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**BART EXEMPTION ANALYSIS
FOR
MOSAIC FERTILIZER, LLC
NEW WALES FACILITY**

Prepared For:

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LIST OF ACRONYMS AND ABBREVIATIONS

BART	Best Available Retrofit Technology
CALMET	California Meteorological Model
CALPUFF	California Puff
CAA	Clean Air Act
CFR	Code of Federal Regulations
dv	deciview
EPA	U.S. Environmental Protection Agency
F.A.C.	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
gr/dscf	grains per dry standard cubic foot
H ₂ SO ₄	sulfuric acid
IMPROVE	Interagency Monitoring of Protected Visual Environments
km	kilometer
lb/hr	pounds per hour
lb/ton	pounds per ton
NP	National Park
NPS	National Park Service
NWA	National Wilderness Area
PM	particulate matter
PSD	prevention of significant deterioration
RHR	1999 Regional Haze Rule
SAM	sulfuric acid mist
SAP	sulfuric acid plant
SO ₂	sulfur dioxide
SO ₃	sulfur trioxide
TPD	tons per day
UTM	Universal Transverse Mercator

1.0 INTRODUCTION

Pursuant to Section 403.061(35), Florida Statutes, the Federal Clean Air Act (CAA), and the regional haze regulations contained in Title 40, Part 51 of the Code of Federal Regulations (40 CFR 51), Subpart P – Protection of Visibility, the Florida Department of Environmental Protection (FDEP) is required to ensure that certain sources of visibility-impairing pollutants in Florida use Best Available Retrofit Technology (BART) to reduce the impact of their emissions on regional haze in Federal Class I areas. Requirements for individual source BART control technology determinations and for BART exemptions are contained in Rule 62-296.340 of the Florida Administrative Code (F.A.C.).

Rule 62-296.340(5)(c), F.A.C., states that a BART-eligible source may demonstrate that it is exempt from the requirement for a BART determination for all pollutants by performing an individual source attribution analysis in accordance with the procedures contained in 40 CFR 51, Appendix Y. A BART-eligible source is exempt from BART determination requirements if its contribution to visibility impairment, as determined below, does not exceed 0.5 deciview (dv) above natural conditions in any Class I area.

FDEP has adopted the U.S. Environmental Protection Agency's (EPA's) visibility protection guidelines contained in 40 CFR 51, Subpart P. Based on the guidelines, the 98th percentile, i.e., the 8th highest 24-hour average visibility impairment value in any single year, or the 22nd highest 24-hour average visibility impairment value over 3 years combined, whichever is higher, is compared to 0.5 dv in the source attribution analysis.

This report is submitted to FDEP to present the source attribution analysis for the Mosaic Fertilizer, LLC (Mosaic) New Wales facility, which is a BART-eligible source with multiple BART-eligible emissions units. The BART-eligible source includes the following emissions units with the potential to emit at least 50 tons per year (TPY) or more of a visibility-impairing pollutant:

- EU002 - Sulfuric Acid Plant (SAP) No. 1;
- EU003 - SAP No. 2;
- EU004 - SAP No. 3;
- EU009 - Diammonium Phosphate (DAP) Plant No. 1;
- EU011 - Monoammonium Phosphate (MAP) Plant;
- EU027 - Animal Feed Ingredient (AFI) Plant; and
- EU036 - Multifos A and B Kilns, Dryer, and Blending Operation.

The rest of the BART-eligible, non-fugitive emissions units at the New Wales facility are sources with relatively low PM emissions only.

Mosaic is proposing two emission reduction scenarios for the BART-eligible emissions units at the New Wales facility. For each of the emissions reduction scenarios, the New Wales facility is exempt from BART because its contribution to visibility impairment does not exceed 0.5 dv above natural conditions in any Class I area. The objective of this analysis is to demonstrate that the Mosaic New Wales facility, with either of the emission reduction scenarios, is exempt from BART determination.¹

This report contains a description of the BART-eligible emissions units and proposed limits, the visibility modeling methodology, and the visibility modeling analysis results for the facility. The source information and methodologies used for the BART exemption analysis are presented in the document entitled "Air Modeling Protocol to Evaluate BART Options for the Mosaic New Wales Facility", which is included as Appendix A to this report. This Protocol is a revised version of the modeling protocol document entitled "Revised Air Modeling Protocol to Evaluate BART Options for Affected Mosaic Fertilizer Facilities", submitted with the BART Determination Analysis for the Mosaic New Wales facility in January 2007.

FDEP permit application forms are provided in Appendix B. The purpose of these forms is to request that the proposed lower emission limits for each emissions reduction scenario be incorporated into an air construction permit for the Mosaic New Wales facility, in order to make the limits federally enforceable, and thereby formally exempt this facility from BART.

¹ Mosaic originally submitted a BART application to FDEP in January 2007. The January 2007 application was submitted prior to Mosaic's decisions to reduce SO₂ and SAM emissions and, therefore, did not demonstrate a basis for BART exemption. At the reduced emission levels; however, Mosaic should be considered exempt from BART and upon FDEP's concurrence, the prior application may be considered superseded by this exemption application.

2.0 DESCRIPTION OF BART-ELIGIBLE EMISSIONS UNITS

The Mosaic New Wales facility is a phosphate fertilizer manufacturing complex, which processes phosphate rock into several different fertilizer products and animal feed ingredients. The facility operates five SAPs, three PAPs, three DAP plants, a MAP plant, a granular monoammonium phosphate (GMAP) plant, an AFI plant, a Multifos production plant, a molten sulfur system, phosphoric acid clarification and storage area, and a phosphogypsum stack.

The New Wales facility is located near Mulberry in Polk County, Florida, and is currently operating under the Title V Permit No. 1050059-045-AV, which was issued on February 14, 2008. An area map showing the facility location and prevention of significant deterioration (PSD) Class I areas located within 300 kilometers (km) of the facility is presented in Figure 1-1 of the BART Modeling Protocol (see Appendix A). The PSD Class I areas and their distances from the New Wales facility are as follows:

- Chassahowitzka National Wilderness Area (NWA) – 104 km; and
- Everglades National Park (NP) – 226 km; and

The Universal Transverse Mercator (UTM) coordinates of the New Wales facility are approximately 396.6 km east and 3,078.9 km north in UTM Zone 17.

