TECHNICAL EVALUATION

&

PRELIMINARY DETERMINATION

PROJECT

Draft Permit No. 0570008-061-AC
Best Available Retrofit Technology (BART) Exemption

Riverview Facility
Hillsborough, Florida

APPLICANT

Mosaic Fertilizer, LLC
8813 U.S. Highway 41 South
Riverview, FL 33569

PERMITTING AUTHORITY

Title V Section
Bureau of Air Regulation
Division of Air Resource Management
Florida Department of Environmental Protection

February 27, 2009

1. GENERAL PROJECT INFORMATION

Facility Description and Location

The applicant, Mosaic Fertilizer, LLC, operates an existing phosphate fertilizer manufacturer. This facility consists of several industrial processes that convert insoluble rock containing phosphorus ore into a soluble form suitable for agricultural use. The processes consist of a molten sulfur storage & handling system, one material handling system, three (3) sulfuric acid plants, one (1) phosphoric acid plant (two trains), two (2) diammonium phosphate (DAP) plants, two (2) monoammonium phosphate (MAP) plants, one auxiliary boiler, and two (2) animal feed plants.

The Standard Industrial Classification (SIC) code for this type of facility is SIC No. 2874.

The facility is located about 7 miles south of Tampa at 8813 U.S. Highway 41 South, Riverview, Hillsborough County. The UTM coordinates are Zone 17, 362.9 km East and 3082.5 km North. Latitude: 27° 51' 28" North and Longitude: 82° 23' 15" West.

Regulatory Categories

This project is subject to the applicable environmental laws in Section 403 of the Florida Statutes (F.S.). The Florida Statutes authorize the Department of Environmental Protection (Department) to establish rules regarding air quality in the Florida Administrative Code (F.A.C.). The facility is classified according to the following major regulatory categories.

- The facility is a major source of hazardous air pollutants (HAPs) based on Title V Permit No. 0570008-045-AV.[1]
- The facility does not operate units currently subject to the acid rain provisions of the Clean Air Act (see Title V Permit No. 0570008-045-AV). The acid rain opt-in provisions of 40 CFR 74 for Process Sources are "Reserved."
- The facility is a Title V major source of air pollution in accordance with Chapter 213, F.A.C.
- The facility is a major stationary source pursuant to Rule 62-212.400, F.A.C. for the Prevention of Significant Deterioration (PSD) of Air Quality (see Title V Permit No. 0570008-045-AV).
- The facility operates emissions units that are subject to Rule 62-296.340(5)(c) (escape BART), F.A.C.

Project Description

Mosaic Fertilizer, LLC submitted an application to escape the BART determination requirements of Rule 62-296.340(5)(c) (escape BART), F.A.C., which addresses the following emissions units:

EU ID No.	Brief Description
-022	No. 3 MAP Plant
-023	No. 4 MAP Plant
-024	South Cooler
-063	Molten Sulfur Storage and Handling System -- Storage Tank Nos. 1, 2 and 3
-066	Molten Sulfur Storage and Handling System -- Storage Pit No. 7
-067	Molten Sulfur Storage and Handling System -- Storage Pit No. 8
-068	Molten Sulfur Storage and Handling System -- Storage Pit No. 9

-004	No. 7 Sulfuric Acid Plant
-005	No. 8 Sulfuric Acid Plant
-006	No. 9 Sulfuric Acid Plant

Applicability Resolution

Several emission units had been identified as BART eligible units in the Department's rule making workshop materials under a draft list. The draft list of emission units was included in the March 1, 2007, additional information request. The emission units not included in the BART analysis performed by the applicant were specifically, Nos. 3 & 4 MAP Plant and South Cooler, (Emission Unit Identification number (EU ID No. -022, -023 & -024), Phosphoric Acid Production System (EU ID No. -073) and Phosphogypsum Stack I (EU ID No. -104).

According to the applicant, the Nos. 3 & 4 MAP Plant and South Cooler, (Emission Unit Identification number (EU ID No.) -022, -023 & -024) shutdown in September 2004. The applicant claims to have made a request to the Department's SWD Office to remove these units from the air operation permit, Title V Permit No. 0570008-045-AV. Final action has not yet been taken on this request. The status of these emissions units as being shutdown is reflected in this permitting action.

The Phosphoric Acid Production System (EU ID No. -073) and Phosphogypsum Stack I (EU ID No. -104) are not considered to be sources of nitrogen oxides (NO_X), particulate matter (PM_{10}), and sulfur dioxide (SO_2).[2] Fugitive PM emissions from sources greater than 50 km from a Class I area were not required to undergo a BART control evaluation.

