0.0 11.24-2 (1/95)	1,2,4,8,13	Semi-wet process
	Intermediate Stockpile	WFOPS-2				Fugitive	0.0	0.0	0.0			800	1000	0.000016	0.000016	0.000016						0	0.00	0.00	0.0	0.0	0.0 11.19.2-2	9,13	No controls
20-252 / 20-253 / 20-254	Vibratory feeders 20-252/253/254 to Conveyor 20-251	PFOPS-9				Process	0.0	0.0	0.0			600	1000	0.12	0.06	0.017	72	36	0.1	0.0	0.0	0.7	21.60	21.60	0.0	0.0	0.0 11.24-2 (1/95)	1,2,4,13,20	Enclosure (0.7)
20-251 / 20-255	Transfer	PFOPS-10				Process	0.0	0.0	0.0			600	1000	0.12	0.06	0.017						0.5			0.0	0.0	0.0 11.24-2 (1/95)	1,2,4,13,21	Box enclosure (0.5)
20-262 / 20-263	Omnicone incl: 20-258, 20-259, 20-262, 20-263, and transfer to 20-265	PFOPS-11				Process	0.0	0.0	0.0			400	1000	0.5	0.05	0.0093	200	20	0.3	0.0	0.0	0.925	15.00	15.00	0.0	0.0	0.0 11.24-2 (1/95)	1,2,4,13,21	Enclosure (0.5) + Ducon Wet Scrubber (0.85
20-270	Ducon Wet Scrubber	SSOPS-4	0.91	0.91	0.26	Stack	4.0	4.0	4.0	16891	0.0063	400	3504000	NA	NA	NA					NA				4.0	4.0	4.0 Vendor	3,24	
20-285	Omnicone bypass: 20-255 to 20-285 to 20-265	PFOPS-12					0.0	0.0	0.0			400	0	0.12	0.06	0.017	48	24	0.0	0.0	0.0	0.925	3.60	3.60	0.0	0.0	0.0 11.24-2 (1/95)	1,2,4,13,25	Enclosure (0.5) + Ducon Wet Scrubber (0.85
	Conveyor 20-265 to 20-244/245	PFOPS-13					0.1	0.0	0.0			650	1000	0.12	0.06	0.017	78	39	0.1	0.0	0.0	0	78.00	78.00	0.1	0.0	0.0 11.24-2 (1/95)	1,2,4,13,26	Water sprays (0.7)
	Concentrate Filter Press to Conveyor	PFOPS-14					0.0	0.0	0.0			650	117,530	0.01	0.004	0.0011	6.5	2.6	0.6	0.2	0.1	1	0.00	0.00	0.0	0.0	0.0 11.24-2 (1/95)	1,2,4,13,27	Wet process plus fully enclosed
	Conveyor to Concentrate Storage	PFOPS-15					0.2	0.1	0.0			650	117,530	0.01	0.004	0.0011	6.5	2.6	0.6	0.2	0.1	0.7	1.95	1.95	0.2	0.1	0.0 11.24-2 (1/95)	1,2,4,13,27	Semi-wet process plus partial enclosure (0.7)
	Concentrate Loading	HFOPS-B					0.6	0.2	0.1				117,530	0.01	0.004	0.0011	0	0	0.6	0.2	0.1	0	0.00	0.00	0.6	0.2	0.1 11.24-2 (1/95)	1,2,4,13,27	Semi-wet process
	Concentrate Wind Erosion	WFOPS-					0.0	0.0	0.0			650	117,530	0.000016	0.000016	0.000016						0	0.00	0.00	0.0	0.0	0.0 11.19.2-2	1,2,4,13,27	No controls
60-500	Lime pneumatic loading to lime bin 60-500	PFOPS-16					0.0	0.0	0.0			100	7300	0.61	0.61		61	61	2.2	2.2	0.6	0.99	0.61	0.61	0.0	0.0	0.0 11.17-4 (2/98)	1,2,4,13,28	Pneumatic + baghouse
60-502	Mikro-Pulsalre	SSOPS-6	0.09	0.09	0.03		0.4	0.4	0.4	105	0.1			NA	NA	NA					NA				0.4	0.4	0.4 Vendor	3,29	
	Lime Bin to Feeder to 60-600 Belt	PFOPS-17					8.0	8.0	8.0			100	7300	2.2	2.2	2.2	220	220	8.0	8.0	2.3	0	220.00	220.00	8.0	8.0	8.0 11.17-4 (2/98)	1,2,4,13,28	No control
60-600	Transfer to Ball Mill	PFOPS-18					8.0	8.0	8.0			100	7300	2.2	2.2	2.2	220	220	8.0	8.0	2.3	0	220.00	220.00	8.0	8.0	8.0 11.17-4 (2/98)	1,2,4,13,28	No control
60-505	Lime ball mill	PFOPS-19					0.0	0.0	0.0			100	7300	0	0	0	0	0	0.0	0.0	0.0	0	0.00	0.00	0.0	0.0	0.0 11.17-4 (2/98)	1,2,4,13,28	Wet process
	Concentrator: Ball mills, flotation, thickening, various conveyors, all wet	PFOPS-20					0.0	0.0	0.0					0	0	0	0	0	0.0	0.0	0.0	0.7	0.00	0.00	0.0	0.0	0.0 11.24-2 (1/95)	30	Wet process