Based on the BART applicability analysis contained in the Protocol, a total of 32 BART-eligible emissions units have been identified at the New Wales facility. Four of these emit no visibility-impairing pollutants; i.e., sulfur dioxide (SO₂), nitrogen oxides (NO_x), or particulate matter with an aerodynamic diameter equal to or less than 10 micrometers (PM₁₀). One emissions unit represents “facility-wide fugitive emissions”. Among the BART-eligible, non-fugitive emissions units that emit visibility-impairing pollutants (SO₂, NO_x, or PM₁₀) at the New Wales facility, only seven are large with the potential to emit at least 50 TPY or more, as identified in Section 1.0. A detailed description of these BART-eligible emissions units at the New Wales facility is presented in the following sections.

2.1 SAP Nos. 1, 2, and 3 (EU002, EU003, and EU004)

SAP Nos. 1, 2, and 3 at the New Wales facility are double-absorption plants, each with the capacity to produce 3,400 tons per day (TPD) of 100-percent sulfuric acid (H₂SO₄). In the acid-making process, molten sulfur is combusted (oxidized) with dry air in the sulfur furnace. The resulting SO₂ gas is catalytically converted (further oxidized) to sulfur trioxide (SO₃) over a catalyst bed in a converter tower.

The SO₃ is then absorbed in sulfuric acid. The remaining SO₂, not previously oxidized, is passed over a final converter bed of catalyst and the SO₃ produced is then absorbed in H₂SO₄. The remaining gases exit to the atmosphere through a high-efficiency mist eliminator. The plants also incorporate a waste heat boiler system for generating steam from the heat produced by the combustion of molten sulfur and by the catalytic conversion of SO₂ to SO₃.

The current 24-hour average SO₂ emission limit for each of the three plants is 3.5 pounds per ton (lb/ton) of 100 percent H₂SO₄, equivalent to 496 pounds per hour (lb/hr). The current sulfuric acid mist (SAM) and NO_x emission limits for each of the SAP Nos. 1, 2, and 3 are 0.10 lb/ton and 0.12 lb/ton of 100 percent H₂SO₄, respectively, equivalent to 14.2 lb/hr and 17.0 lb/hr, respectively.

2.2 DAP Plant No. 1 (EU009)

The DAP Plant No. 1 at the New Wales facility produces MAP or DAP at a maximum rate of 150 tons per hour (TPH). The plant consists of a reactor, granulator, dryer, cooler, and associated equipment. Emissions are controlled by three parallel venturi scrubbers followed by a common cyclonic scrubber with impact spraying system. Emissions from the reactor and granulator are controlled by a pre-scrubber, the reactor/granulator (R/G) venturi scrubber, and the common cyclonic scrubber with an impact spraying system. Emissions from the dryer are controlled by its dedicated cyclones, the dryer venturi scrubber, and the common cyclonic scrubber. Emissions from the cooler are controlled by its own dedicated cyclones, the cooler venturi scrubber, and the common cyclonic scrubber. Emissions from the associated equipment vents are controlled by cyclones and the cooler venturi scrubber. The venturi scrubbers use process acid. The impact spraying system for the common cyclonic scrubber uses recirculating water. Particulate matter (PM) emissions from DAP Plant No. 1 are limited to 28.6 lb/hr.

2.3 MAP Plant (EU011)

The MAP plant at the New Wales facility produces MAP at a maximum rate of 50 TPH or 1,200 TPD. Emissions from the MAP plant are controlled by a venturi scrubber and a cyclonic demister. PM emissions from the MAP plant are limited to 0.3 lb/ton of MAP, equivalent to 15.0 lb/hr.

2.4 AFI Plant (EU027)

The AFI Plant at the New Wales facility produces up to 120 TPH of animal feed. The plant consists of a reactor, pug mill, granulator, dryer, screening system, and cooler. The dryer has a maximum heat input

rate of 135 million British thermal units per hour (MMBtu/hr) and is fired with natural gas or new, No. 6 or better grade fuel oil. PM emissions from the AFI Plant are controlled by a series of cyclones followed by four parallel venturi scrubbers and fans venting to a common stack. PM emissions from the AFI Plant are limited to 36.8 lb/hr.

2.5 Multifos A and B Kilns, Dryer and Blending Operation (EU036)

The Multifos Plant consists of a phosphate rock dryer, a blending operation, a storage building, a pug mill, coolers, crushers, screens, mills, and three defluorination kilns designated as Kiln "A", Kiln "B", and Kiln "C" (Emission Unit 074).

The dryer, fired with either natural gas or No. 6 fuel oil, dries wet phosphate rock. The dried phosphate rock is normally stored in a hopper prior to the blending operation. The blending operation combines dried phosphate rock with soda ash and phosphoric acid in the pug mill to produce a mixed feed, which is then sent to the mixed feed storage building. From storage, the mixed feed is transferred to the common kiln feed conveyor system. Each of Kilns A and B are capable of being fired by either natural gas or No. 6 fuel oil. Emissions from the dryer, the blending operation, and Kilns A and B are controlled by three separate packed bed scrubbers connected to a common stack.

Total annual production rate of Kilns "A" and "B" combined is limited to 140,000 TPY of Multifos. The process input rate to each Kiln "A" and Kiln "B" is limited to 15 TPH, which is equivalent to 5.7 TPH of P_2O_5 . Maximum heat input rate of the dryer is limited to 15 MMBtu/hr. Each of the kilns has a maximum heat input rate of 56 MMBtu/hr. PM emissions from the Multifos "A" and "B" kilns, dryer, and blending operation are limited to 29.83 lb/hr.

2.6 Other BART Eligible Units (EUs 15, 23 to 28, 29 to 35, 38, 52, 55, 63, & 66 to 68)

Other BART-eligible emissions units at the New Wales facility consist of the following:

- AFI truck loadout system (EU015);
- AFI storage silos north and south sides (EUs 023 and 028);
- AFI railcar loadout system (EU024);
- AFI limestone storage silos (EU025);
- AFI silica storage bin (EU026);
- AFI limestone feed bin (EU052);

- Multifos soda ash unloading (EU030);
- Multifos soda ash conveying (EU031);
- Multifos “A” and “B” kiln coolers (EUs 032 & 033);
- Multifos “A” and “B” kilns milling and sizing – East and West baghouses (EUs 034 and 035);
- Multifos “A” and “B” kilns milling and sizing – surge bin (EU 038);
- MAP plant cooler (EU 055);
- 1,500-Ton truck unloading sulfur pit (EU 063);
- 200-Ton molten sulfur transfer pit (EU 066); and
- 1,500-Ton truck unloading sulfur pit, front and rear vents (EUs 067 and 068).