These emission units are therefore not considered as part of this BART analysis for the reasons previously stated.

This Technical Evaluation & Preliminary Determination (TE&PD) details the project, describes the required air pollutant emission reductions and reasonable assurances to escape and remain exempt from a BART determination pursuant to Rule 62-296.340(5)(c) (escape BART), F.A.C.

Processing Schedule

The processing events shown below for the BART determination are relevant to the escape BART project as they are cited within this TE&PD document and the draft permit.

BART Determination

February 2, 2007	Department received the BART application (hard copy) for an air pollution construction permit.
March 1, 2007	Department requested additional information (RAI), sent electronically.
May 15, 2007	Department's extension of time in which to respond to RAI, sent electronically.
July 11, 2007	Department received additional information (hard copy) dated July 9.
August 10, 2007	Department requested additional information (RAI) dated August 9, sent electronically.
Sept. 13, 2007	Department received additional information (hard copy) dated Sept. 11.
Sept. 19 & 20, 2007	Department requested clarifying information via e-mail.
Sept. 20 & 21, 2007	Department received clarifying information via e-mail; application complete.
December 18, 2007	Department issued (clerked) Draft permit with Technical Evaluation & Preliminary Determination.
January 17, 2008	Applicant filed a Petition for Administrative Hearing.

January 21, 2008	Department received comments from U.S. EPA Region 4 dated January 18.
January 25, 2008	Department received comments from Applicant dated January 24.

BART Exemption Determination

August 11, 2008	Department received the BART exemption application (hard copy) for an air pollution construction permit.
September 9, 2008	Department requested additional information (RAI), sent electronically.
October 2, 2008	Department received additional information (hard copy) dated September 30.
October 31, 2008	Department requested clarifying information via e-mail.
November 5, 2008	Department received information (hard copy) dated October 31.
December 4, 2008	Department received clarifying information via e-mail; application complete.

Relevant Documents

- Permits PSD-FL-209, 250 & 315.[3]
- Current Title V Air Operation Permit (Renewal) No. 0570008-045-AV, expires 05/31/2011.[4]
- Air Construction Permit No. 0570008-060-AV, issued 12/22/2008, expires 12/31/2010.[5]

2. APPLICABLE BART EXEMPTION REGULATIONS

Regulatory Authority

This project is subject to the applicable regulatory requirements in the following Chapters of the F.A.C.: 62-4 (Permitting Requirements); 62-204 (Ambient Air Quality Requirements, PSD Increments, and Federal Regulations Adopted by Reference); 62-210 (Permits Required, Public Notice, Reports, Stack Height Policy, Circumvention, Excess Emissions, and Forms); 62-212 (Preconstruction Review, PSD Review and BACT, and Non-attainment Area Review and LAER); 62-296 (Emission Limiting Standards); and 62-297 (Test Methods and Procedures, Continuous Monitoring Specifications, and Alternate Sampling Procedures). It is also subject to the applicable provisions in Title 40 of the Code of Federal Regulations (CFR) as adopted in Chapter 62-204 and 62-296, F.A.C.

Specifically, this project is subject to Rule 62-296.340(5)(c) (escape BART), F.A.C., by reducing the visibility impact from this facility to below the 0.5 deciview (dV) threshold in the air dispersion modeling for exemption from a BART determination. The visibility impact from this facility is reduced by taking federally enforceable reductions through a minor source air construction permit.

The Department previously identified all BART-eligible sources through a series of notifications, workshops, and rule making efforts. The state rule implements the federal provisions of Appendix Y in 40 CFR Part 51, "Guidelines for BART Determinations Under the Regional Haze Rule."

Affected Pollutants

In accordance with Appendix Y in 40 CFR 51, the affected visibility-impairing pollutants include the following: nitrogen oxides (NO_X), particulate matter (PM_{10}), and sulfur dioxide (SO_2). Although ammoniated nitrates and sulfates are among the key species contributing to regional haze, BART does <u>not</u> directly address or require a review of ammonia (NH_3) as a visibility-impairing pollutant.

With respect to particulate emissions, Rule 62-210.200, F.A.C. defines PM as, "... all finely divided solid or liquid material, other than uncombined water, emitted to the atmosphere as measured by applicable reference methods, or an equivalent or alternative method ..." PM with an aerodynamic diameter less than or equal to a nominal 10 micrometers is defined as PM_{10} and PM with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers is defined as $PM_{2.5}$. Emissions of PM, PM_{10} and $PM_{2.5}$ are all regulated pollutants. For the existing emissions units and air pollution control equipment, the control strategy specified in the BART determinations directly reduces PM emissions, which serves as a surrogate to also reduce PM_{10} and $PM_{2.5}$ emissions.