	PM lb/hr	PM10 lb/hr	PM2.5 lb/hr	PM tpy	PM10 tpy	PM2.5 tpy
Actual Stack and Process Emissions 2010:	1.21	1.21	0.34	69.36	41.85	27.05
Project Future Potential - Past Actual				-5.24	-2.63	-2.14

ATTACHMENT "D"
VENDOR DATA

APPLIED
Industrial Technologies *Field Services*

Applied Industrial Technologies-
Field Services
2025 North Dragoon Street
Tucson, AZ 85745-1425
520 792 3978 Tel
520 791 7979 Fax

To: John Hazen
Asarco Mission South Project

John,

Below is all the information you requested for the Pan Feeder Replacement Drive.

Information on load:
Motor HP 30HP
Motor RPM 1750RPM
Motor Voltage 460V
Motor Full Load Amps 40

Current Tonnage is 1525TPH drawing 20 amps
20A/40A x 30HP = 15HP demand
2000TPH drawing 26 amps
26A/40A x 30HP = 19.5HP demand

Proposed Upgrade
3000TPH =1.5 x 19.5HP = 29.25 calculated HP
3500TPH = 1.75 x 19.5HP = 34.13 calculated HP

Based on this calculation, we recommend using a 50HP/1750RPM VFD duty motor with variable speed control. A quote for the drive is below:

Falk Gear Drive M163VRC3-A-126.1:1	
Rating 75.9 Mech HP @1000RPM input/7.93 Output RPM	$39,674.19
MCF Rigid Coupling with Type 2 Hubs	$12,111.32
Unit Mount Torque Arm	$1,971.52
Top Mount for 320T Frame Motor	$2,085.67
Synchronous Goodyear Drive (See attached documentation)	$567.25
50HP WEG Motor (05018EP3E326T)	$2310.00
75HP ABB VFD (ACS800)	$6332.35
NEMA 12 Cabinet with Air Conditioning	$10,213.88
Grand Total	**$68,933.83**

Delivery is 8-10 weeks ARO. Falk Gear Drive is longest lead time item

Thanks,

Chuck Driver
Applied Industrial Technologies
Tucson, AZ

Current
30 HP
1750 RPM
@ 35:1 Reduction

81.967 RPM

24.72 RPM

Pan feeder
6:1

19 Tooth Drive
63 Tooth Driven

MaximizerPro
Drive Selection Analysis Program

DRIVE LAYOUT

GOODYEAR ENGINEERED PRODUCTS
Veyance Technologies, Inc.

Drive Conditions			
Power Load:	50.0 Hp	Operating Hub Load:	525.6 Lbf
Required; Actual service factor:	1.7 ; 1.9	Installation Hub Load:	757.4 Lbf
Center Distance:	29.77 Inch	Noise Level:	78 dB(A)
Annual Energy Used ($); Energy Costs:	20037; 0.06$/kWh	Belt speed; Mass:	3675 ft/min; 0.112 kg/m

	DriveR Sprocket	DriveN Sprocket
RPM:	1750.0	1000.0
# of Teeth:	80	140
Tooth Pitch:	0.31 Inch	0.31 Inch
Pitch Dia.:	8.02 Inch	14.04 Inch
Flange Dia.:	/	/
Drive Width:	2.01 Inch	2.01 Inch

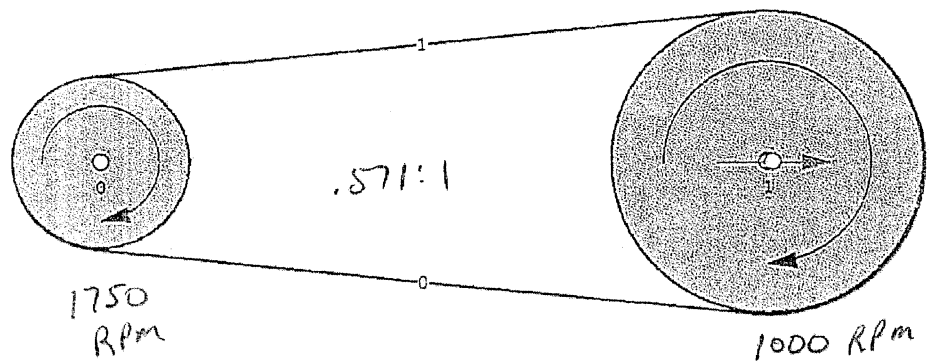
	New Belt	Used Belt
Installation Tension:	380.7 Lbf	271.9 Lbf
Tensioning Force (F):	24.8 Lbf	18.1 Lbf
Tensioning deflection (q):	0.46 Inch	0.46 Inch
Span Length (L):	29.62 Inch	29.62 Inch
Tensioning Frequency:	81.8 Hz	69.2 Hz

Drive must be properly aligned to give intended service life.