Except for the molten sulfur pits (EUs 063, 066, 067, and 068), all of these emissions units emit only PM and the PM emission rates are very low (less than 5 lb/hr each). The PM emission rates of these units are presented in Table 2-3 of the BART Protocol. As noted in the Title V Permit No. 1050059-045-AV, the molten sulfur pits each emit 0.2 lb/hr or less of PM and 0.3 lb/hr or less of SO₂.

2.7 Emission Reduction Scenarios

2.7.1 Scenario A

Emission reductions proposed in Scenario A are summarized below:

- SAM emissions from SAP Nos. 1, 2, and 3 each are reduced from 14.0 to 7.1 lb/hr;
- DAP Plant No. 1 (EU 009) and AFI Plant (EU 027) dryers are fired using only natural gas (except for periods of natural gas curtailments);
- Shutdown of Kiln A and B (including associated coolers) of the Multifos Plant (EU 036);
- PM emissions from the DAP Plant No. 1 reduced from 28.6 to 15 lb/hr; and
- PM emissions from the MAP plant reduced from 15 lb/hr to 7 lb/hr.

The proposed unit-specific emissions reductions are described below:

SAP Nos. 1, 2, and 3

Under Scenario A, Mosaic is proposing to lower the SAM emission limits for SAP Nos. 1, 2, and 3 in order to meet the BART exemption criteria, as follows:²

- SAM emissions from SAP Nos. 1, 2, and 3 each are reduced from 14.0 lb/hr to 7.1 lb/hr.

The total proposed reduction in allowable SAM emissions is 20.7 lb/hr.

Most of the actual SAM emission rates from the SAPs are lower than the proposed 7.1 lb/hr, as shown in Table 2-1, which summarizes the recent test data from the SAPs. The control strategy described below will insure that the proposed lower SAM limits will be met consistently.

Mosaic's intended strategies for achieving the lower SAM emission rates on the SAPs are as follows. Currently, SAP No. 3 employs Brownian-type candles for mist elimination, while SAP Nos. 1 and 2 employ impaction media in the form of high velocity (HV) panels for mist elimination. Under Scenario A, SAP Nos. 1 and 2 will install Brownian-type candles during upcoming turnarounds when the final towers in the SAPs are replaced. These are currently planned for June 2009 for SAP No. 1, and June 2011 for SAP No. 2 (subject to change).

Although Mosaic is currently planning to install Brownian diffusion-type candles on SAPs No. 1 and 2, and maintaining the current Brownian-type candles on SAP No. 3, if these technologies are later deemed by Mosaic to be insufficient, Mosaic may consider other technologies, and Mosaic requests that the air construction permit reflect this flexibility.

Mosaic is not proposing any reduction in SO₂ or NO_x emissions rates from the SAPs under Scenario A.

DAP Plant No. 1 (EU 009)

Mosaic is proposing to use only natural gas fuel (except for periods of natural gas curtailment) in the DAP Plant No. 1 dryer, which is currently permitted to burn both natural gas and fuel oil. Mosaic is also proposing to reduce the PM emission rate from the current 28.6 lb/hr to 15 lb/hr. Recent PM test data

² Although Mosaic is not proposing lower SAM emissions in terms of lb/ton of H₂SO₄ produced (since the BART limit should be a 24-hour daily limit on mass emissions), the equivalent SAM emission rate in terms of lb/ton H₂SO₄ produced for each SAP at full production rate is 0.05 lb/ton H₂SO₄.

from the DAP Plant are shown in Table 2-2, and the data show that the actual PM emission rates are lower than the proposed 15 lb/hr. Other criteria pollutant emission rates due to natural gas firing in the DAP Plant dryer are presented in the BART Modeling Protocol in Appendix A.

MAP Plant (EU 011)

Mosaic is proposing to reduce the PM emission rate from the MAP plant from the current 15 lb/hr to 7 lb/hr. Recent test data, summarized in Table 2-2, indicate actual emission rates are lower than 7 lb/hr.

AFI Plant (EU 027)

Mosaic is proposing to use only natural gas fuel (except for periods of natural gas curtailment) in the AFI Plant dryer, which is currently permitted to burn both natural gas and fuel oil. Criteria pollutant emission rates due to natural gas firing in the AFI Plant dryer are presented in the BART Modeling Protocol in Appendix A. Mosaic is not proposing any change to the currently permitted PM emission limit of 36.8 lb/hr from the AFI Plant. Recent PM test data are summarized in Table 2-2.

Multifos A & B Kilns, Dryer and Blending Operation (EU 036)

Under Scenario A, Mosaic is proposing to shutdown the Multifos A and B Kilns and their respective coolers, which means shutdown of the following BART-eligible units that are part of the Multifos A and B system:

- Multifos "A" Kiln Cooler (EU 032);
- Multifos "B" Kiln Cooler (EU 033); and
- Multifos A and B Kilns in Emission Unit 036.

The reduction in PM emissions resulting from these shutdowns total 36.2 lb/hr, the reduction in SO₂ emissions is 316 lb/hr, the reduction in NO_x emissions is 45.7 lb/hr, and the reduction in SAM emissions is 4.2 lb/hr.

2.7.2 Scenario B

Emissions reductions proposed in Scenario B are summarized below:

- SO₂ emissions from SAP Nos. 1, 2, and 3 each are reduced from 496 to 400 lb/hr (daily average);
- SAM emissions from SAP Nos. 1, 2, and 3 each are reduced from 14.0 to 6.7 lb/hr;
- NO_x emissions from SAP Nos. 1, 2, and 3 each are reduced from 17 to 16 lb/hr;
- DAP Plant No. 1 (EU 009) and AFI Plant (EU 027) dryers are fired using only natural gas (except for periods of natural gas curtailment);
- Multifos A and B Kilns dryer is fired with only natural gas (except for periods of natural gas curtailment) and PM emissions are reduced from 29.8 lb/hr to 25.0 lb/hr;
- SO₂ emissions from the Multifos A and B Kilns dryer (EU 036) reduced from 316 lb/hr to 25 lb/hr;
- PM emissions from the DAP Plant No. 1 reduced from 28.6 to 15 lb/hr; and
- PM emissions from the MAP Plant reduced from 15 to 7 lb/hr.