SO_2 and sulfuric acid mist (SAM) emissions were lowered in the air dispersion modeling used to escape BART. According to the applicant's consultant, the lowering of SAM emissions had a more profound affect in reducing the visibility impact compared to lowering SO_2. The lowering of PM/PM_{10} or NOx was not done in the modeling used to escape BART.

The proposed work under this project is scheduled to take place during the full turnaround of each sulfuric acid plant (SAP) and is projected to end in 2012 as described in the BART exemption application, Table 2-2. An expiration date of June 30, 2013 for this construction permit was established to allow sufficient time for testing and submitting the test results. This expiration date is six (6) months prior to the BART compliance deadline of December 31, 2013 (Rule 62-296.340(3)(b)2., F.A.C.).

3. SUMMARY OF APPLICANT'S BART EXEMPTION MODELING ANALYSIS

Mosaic Riverview specifically made changes to reduce sulfur dioxide (SO_2) and sulfuric acid mist (SAM) emissions, as contained in the draft permit, to meet the specific exemption criteria in the Best Available Retrofit Technology (BART) rule (Rule 62-296.340(5)(c), F.A.C.). Taking into consideration these emission reductions, Mosaic completed air quality modeling consistent with an approved modeling protocol submitted to the Department. The EPA-approved CALPUFF dispersion model was used to determine visibility impacts on all federal Class I areas within 300 kilometers of the facility using three years of meteorological data derived from the MM5 meteorological model. This modeling was thoroughly reviewed by the Department and determined to be appropriate for the purpose of meeting the exemption criteria of the BART rule.

Visibility impacts were completed for three federal Class I areas: Chassahowitzka National Wilderness Area, located 87 kilometers from the facility; Everglades National Park (239 kilometers); and, St. Marks National Wilderness Area (291 kilometers). The controlling area, that is the area with the greatest visibility impact from Mosaic Riverview, is Chassahowitzka. BART exemption modeling considered only the impacts from the BART-eligible sources within the facility. In this case, the Sulfuric Acid Plants (SAPs) No. 7, 8 & 9, the Molten Storage Tank Nos. 1, 2, & 3 and the Molten Storage Pit Nos. 7, 8, & 9. The results of the modeling for the controlling Chassahowitzka area is shown below as taken from the complete modeling report submitted by Mosaic.

TABLE 3-3
SUMMARY OF BART EXEMPTION MODELING RESULTS - NEW IMPROVE ALGORITHM WITH PROPOSED 24-HOUR AVERAGE SO_2 AND H_2SO_4 EMISSION LIMITS FOR THE NOS. 7, 8, AND 9 SAPs MOSAIC FERTILIZER, LLC, RIVERVIEW FACILITY

Class I Area	Distance from Source to Nearest Class I Area Boundary (km)	Number of Days and Receptors with Visibility Impacts >0.5 dv									22nd Highest Impact (dv) Over 3-Yr Period
		2001			2002			2003			
		No. of Days	No. of Receptors	8th Highest Impact (dv)	No. of Days	No. of Receptors	8th Highest Impact (dv)	No. of Days	No. of Receptors	8th Highest Impact (dv)	
Chassahowitzka NWA	87	8	NA	0.405	11	NA	0.481	16	NA	0.494	0.346

The maximum visibility impact at any of the three federal Class I areas is 0.494 deciviews (dV). This value is less than the criterion for exemption from the BART rule of 0.5 dV. Based on the emission changes made in this draft permit and the modeling performed by the applicant, the Department concludes that the BART-eligible sources at Mosaic Riverview are exempt from the BART rule requirements.

The permitting authority confirmed that the air dispersion modeling used to escape BART was performed at the proposed lower SO_2 and SAM emission rates. At these lower SO_2 and SAM emission rates, the Mosaic-Riverview facility escaped a BART determination by modeling below the 0.5 dV exemption threshold. The initial modeling under the BART determination had been 0.643 dV. This project represents a 23% reduction in visibility impairment from this facility.

4. BART ANALYSIS AND PRELIMINARY BART EXEMPION DETERMINATION FOR NOS. 7, 8 & 9 SULFURIC ACID PLANTS

This section provides the BART exemption determination for the following emissions units:

EU ID No.	Brief Description
-004	No. 7 Sulfuric Acid Plant
-005	No. 8 Sulfuric Acid Plant
-006	No. 9 Sulfuric Acid Plant

BART Exemption - SO_2

These emissions units had a best available control technology (BACT) established SO_2 emissions limit. The BACT for No. 7 Sulfuric Acid Plant was established in 1998 when production was increased (see PSD-FL-250, Permit Number 0570008-025-AC). The BACT for Nos. 8 & 9 Sulfuric Acid Plants was established in 2001 as part of a facility expansion (see PSD-FL-315, Permit Number 0570008-036-AC). The BACT for SAP No. 7 specified the use of the existing double absorption system with an increased use of vanadium catalyst in the two converters and the use of impaction-based mist eliminators. The BACT for SAP Nos. 8 & 9 specified the use of the existing double absorption system and the use of mist eliminators.