DriveR Part Numbers
Sprocket: GTR-80G-8M-21*
Bushing: TL3020
Shaft Size: N/S

Belt Part Number
8GTR-2400-21
Belt power rating: 93.1 Hp

DriveN Part Numbers
Sprocket: GTR-140G-8M-21
Bushing: TL3020
Shaft Size: N/S



1000 RPM @ 126.1 : 1

7.93 RPM

Check shaft lengths!
Check if pulley has a flange.
Drive must be properly aligned to give intended service life!
Sprocket part numbers that have a * after them can be ordered with a bolt on flange as an option.
Recommended center distance movement for installation and take up: -0.20 Inch 0.20 Inch

A P P L I E D I N D U S T R I A L T E C H N O L O G I E S

Q U O T A T I O N

TO:
ASARCO LLC
STE 2000
5285 E WILLIAMS CIR
TUCSON, AZ 85711-4426

ATTENTION OF: BILLY MENDEZ
PHONE: (520) 879-7808

PAGE 1
DATE: 05/21/12
INQUIRY #cd184910
QUOTATION # 8980184910
TERMS: Net 30 Days
ACCT : 8980025
SUBTOTAL: $59,900.11

LINE#	QUANTITY	MFG	PART DESCRIPTION	UNIT PRICE	U M	EXTENDED PRICE	EST. DELIVERY/ F.O.B.
1	1.00	GDYR	GTR-80G-8M-21 POLY CHAIN SPROCKET YOUR PART - 11338332	120.720	EA	120.72	6 weeks ORIGIN
2	1.00	DODG	3020X1 7/8KW TAPERLOCK BUSHING	36.990	EA	36.99	6 weeks ORIGIN
3	1.00	GDYR	GTR-140G-8M-21 POLY CHAIN SPROCKET	246.460	EA	246.46	6 weeks ORIGIN
4	1.00	DODG	3030X2 1/2KW TAPERLOCK BUSHING	53.130	EA	53.13	6 weeks ORIGIN
5	1.00	FALK	M163VR3A-126:1 V CLASS DRIVE	42153.820	EA.	42153.82	6 weeks ORIGIN
6	1.00	FALK	MCF 2190 RIGID COUPLING	12868.270	EA.	12868.27	6 weeks ORIGIN
7	1.00	FALK	TORQUE ARM V CLASS TORQUE ARM	2094.750	EA	2094.75	6 weeks ORIGIN
8	1.00	FALK	320 TOP MOUNT TOP MOTOR MOUNT	2216.020	EA.	2216.02	6 weeks ORIGIN

CONTINUED ON PAGE 2

Q U O T A T I O N

TO:
ASARCO LLC
STE 2000
5285 E WILLIAMS CIR
TUCSON, AZ 85711-4426

ATTENTION OF: BILLY MENDEZ
PHONE: (520) 879-7808

PAGE 2
DATE: 05/21/12
INQUIRY #cd184910
QUOTATION # 8980184910
TERMS: Net 30 Days
ACCT : 8980025
SUBTOTAL: $59,900.11

LINE#	QUANTITY	MFG	PART DESCRIPTION	UNIT PRICE	U M	EXTENDED PRICE	EST. DELIVERY/ F.O.B.
9	1.00	GDYR	8GTR-2400-21 POSITIVE DRIVE BELT	109.950	EA	109.95	6 weeks ORIGIN

Quoted prices will be held firm for 15 days from date of this quotation. Orders shipped after 15 days from the date of quotation may be subject to manufacturer increases.

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Returned product is subject to a restocking charge
We are Committed to Customer Satisfaction Through Continuous Improvement.
Please reference our quotation number when placing your order with:

APPLIED INDUSTRIAL TECHNOLOGIES, INC.
2025 N DRAGOON ST
TUCSON, AZ 85745-1425

PHONE: (520) 791-0036
FAX : (520) 791-7979
Email-address: SC0898@APPLIED.COM
ATTENTION: Chuck Driver
OR: James Boyle

SUBMITTED BY:

Chuck Driver

DATE: MAY 21, 2012