The proposed unit-specific emissions reductions are described below.

SAP Nos. 1, 2, and 3

Under Scenario B, Mosaic is proposing to lower the permitted daily maximum production capacity and 24-hour daily average SO₂ emission limits for the all three SAPs, in order to meet the BART exemption criteria, as follows:³

- SAP Nos. 1, 2, and 3 – maximum daily production reduced from 3,400 TPD to 3,200 TPD of H₂SO₄; SO₂ emission reduction from 496 lb/hr to 400 lb/hr (daily average) each.

The total proposed reduction in allowable SO₂ emissions is 288 lb/hr.

Mosaic has developed intended strategies for achieving the lower SO₂ emission rates on the SAPs. These strategies are described below for each SAP.

³ Although Mosaic is not revising the existing SO₂ emission limits in terms of lb/ton H₂SO₄ produced (since the BART limit should be a 24-hour daily limit on mass emissions), for informational purposes only, the approximate equivalent lb/ton emission rate at full production rate for each SAP is 3.0 lb/ton H₂SO₄.

SAP No. 1- During the currently scheduled January 2012 turnaround, the standard vanadium catalyst loading will be increased from the current approximate 498,400 liters to approximately 610,000 liters. This will increase the catalyst loading ratio from approximately 147 liters per ton H_2SO_4 per day (L/TPD) at 3,400 TPD production capacity to approximately 190 L/TPD at 3,200 TPD production capacity. In addition, during the planned June 2009 turnaround, the interpass absorption (IPA) tower will be replaced with a heat recovery system (HRS) tower. Although this change is not necessary to achieve the proposed lower SO_2 emission rate, the Final Absorption Tower is 33 years old, and is in need of replacement. It therefore is appropriate to convert to the HRS tower at this time in order to improve energy recovery in the SAP and increase steam generation. At this time, the IPA tower will become the final absorption tower with the Brownian Candles installed, and the existing final tower will be removed. During the planned January 2012 turnaround, the sulfur furnace, and the drying tower will be replaced. The current estimated cost to perform this work is approximately \$38 million including the HRS tower. A flow diagram of the SAP Nos. 1, 2 and 3, which indicate the proposed configurations, are included with the permit application form attached.

SAP No. 2- During the scheduled June 2011 turnaround, the standard vanadium catalyst loading will be increased from the current approximate 498,400 liters to approximately 610,000 liters. This will increase the total catalyst loading ratio from approximately 147 L/TPD at 3,400 TPD daily production capacity to approximately 190 L/TPD at 3,200 TPD production capacity. In addition, during the June 2011 turnaround, the IPA tower will be replaced with an HRS absorption tower, the drying tower will be replaced, and the sulfur furnace will be replaced. Although the IPA tower replacement not necessary to achieve the proposed lower SO_2 emission rate, the Final Absorption Tower is 33 years old, and is in need of replacement. It therefore is appropriate to convert to the HRS tower at this time in order to improve energy recovery in the SAP and increase steam generation. At this time, the IPA tower will become the final absorption tower with the Brownian Candles installed, and the existing final absorption tower will be removed (see attached flow diagram). The current estimated cost to perform this work is approximately \$38 million.

SAP No. 3- During the currently scheduled January 2010 turnaround, the standard vanadium catalyst loading will be increased from the current approximate 535,200 liters to approximately 610,000 liters. This will increase the catalyst loading ratio from approximately 157 L/TPD at 3,400 TPD production capacity to approximately 190 L/TPD at 3,200 TPD production capacity. The current estimated cost to perform this work is approximately of \$500,000.

Mosaic has been working with their catalyst supplier (Haldor Topsoe) to provide assurances that the proposed catalyst loadings are expected to meet the proposed SO₂ emission limits. The supplier has responded with a study which confirms that the proposed catalyst loadings, using all vanadium catalyst, are expected to achieve an SO₂ emission rate of 2.8 to 3.0 lb/ton H₂SO₄ (see Appendix C). The catalyst volumes in the study were based on 3,400 TPD production rates; therefore, Mosaic adjusted the volumes for 3,200 TPD production. Notwithstanding this study, Mosaic may include various types of catalyst and/or different catalyst loadings in order to achieve the desired SO₂ emissions.

It is not possible to achieve the proposed emission rates while achieving the maximum permitted production rate with the existing catalyst volume, assuming standard vanadium catalyst. If some volume of cesium catalyst were used, the proposed emission reductions are likely possible with the existing volume. However, Mosaic has determined it is more cost effective to use a larger catalyst volume with standard catalyst versus using cesium catalyst.

The purpose of the proposed changes is to meet the lower SO₂ emission limits while maintaining the current production capability. It is not expected that the SAPs will operate any longer due to these changes. The SAPs are expected to run in the same manner they are operating now. [Note that SAP Nos. 1, 2 and 3 recently completed construction (January 2008) under a PSD permit (PSD-FL-325) which authorized an increase in production rate from 2,900 TPD H₂SO₄ to 3,400 TPD.] Annual operation is highly dependent on turnaround schedules. Operating hours for each SAP are higher in years which do not experience turnarounds. The times between turnarounds are dependent on many factors, such as dust build-up in the catalyst beds. The higher catalyst loadings proposed for the SAPs could result in catalyst fouling quicker, which would decrease operating time. The times between turnarounds could either increase or decrease based on these factors. However, the turnaround schedule for each of the SAPs is approximately 30 months from the last turnaround, and the planned turnaround schedule for the future also reflects this, as shown in Table 2-3.

Mosaic will demonstrate compliance with the new proposed lb/hr limits by using the existing CEMS for SO₂, along with monitoring of daily H₂SO₄ production for each plant. The CEMS is already capable of providing these data.

Under Scenario B, Mosaic is also proposing to lower the SAM emission limits for the all three SAPs, in order to meet the BART exemption criteria, as follows:⁴

- SAP Nos. 1, 2 and 3 – SAM reduction from 14.0 lb/hr to 6.7 lb/hr each.

The total proposed reduction in allowable SAM emissions is 21.9 lb/hr.

Most of the actual SAM emission rates from the SAPs are lower than the proposed 6.7 lb/hr, as shown in Table 2-1, which summarizes the recent test data from the SAPs. The control strategy described below will insure that the proposed lower SAM limits will be met consistently.