Preliminary BART Exemption Determination for SO_2

Applicant's Proposed SO_2 BART Exemption

SO_2 Emission Standards and Limitations

The applicant proposed reduced SO_2 emission limitations for each SAP in order to escape BART. The applicant's proposed BART emission reductions for SO_2 in lb/hour & TPY equivalents were also established in the PSD avoidance permit for the SAP No. 8 equipment, e.g., converter, superheater no. 3 & cold interpass exchanger, replacement project processed in the SWD Office, Permit No. 0570008-060-AC.

The applicant proposed the following emission reductions of SO_2 as demonstrated by certified CEMS data:

	SO_2 Emission Reduction
SAP No. 7	from 467 lb/hour to 400 lb/hour
SAP No. 8	from 393.8 lb/hour to 315 lb/hour
SAP No. 9	from 495.8 lb/hour to 425 lb/hour

The applicant proposed a 24-hour (daily) block average based on the emission rate averaging period of 24-hour (daily) used in the air dispersion modeling.

The proposed new equivalent lb SO_2/ton 100% H_2SO_4 values for SAP Nos. 7, 8, and 9 at design capacity are: 3.0 lb SO_2/ton 100% H_2SO_4; 2.8 lb SO_2/ton 100% H_2SO_4; and, 3.0 lb SO_2/ton 100% H_2SO_4, respectively. The new equivalent lb/ton values corresponding to the lb/hour limits are less than the current existing standards.

Changes Required at SAPs to Meet BART Exemption Standards and Limitations

The applicant proposed to meet the lower emission standards & limitations by using the currently employed double absorption system with increased catalyst (vanadium) loadings and the replacement of select process equipment in the Nos. 7, 8 & 9 SAPs. The applicant claims that many of the process equipment replacements are necessary to achieve and maintain the lower SO_2 emission limits.

In the additional information response dated September 30, 2008, the applicant indicated that the converter in SAP No. 8 is 43 years old, the original converter when the plant was built in 1965. The new larger converter

with increased catalyst volume maintains the SAP No. 8's production. The applicant indicated that the replacement of the cold gas-to-gas heat exchangers in the SAP Nos. 7 & 8 and the superheater in the SAP No. 8 is necessary to remedy and repair gas leaks. Replacement of the heat recovery system in the SAP No. 9 is primarily for increased energy recovery.

The specific pieces of process equipment being replaced to reduce emissions and thereby escape BART are cited below:

SAP No.	Work Activities
7	• Replace the cold gas-to-gas heat exchanger.
8	• Replace the cold gas-to-gas heat exchanger; • Replace the superheater; and, • Replace the converter with a larger one. Note: These work activities are permitted under Permit No. 0570008-060-AC.
9	• Install a heat recovery system (HRS) to replace the interpass absorption (IPA) tower.

In addition to the process equipment being replaced, the applicant is proposing to add additional catalyst to escape BART. A catalyst study was completed by the catalyst supplier, Haldor Topsoe, Inc. The study was provided in Appendix C as part of the BART exemption application. The study includes specific Haldor Topsoe catalyst, vanadium 12 mm daisy-shaped products referred to as "VK38" which is a standard vanadium catalyst & "VK48" which is a high vanadium catalyst.[6] The study also includes specific increased catalyst loadings (volumes). The study recognized the need to replace the converter in SAP No. 8. The catalyst loading ratio proposed for SAP No. 8 was with the new proposed converter scaling up the 468,000 liters cited in the Haldor Topsoe catalyst study.

As cited in the Haldor Topsoe catalyst study the proposed increased catalyst loading ratios in the SAPs are as follows:

SAP No.	Work Activities
7	• Increase the catalyst loading ratio from 181 liters per ton H_2SO_4 per day (L/TPD) to 202 L/TPD {increases the current catalyst loading from approximately 578,000 liters to 647,000 liters}.
8	• Increase the catalyst loading ratio from 175 L/TPD to 213 L/TPD {increases the current catalyst loading from approximately 472,000 liters to 575,000 liters. The 468,000 liters cited in the study was with the existing converter}. Note: This work activity is permitted under Permit No. 0570008-060-AC, as part of the new larger converter.
9	• Increase the catalyst loading ratio from 149 L/TPD to 195 L/TPD {increases the current catalyst loading from approximately 508,000 liters to 663,000 liters}.