Mosaic's intended strategy for achieving the lower SAM emission rates on the SAPs is to use the current control technology, described as follows. Currently, SAP No. 3 employs Brownian-type candles for mist elimination, while SAP Nos. 1 and 2 employ impaction media in the form of HV panels for mist elimination. Under Scenario B, SAP Nos. 1 and 2 will install Brownian-type candles during upcoming turnarounds when the final towers in the SAPs are replaced. These are currently planned for June 2009 for SAP No. 1, and June 2011 for SAP No. 2 (subject to change).

Although Mosaic is currently planning to install Brownian diffusion-type candles on SAPs No. 1 and 2, and to maintain the current Brownian-type candles on SAP No. 3, if these technologies are later deemed by Mosaic to be insufficient, Mosaic may consider other technologies, and Mosaic requests that the air construction permit reflect this flexibility.

Mosaic is not proposing any reduction in NO_x emissions rates from the SAPs in terms of lb/ton; however, since the production rate of the SAPs are decreasing, the allowable emissions are decreasing from 17 to 16 lb/hr.

DAP Plant No. 1 (EU 009)

Mosaic is proposing to use only natural gas fuel (except during periods of natural gas curtailments) in the DAP Plant No. 1 dryer, which is currently permitted to burn both natural gas and fuel oil. Mosaic is also proposing to reduce the PM emission rate from the current 28.6 to 15 lb/hr. Recent test data from the

⁴ Although Mosaic is not proposing lower SAM emissions in terms of lb/ton of H₂SO₄ produced (since the BART limit should be a 24-hour daily limit on mass emissions), the equivalent SAM emissions in terms of lb/ton H₂SO₄ produced for each SAP are 0.05 lb/ton H₂SO₄.

DAP Plant No. 1 are summarized in Table 2-2. As shown, the actual PM rates are lower than the proposed 15 lb/hr. Other criteria pollutant emission rates due to natural gas firing in the DAP Plant dryer are presented in the BART Modeling Protocol in Appendix A.

MAP Plant (EU 011)

Mosaic is proposing to reduce the PM emission rate from the MAP plant from the current 15 lb/hr to 7 lb/hr. Recent test data, summarized in Table 2-2, indicate actual rates are lower than 7 lb/hr.

AFI Plant (EU 027)

Mosaic is proposing to use only natural gas fuel (except during periods of natural gas curtailments) in the AFI Plant dryer, which is currently permitted to burn both natural gas and fuel oil. Criteria pollutant emission rates due to natural gas firing in the DAP Plant dryer are presented in the BART Modeling Protocol in Appendix A. Mosaic is not proposing any change to the currently permitted PM emission limit of 36.8 lb/hr from the AFI Plant. Recent test data from the AFI Plant are summarized in Table 2-2.

Multifos A & B Kilns, Dryer and Blending Operation (EU 036)

Under Scenario B, Mosaic is proposing to use only natural gas (except during periods of natural gas curtailments) in the Multifos A and B Kilns dryer and proposing the following PM and SO₂ emissions limits:

- PM – reduction from 29.8 lb/hr to 25 lb/hr; and
- SO₂ – reduction from 316.0 lb/hr to 25 lb/hr.

Stack test data summary for the Multifos A and B Kilns stack, presented in Table 2-2, shows hourly PM emission rates well below 25 lb/hr.

Currently there is no SO₂ emission limit for the Multifos A and B Kilns. The Multifos Kiln C, which has a scrubber, has a SO₂ emissions limit of 9.11 lb/hr. Mosaic is proposing to install a scrubber for Multifos A and B stack and proposes an SO₂ emission limit of 25 lb/hr based on the current limit for the C Kiln. SO₂ emissions data from Kiln C are shown in Table 2-2. As shown, the SO₂ emissions are below the proposed limit for A and B Kilns of 25 lb/hr.

2.7.3 Implementation of New Emission Limits

Mosaic has described above two emission reduction scenarios, and its tentative plans to meet the new emission limits on the BART-eligible units in order to meet the BART exemption criteria. Mosaic has presented two different scenarios because the shutdown of the Multifos A and B Kilns depends on market research, future demand, economics, and other factors. The decision will be made to implement Scenario A or B no later than January 1, 2010.

Scenario A, which includes Multifos A and B Kilns shutdown, also includes lower SAM emissions from the SAPs and lower PM emissions from the MAP Plant and DAP Plant No. 1. Scenario B, with the continuing operation of the Multifos unit, includes lower daily average SO₂ and SAM emissions rates from the SAPs in addition to lower PM emission rates from the Multifos A and B Kilns, MAP Plant and DAP Plant No. 1, and a lower SO₂ emission rate from the Multifos A and B Kilns. This scenario also includes a new scrubber for each of the Multifos A and B Kilns in order to meet the lower SO₂ limit.

Changes are anticipated to the SAM mist elimination systems employed on the SAPs; although, Mosaic requests flexibility in the construction permit if alternative technology is deemed beneficial by Mosaic. Mosaic also requests the flexibility to choose strategies from both scenarios, if necessary in order to meet the exemption criteria.

The BART regulations require sources to comply with any BART emission limits as expeditiously as practical, but no later than December 31, 2013. Mosaic intends to meet this requirement by implementing the proposed changes to the SAPs during the identified turnaround of each SAP. The current schedule for each of these turnarounds is shown in Table 2-2 (2012 for SAP No. 1; 2011 for SAP No. 2, and 2012 for SAP No. 3). Turnarounds are the only mechanism by which Mosaic can implement the proposed changes on the SAPs. Due to the nature of the proposed changes, they require significant downtime. Also note that turnaround schedules can change based on changes in design/build schedules.

Under Scenario B, the SAPs will comply with the BART emission limits by January 1, 2013. The Multifos Kilns A and B will comply with its lower emission limits as expeditiously as practicable after January 1, 2010.

As discussed above, Mosaic may include various types of catalyst and/or different catalyst loadings in order to achieve the desired SO₂ emissions from the SAPs, while it is believed that the changes to the SAM mist elimination systems will be sufficient to meet the BART emission limits. However, additional

issues may arise or problems identified, requiring a modified approach. More in-depth engineering studies will be performed prior to the respective SAP turnarounds to address any such issues.

It should be recognized that even with the best planning, actual operation after the proposed changes are implemented may not immediately meet the goals of the projects. Process equipment operating rates, flow rates, etc., may need to be optimized through actual operation to fully meet the goals, and additional equipment or catalyst may be necessary. Therefore, the new emission limits may not be fully achieved until sometime after the turnarounds. In any event Mosaic will meet the regulatory deadline of December 31, 2013, for compliance with the BART exemption emission limits.

2.8 PSD Applicability

The purpose of all the physical changes described in this BART Exemption application is to meet the BART exemption criteria. The only physical changes to the BART-eligible emissions units proposed in this application are those to the SAPs (other than changes to the air pollution control system such as the addition of the scrubber to the Multifos A and B Kilns). The purpose of these changes is to meet lower SO₂ emission limits. Some of the changes would be conducted in the absence of BART as routine maintenance, repair or replacement. Mosaic has not used production rate increases to internally justify any of these changes. Due to the lower SO₂ limits, short term H₂SO₄ production from the SAPs may actually decrease. This is because there is a correlation between SO₂ emissions and production rate in a SAP.

Mosaic is proposing to reduce SO₂ emissions, but is not requesting any increase in the permitted H₂SO₄ production rates of the SAPs, and is actually lowering the permitted production rate of SAP Nos. 1, 2, and 3 from 3,400 TPD to 3,200 TPD. The SAP Nos. 1, 2 and 3 at New Wales were issued PSD air construction permit PSD-FL-325 on July 12, 2002. Construction was completed on these projects at different times. However, these three SAPs have routinely achieved up to the 3,200 TPD production rate since completing the converter replacements on these plants. To demonstrate this, Mosaic reviewed the daily production data since those times. The results are presented in Figures 2-1, 2-2, and 2-3. The data show the following:

- SAP No. 1 has achieved 90 percent or more of the proposed maximum production rate of 3,200 TPD on 453 days and more than 95 percent of the proposed rate on 45 days between May 2004 (date of converter replacement) and September 1, 2008.

- SAP No. 2 has achieved 90 percent or more of the proposed maximum production rate of 3,200 TPD on 367 days, and more that 95 percent of the proposed rate on 290 days between January 2007 (date of converter replacement) and September 1, 2008.
- SAP No. 3 has achieved 90 percent or more of the proposed maximum production rate of 3,200 TPD on 91 days and more that 95 percent of the proposed rate on 2 days between October 2005 (date of converter replacement) and September 1, 2008.

These data demonstrate that the three SAPs are currently physically capable of achieving the proposed maximum production rates, and therefore any difference in annual emissions would be the result of fluctuations in demand or other factors and would not be caused by the proposed changes. Mosaic is not requesting any increase above the current physical capacity of the plants. Mosaic is requesting reductions in allowable SO₂ emissions in order to become BART-exempt. As a result, the project will not trigger PSD review.

**TABLE 2-1
SUMMARY OF RECENT EMISSION TESTS AT THE SULFURIC ACID PLANTS, MOSAIC NEW WALES FACILITY**

Test Date	Unit	Average Process Rate (TPD H ₂ SO ₄)	SO ₂		H ₂ SO ₄		NO _x	
			avg lb/hr	avg lb/ton H ₂ SO ₄ ^a	avg lb/hr	avg lb/ton H ₂ SO ₄ ^a	avg lb/hr	avg lb/ton H ₂ SO ₄ ^a
<u>SAP No. 1</u>								
01/31/2002	SAP 01	2501.0	414.0	3.97	4.00	0.038	--	--
02/27/2003	SAP 01	2548.0	307.0	2.89	10.00	0.094	6.3	0.06
04/09/2003	SAP 01	2649.0	383.1	3.47	--	--	--	--
06/09/2004	SAP 01	3024.0	419.0	3.33	5.50	0.044	7.8	0.06
06/28/2005	SAP 01	2917.0	394.9	3.25	2.66	0.022	6.5	0.05
06/22/2006	SAP 01	2991.0	416.3	3.34	3.76	0.030	4.5	0.04
08/24/2007	SAP 01	2772.0	331.5	2.87	3.50	0.030	7.5	0.06
08/28/2008	SAP 01	2703.0	349.1	3.10	4.51	0.040	7.9	0.07
<u>SAP No. 2</u>								
07/18/2002	SAP 02	2859.0	451.0	3.79	2.00	0.017	--	--
01/08/2003	SAP 02	2652.0	361.3	3.27	5.53	0.050	--	--
12/18/2003	SAP 02	2441.0	369.0	3.63	3.00	0.029	--	--
12/02/2004	SAP 02	2737.0	402.8	3.53	3.00	0.026	9.1	0.08
12/16/2005	SAP 02	2779.0	373.9	3.23	8.56	0.074	5.1	0.04
08/29/2006	SAP 02	2334.0	307.2	3.16	3.99	0.041	6.3	0.06
02/28/2007	SAP 02	3075.0	373.3	2.91	3.53	0.028	9.1	0.07
<u>SAP No. 3</u>								
03/01/2002	SAP 03	2716.0	430.0	3.80	3.40	0.030	--	--
06/04/2003	SAP 03	2738.0	433.0	3.80	5.00	0.044	9.6	0.08
11/12/2003	SAP 03	2717.0	396.2	3.50	2.90	0.026	6.7	0.06
12/09/2004	SAP 03	2714.0	265.3	2.35	--	--	--	--
06/16/2005	SAP 03	2497.0	338.0	3.25	2.20	0.021	5.3	0.05
04/18/2006	SAP 03	2733.0	424.2	3.73	5.20	0.046	6.4	0.06
08/29/2007	SAP 03	2536.0	351.9	3.33	4.72	0.045	5.3	0.05
02/19/2008	SAP 03	2755.0	367.3	3.20	0.90	0.008	7.7	0.07

^a As calculated.