The percentage increases in the catalyst loading ratios for the SAPs are as follows:

	Catalyst Loading Ratio liters per ton H_2SO_4 per day (L/TPD)	% Increase in Catalyst Loading
SAP No. 7	from 181 to 202	12%
SAP No. 8	from 175 to 213	22%
SAP No. 9	from 149 to 195	31%

Department's Preliminary SO_2 BART Exemption Determination

SO_2 Emission Standards and Limitations

The applicant provided actual SO_2 continuous emissions monitoring system (CEMS) data in the form of graphs from the most recent 5-year period (calendar year 2007 - 2003 emissions) (see Additional Information Response dated September 30, 2008) and actual SO_2 stack test results from 2000 through 2007 (see Appendices C and E respectively of the Additional Information Response dated July 9, 2007). The applicant, at the Department's request, reduced the SO_2 CEMS data to three (3) and twenty four (24) average periods. Visual interpretations of the SO_2 CEMS data in the graphs submitted by the applicant were performed. A predominant average was established encompassing the majority of the CEMS data. Each data range average for the three (3) and twenty four (24) data sets for each SAP are shown in **Figure A**. The predominant averages are summarized below.

SO_2 CEMS Data Analysis

	Predominant Average (2003 - 2007) lb SO_2/ton, 3-hour average	**Predominant Average (2003 - 2007) lb SO_2/ton, 24-hour average**
SAP No. 7	3.75	3.37
SAP No. 8	3.75	3.37
SAP No. 9	3.75	3.37

In addition, the applicant provided actual SO_2 stack test results from 2000 through 2007 (see Appendix E of the Additional Information Response dated July 9, 2007). These test results can be summarized as follows:

SO_2 Stack Test Data Review

	Averages of Stack Tests (2000 - 2007) lb SO_2/ton, 3-hour average	**Test Ranges**
SAP No. 7	3.27	2.5 - 4.0
SAP No. 8	3.50	2.9 - 3.8
SAP No. 9	2.92	2.1 - 3.3

	Design Production Capacity, TPD of 100% H_2SO_4 (sulfuric acid)	**Permitted Production** (Achieved during Stack Test), TPD of 100% H_2SO_4 (sulfuric acid)	Stack Test Date
SAP No. 7	3,200	3,019	3/27/2008
SAP No. 8	2,700	2,592	1/23/2008
SAP No. 9	3,400	3,264	3/8/2008

After reviewing the CEMS and stack test data for SO_2, it is apparent the applicant can not currently achieve the proposed emission reductions for SO_2.

To reduce SO_2 emissions the applicant commissioned a study performed by the catalyst supplier, Haldor Topsoe, Inc. The study confirms that with the proposed modifications to each SAP, the SAPs can achieve the SO_2 emission rates of 2.8 to 3.0 lb SO_2/ton 100% H_2SO_4. The specific additional catalyst loadings & types of catalysts in the study as previously discussed herein provide the permitting authority reasonable assurances of compliance with the reduced SO_2 emission limits.

The Department calculated corresponding SO_2 reductions as shown in the shaded columns below:

	SO_2 Emission Reduction	% Reduction	TPY Reduction
SAP No. 7	from 467 lb/hour to 400 lb/hour	14%	293
SAP No. 8	from 393.8 lb/hour to 315 lb/hour	20%	345
SAP No. 9	from 495.8 lb/hour to 425 lb/hour	14%	310

The Department proposes the escape BART SO_2 limitations for the SAPs to be the following:

SAP No.	lb/hour
7	400
8	315
9	425

Emissions of SO_2 shall not exceed 400 pounds per hour for No. 7 SAP, 315 pounds per hour for No. 8 SAP, and 425 pounds per hour for No. 9 SAP based on a 24-hour (daily) block average as determined by CEMS data.

This BART exemption determination requires the applicant to demonstrate compliance with the SO_2 emission standards and limitations on a continuous basis using the CEMS data. A 24-hour (daily) block average is aligned with the 24-hour averaging period used in the air quality modeling analysis for visibility.

SO_2 Control Technology

The Department accepts the applicant's proposed SO_2 control technology to reduce emissions by using the currently employed double absorption system with increased catalyst (vanadium) loadings and the replacement of the indicated select process equipment in the Nos. 7, 8 & 9 SAPs.

BART Exemption - SAM

Applicant's Proposed SAM BART Exemption

SAM Emission Standards and Limitations

The applicant proposed reduced SAM emission limitations for each SAP to escape BART. The applicant's proposed BART emission reductions for SAM in lb/hour & TPY equivalents were used in the PSD avoidance permit for the SAP No. 8 equipment, e.g., converter, superheater no. 3 & cold interpass exchanger, replacement project processed in the SWD Office, Permit No. 0570008-060-AC.

The applicant proposed the following reductions of SAM as demonstrated by stack test data:

	SAM Emission Reduction
SAP No. 7	from 16 lb/hour to 6.7 lb/hour
SAP No. 8	from 11.25 lb/hour to 5.6 lb/hour
SAP No. 9	from 14.2 lb/hour to 7.1 lb/hour

The applicant proposed stack test data to be used to demonstrate compliance.

The proposed new equivalent lb SAM/ton 100% H_2SO_4 values for SAP Nos. 7, 8, and 9 at design capacity for each SAP is 0.05 lb SAM/ton 100% H_2SO_4.

The applicant provided actual SAM stack test results from 2000 through 2007 (see Appendix E of the BART Additional Information Response dated July 9, 2007). The test results can be summarized as follows:

SAM Stack Test Data Review

	Test Ranges (2000 - 2007) lb SAM/ton, 3-hour average
SAP No. 7	0.02 - 0.04
SAP No. 8	0.02 - 0.06
SAP No. 9	0.01 - 0.04

A review of this historical SAM test data indicates that actual SAM emissions from the SAPs have ranged from 0.01 to 0.06 lb SAM/ton 100% H_2SO_4 produced. The existing standard of 0.12 lb SAM/ton 100% H_2SO_4 produced for SAP No. 7 and the standard of 0.10 lb SAM/ton 100% H_2SO_4 produced for SAP Nos. 8 & 9 therefore have been met within a significant margin; actual SAM emissions are very low.

Department's Preliminary SAM BART Exemption Determination

As shown by the stack test data above, the applicant can comply with the proposed SAM emission reductions with the current SAM control technology, demister pads. Demister pads are highly effective in removing SAM emissions thus controlling emissions of sulfuric particulate matter or PM/PM_{10}.

The Department calculated corresponding SAM reductions as shown in the shaded columns below:

	SAM Emission Reduction	% Reduction	TPY Reduction
SAP No. 7	from 16 lb/hour to 6.7 lb/hour	58%	40.7
SAP No. 8	from 11.25 lb/hour to 5.6 lb/hour	50%	24.8
SAP No. 9	from 14.2 lb/hour to 7.1 lb/hour	50%	31.1

The Department proposes the escape BART SAM limitations for the SAPs to be the following:

SAP No.	lb/hour
7	6.7
8	5.6
9	7.1

Emissions of SAM shall not exceed 6.7 pounds per hour for No. 7 SAP, 5.6 pounds per hour for No. 8 SAP, and 7.1 pounds per hour for No. 9 SAP based on a 3-hour average as demonstrated by stack test data.

The new equivalent lb SAM/ton 100% H_2SO_4 values for SAP Nos. 7, 8, and 9 at design capacity for each SAP is 0.05 lb SAM/ton 100% H_2SO_4. The equivalent lb/ton value corresponding to the lb/hour limits is less than the current existing standards. The equivalent tons per year (TPY) values for SAP Nos. 7, 8, and 9 are: 29.3 TPY; 24.5 TPY; and, 31.1 TPY, respectively. The air dispersion modeling was performed using a 24-hour (daily) average.

5. BART ANALYSIS AND PRELIMINARY BART EXEMPTION DETERMINATION FOR MOLTEN SULFUR STORAGE AND HANDLING SYSTEM -- STORAGE TANK NOS. 1, 2 & 3 AND STORAGE PIT NOS. 7, 8 & 9

This section provides the BART exemption determination for the following emissions units:

EU ID No.	Brief Description
-063	Molten Sulfur Storage and Handling System -- Storage Tank Nos. 1, 2 and 3
-066	Molten Sulfur Storage and Handling System -- Storage Pit No. 7
-067	Molten Sulfur Storage and Handling System -- Storage Pit No. 8
-068	Molten Sulfur Storage and Handling System -- Storage Pit No. 9

BART Exemption - SO_2

Preliminary BART Exemption Determination for SO_2

Applicant's Proposed SO_2 BART Exemption

The applicant's requested lower SO_2 and SAM emission limits for the SAP Nos. 7, 8 & 9 will reduce the facility's contribution of visibility impairment to below the exemption threshold of 0.5 dV. Therefore, no changes to the existing standards & limitations and air pollution control technology for these emissions units are necessary to meet the BART exemption.