TABLE 2-2
SUMMARY OF RECENT EMISSION TESTS AT THE DAP, MAP, AFI PLANT AND THE "A", "B", AND "C" KILNS
MOSAIC NEW WALES FACILITY

Test Date	Unit	Average Process Rate (TPH of P ₂ O ₅)	PM		SO ₂		NO _x	
			avg lb/hr	avg lb/ton P ₂ O ₅ ^a	avg lb/hr	avg lb/ton P ₂ O ₅ ^a	avg lb/hr	avg lb/ton P ₂ O ₅ ^a
<u>DAP Plant No. 1</u>								
03/30/2004	DAP No. 1	57.2	8.02	0.140	--	--	--	--
03/03/2005	DAP No. 1	56.7	2.41	0.043	--	--	--	--
05/04/2006	DAP No. 1	51.7	2.80	0.054	--	--	--	--
03/29/2007	DAP No. 1	62.7	1.84	0.029	--	--	--	--
07/23/2008	DAP No. 1	60.9	11.60	0.190	--	--	--	--
<u>"A" & "B" Kilns</u>								
06/17/2002	"A" & "B" Kilns	7.6	9.84	1.295	--	--	--	--
05/28/2003	"A" & "B" Kilns	8.6	20.40	2.372	--	--	--	--
04/23/2004	"A" & "B" Kilns	7.5	10.80	1.440	--	--	--	--
06/30/2004	"A" & "B" Kilns	7.6	28.14	3.703	--	--	--	--
09/12/2005	"A" & "B" Kilns	8.7	13.38	1.538	--	--	--	--
03/01/2006	"A" & "B" Kilns	8.1	15.63	1.930	--	--	--	--
09/27/2006	"A" & "B" Kilns	7.1	14.09	1.985	--	--	--	--
09/07/2007	"A" & "B" Kilns	6.6	8.23	1.247	--	--	--	--
10/05/2007	"A" & "B" Kilns	7.2	6.81	0.946	--	--	--	--
<u>MAP Plant</u>								
12/19/2003	MAP Plant	49.4	0.39	0.008	--	--	--	--
02/25/2005	MAP Plant	49.5	2.56	0.052	--	--	--	--
01/20/2006	MAP Plant	47.6	0.76	0.016	--	--	--	--
08/17/2006	MAP Plant	49.3	0.96	0.019	--	--	--	--
07/12/2007	MAP Plant	49.9	0.62	0.012	--	--	--	--
03/13/2008	MAP Plant	48.8	0.80	0.016	--	--	--	--
<u>AFI Plant</u>								
01/22/2004	AFI Plant	113.3	29.9	0.264	--	--	--	--
03/23/2005	AFI Plant	115.7	31.4	0.271	--	--	--	--
05/12/2006	AFI Plant	107.6	25.2	0.234	--	--	--	--
03/23/2007	AFI Plant	117.8	33.6	0.285	--	--	--	--
08/25/2008	AFI Plant	92.6	15.5	0.167	--	--	--	--
<u>"C" Kiln</u>								
11/14/2003	"C" Kiln	3.9	--	--	8.3	2.128	5.8	1.487
08/31/2005	"C" Kiln	4.2	--	--	--	--	8.4	1.998
01/11/2007	"C" Kiln	4.4	2.3	0.516	6.7	1.516	5.5	1.257

^a As calculated.

TABLE 2-3
CURRENT SULFURIC ACID PLANT TURNAROUND SCHEDULE
MOSAIC NEW WALES

PLANT	2008	2009	2010	2011	2012	2013
SAP No. 1		June			January	
SAP No. 2	October			June		
SAP No. 3			January		June	

Figure 2-1: No. 1 Sulfuric Acid Plant (Proposed 3,200 TPD Max)