The applicant estimated and used the following SO_2 emission rates in the air dispersion modeling (Table 2-4 in the BART exemption application):

	lb/hour
Storage Tank Nos. 1, 2 and 3	3.34
Storage Pit Nos. 7, 8 & 9	0.13

These estimated emissions were based upon the current throughput limitations. Molten sulfur from ships may be transferred to any combination of the three molten sulfur storage tanks at a combined maximum total of 2,277,081 tons of molten sulfur per any consecutive 12-month period. Each storage pit is allowed to transfer molten sulfur to each SAP at a maximum throughput rate of 492,361 tons per consecutive 12-month period.

Department's Preliminary SO_2 BART Exemption Determination

An increase in SO_2 emissions from these emission units could have triggered a BART determination. To preserve the current level of SO_2 emissions from these emissions units, the current throughput limitations corresponding to these SO_2 emission rates are established in the draft permit to maintain an exemption of these emissions units from BART. The molten sulfur transfer rate of 2,277,081 tons for the tanks is limited in the draft permit as well as the maximum throughput rate of 492,361 tons for the storage pits.

In summary, the proposed emission limitations for this facility to escape BART are as follows:

No. 7 SAP

SO_2
400 lb/hr 24-hour (daily) block average as demonstrated by certified CEMS data.
Equivalent to 3.0 lb SO_2/ton 100% H_2SO_4 produced and 1,752 TPY.

SAM
6.7 lb/hr as demonstrated by stack test data (3-hour average).
Equivalent to 0.05 lb/ton 100% H_2SO_4 produced, (3-hour average implied) and 29.3 TPY.

No. 8 SAP

SO_2
315 lb/hr 24-hour (daily) block average as demonstrated by certified CEMS data.
Equivalent to 2.8 lb SO_2/ton 100% H_2SO_4 produced and 1,380 TPY.

SAM
5.6 lb/hr as demonstrated by stack test data (3-hour average).
Equivalent to 0.05 lb/ton 100% H_2SO_4 produced, (3-hour average implied) and 24.5 TPY.

No. 9 SAP

SO_2
425 lb/hr 24-hour (daily) block average as demonstrated by certified CEMS data.
Equivalent to 3.0 lb SO_2/ton 100% H_2SO_4 produced and 1,862 TPY.

SAM
7.1 lb/hr as demonstrated by stack test data (3-hour average).
Equivalent to 0.05 lb/ton 100% H_2SO_4 produced, (3-hour average implied) and 31.1 TPY.

6. COMPARISON OF EXISTING AIR POLLUTION CONTROL TECHNOLOGY & MEASURES TO PROPOSED BART EXEMPTION AIR POLLUTION CONTROL TECHNOLOGY & MEASURES

This proposed BART exemption determination requires some new air pollution control measures as summarized below for the emissions units stated.

EU ID No.	Brief Description
-004	No. 7 Sulfuric Acid Plant
-005	No. 8 Sulfuric Acid Plant
-006	No. 9 Sulfuric Acid Plant

This proposed BART determination requires the use of the existing control technology - the double absorption system with increased catalyst (vanadium) loading, replacement of indicated process equipment, and the use of existing acid mist demister pads for SAP Nos. 7, 8 & 9.

In summary the following specific work activities are required under this project as outlined by the applicant in order to lower emissions to escape BART:

SAP No.	Work Activities
7	• Increase the catalyst loading ratio from 181 liters per ton H_2SO_4 per day (L/TPD) to 202 L/TPD {increases the current catalyst loading from approximately 578,000 liters to 647,000 liters}; and, • Replace the cold gas-to-gas heat exchanger.
8	• Increase the catalyst loading ratio from 175 L/TPD to 213 L/TPD {increases the current catalyst loading from approximately 472,000 liters to 575,000 liters. The 468,000 liters cited in the study was with the existing converter}; • Replace the cold gas-to-gas heat exchanger; • Replace the superheater; and, • Replace the converter with a larger one. Note: These work activities are permitted under Permit No. 0570008-060-AC.
9	• Increase the catalyst loading ratio from 149 L/TPD to 195 L/TPD {increases the current catalyst loading from approximately 508,000 liters to 663,000 liters}; and, • Install a heat recovery system (HRS) to replace the interpass absorption (IPA) tower.

This proposed BART exemption determination also requires the permittee to follow the best operational practices to minimize excess emissions during startup and shutdown as described in the most recent Title V air operation permit application in addition to the startup practices to minimize emissions of SO_2 and SO_3 currently in effect as outlined in the "Memorandum of Understanding Regarding Best Operational Start-up Practices for Sulfuric Acid Plants."

7. COMPARISON OF EXISTING EMISSION LIMITATIONS TO PROPOSED BART EXEMPTION EMISSION LIMITATIONS

This proposed BART exemption determination changes some existing emission limitations as summarized below for the emissions units stated.

EU ID No.	Brief Description
-004	No. 7 Sulfuric Acid Plant
-005	No. 8 Sulfuric Acid Plant
-006	No. 9 Sulfuric Acid Plant

Comparison Table for SAP Nos. 7, 8 & 9: Proposed Escape BART Emission Limits vs. Existing Emission Limits

The following table summarizes the proposed emission limits to escape BART for SO_2 & SAM emissions in terms of lb/ton 100% H_2SO_4 produced compared to the existing emission limits.

EU ID No.	Brief Description	Existing SO_2 emission limit	Proposed escape BART SO_2 emission limit	Existing SAM emission limit	Proposed escape BART SAM emission limit
-004	SAP No. 7	3.5 lb SO_2/ton 24- hour daily (block implied) average[1]	Equivalent to 3.0 lb SO_2/ton 24-hour (daily) block average[3]	0.12 lb SAM/ton	Equivalent to 0.05 lb SAM/ton
-005	SAP No. 8	3.5 lb SO_2/ton 24-hour block average[2]	Equivalent to 2.8 lb SO_2/ton 24-hour (daily) block average[3]	0.10 lb SAM/ton	Equivalent to 0.05 lb SAM/ton
-006	SAP No. 9	3.5 lb SO_2/ton 24-hour block average[2]	Equivalent to 3.0 lb SO_2/ton 24-hour (daily) block average[3]	0.10 lb SAM/ton	Equivalent to 0.05 lb SAM/ton

References:

[1] As determined by SO_2 CEMS. Originating from PSD-FL-250, specific condition 3. (issued 10/16/1998, expired 12/31/2001). Compliance by SO_2 CEMS not specifically reflected in 0570008-045-AV (issued 05/31/2006, expires 05/31/2011).

[2] As determined by SO_2 CEMS. Originating from PSD-FL-315, specific conditions 4. & 9. (issued 11/21/2001, expiration date extended to 12/1/2007). Compliance by SO_2 CEMS not specifically reflected in 0570008-045-AV (issued 05/31/2006, expires 05/31/2011).

[3] As determined by SO_2 CEMS data.

8. PRELIMINARY DETERMINATION

The Department makes a preliminary determination that the proposed project will comply with all applicable state and federal air pollution regulations regarding a BART exemption as conditioned by the Draft permit. This determination is based on a technical review of the complete application, all available information, reasonable assurances provided by the applicant, review of the visibility impact analysis and the conditions specified in the Draft permit. The Draft permit contains specific conditions to provided reasonable assurances of compliance with the applicant's proposed work to escape and remain exempt from a BART determination.

Mr. Scott M. Sheplak, P.E. is the project engineer responsible for reviewing the application, writing this TE&PD and drafting the permit. He may be contacted at scott.sheplak@dep.state.fl.us and 850/921-9532. Mr. Tom Rogers is the project meteorologist responsible for reviewing the air dispersion modeling analysis for visibility. He may be contacted at tom.rogers@dep.state.fl.us and 850/921-9554.

References

[1] World wide web site. Department of Environmental Protection. http://www.dep.state.fl.us/air/eproducts/apds/default.asp Facility ID # 0570008. Accessed on February 24, 2009.

[2] Table 2-2 BART Eligibility Analysis in APPENDIX A - Revised Air Modeling Protocol for Riverview Facility submitted with Air Construction Permit Application dated January 31, 2007.

[3] World wide web site. Department of Environmental Protection. http://www.dep.state.fl.us/air/eproducts/apds/default.asp Permit Number 0570008-045-AV, Appendix H-1: Permit History. Accessed on October 17, 2007.

[4] World wide web site. Department of Environmental Protection. http://www.dep.state.fl.us/air/eproducts/apds/default.asp Facility ID # 0570008. Accessed on February 24, 2009.

[5] World wide web site. Department of Environmental Protection. http://www.dep.state.fl.us/air/eproducts/apds/default.asp Facility ID # 0570008. Accessed on February 24, 2009.

[6] Haldor Topsoe Inc., Sulphuric Acid Catalyst, VK Series product brochure provided in the Additional Information Response from Mosaic dated September 30, 2008. Also, world wide web site. Haldor Topsoe Inc., Sulphuric Acid Catalyst, VK Series. http://www.topsoe.com/Business_areas/Sulphuric_acid/~/media/PDF%20files/Sulphuric_acid/Topsoe_VK_catalysts_series.ashx Accessed on February 25, 2009.