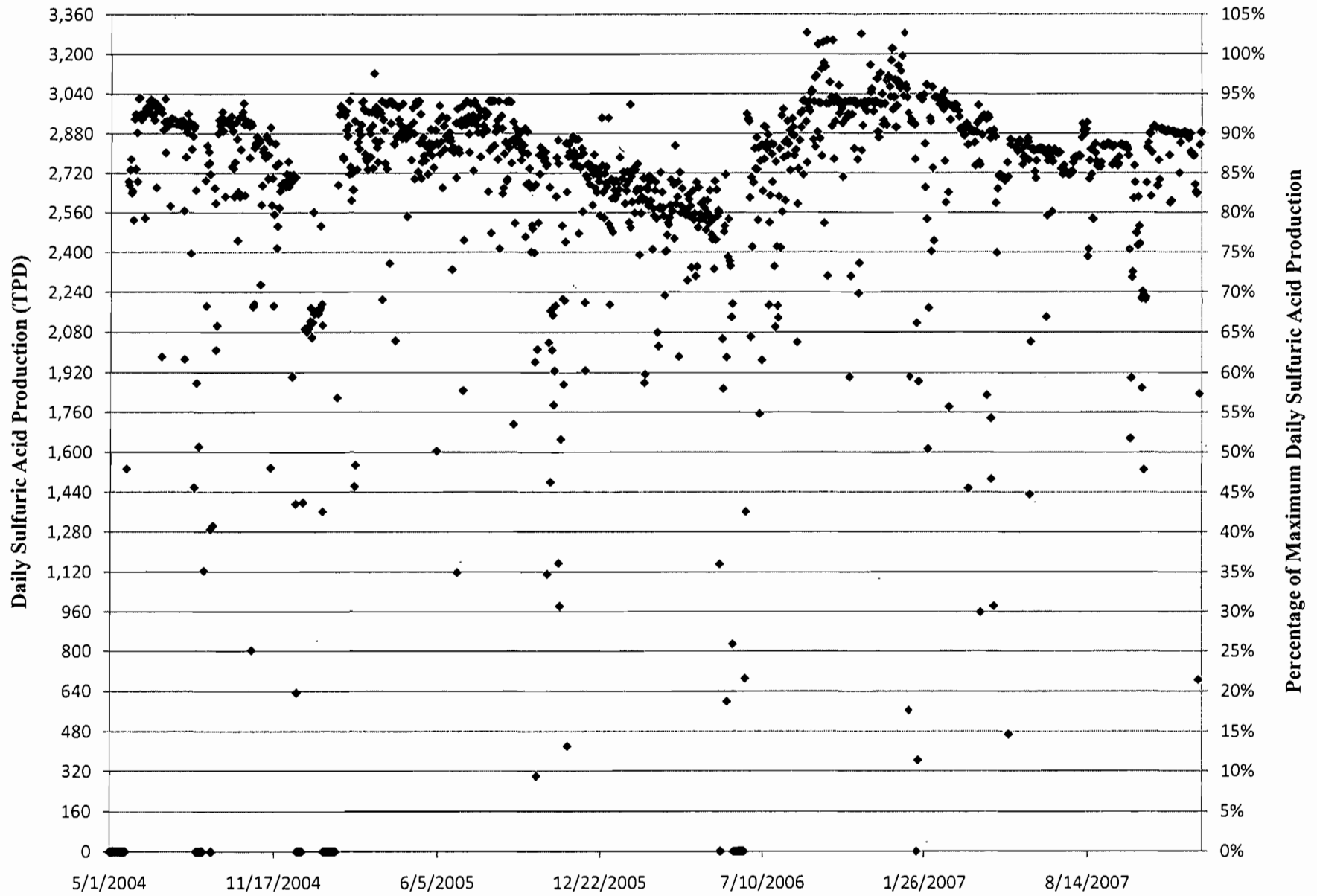
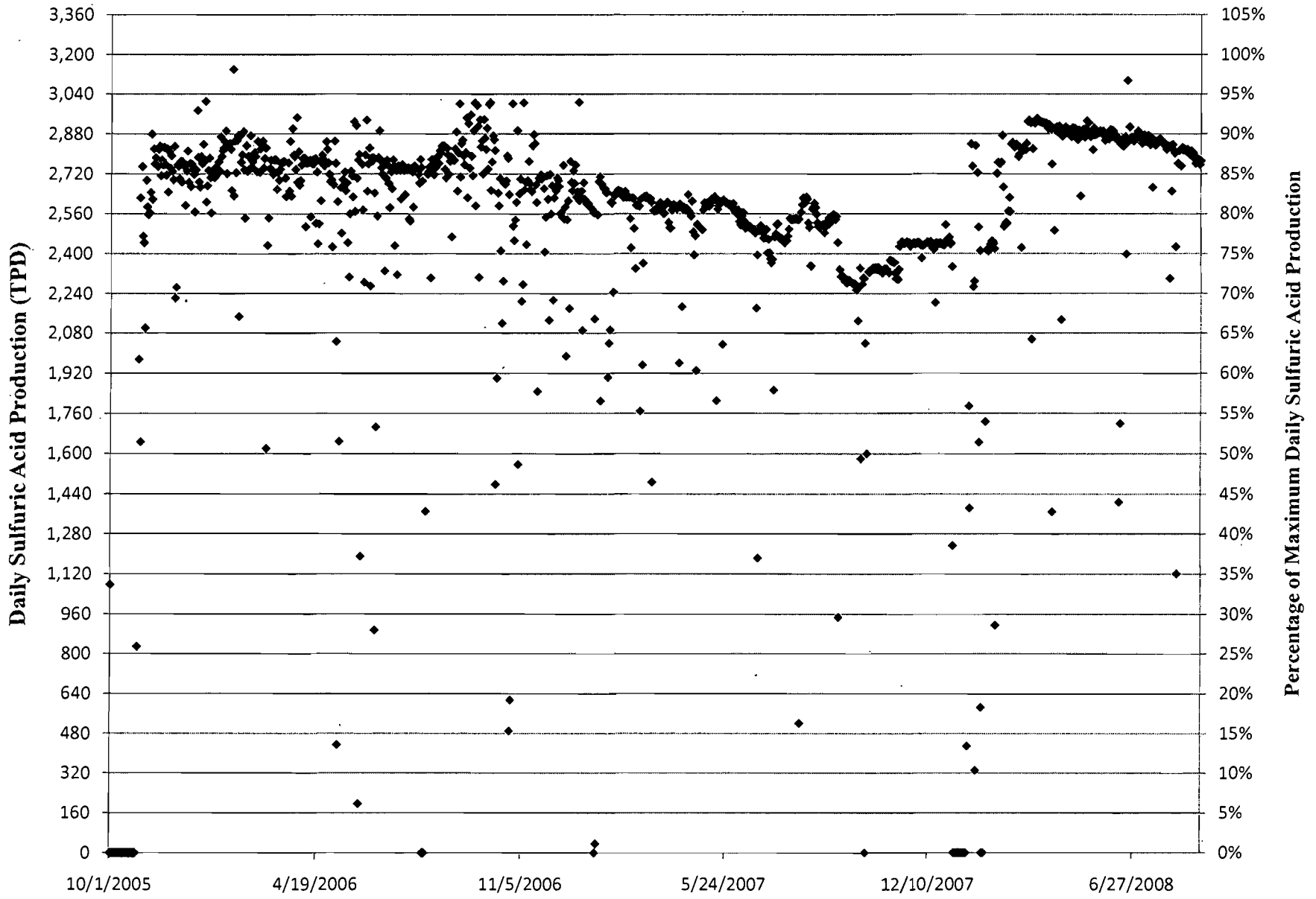


Figure 2-3: No. 3 Sulfuric Acid Plant (Proposed 3,200 TPD Max)



3.0 BART EXEMPTION ANALYSIS AND RESULTS

A revised BART modeling protocol for the Mosaic New Wales facility is included in Appendix A to this BART Exemption Analysis. The baseline emissions and methodology used for the exemption modeling and the exemption modeling results are presented below.

3.1 Emission Rates

The emission rates used for the initial visibility modeling for the New Wales facility are contained in Table 2-3 of the BART modeling protocol (Protocol), which is included as Appendix A. The initial modeling performed in January 2007 did not include any proposed emission reductions from the SAPs. The emission rates used in the revised visibility modeling, which include the proposed emissions rates for both Scenarios A and B, are presented in Table 2-4 of the Protocol. Please note that the PM emission rates from the BART-eligible units other than the SAPs, MAP Plant, DAP Plant No. 1, AFI, and Multifos A and B Kilns (EUs 15, 23 to 28, 30 to 35, 38, 52, 55, 63, & 66 to 68) have been corrected to reflect actual emission rates. These corrected emission rates are presented in Table 2-4 of the Protocol.

3.2 Modeling Methodology

The California Puff (CALPUFF) model, Version 5.756, was used to predict the maximum visibility impairment at the PSD Class I areas located within 300 km of the Mosaic New Wales facility. Recent technical enhancements, including changes to the over-water boundary layer formulation and coastal effects modules (sponsored by the Minerals Management Service), are included in this version. The methods and assumptions used in the CALPUFF model are presented in the Protocol. The 4-km spacing Florida domain was used for the BART exemption. The refined California Meteorological Model (CALMET) domain used for the Mosaic New Wales BART modeling analysis has been provided by FDEP. The major features used in preparing these CALMET data are also described in Section 3.0 of the Protocol.

Currently, atmospheric light extinction is estimated by an algorithm developed by the Interagency Monitoring of Protected Visual Environments (IMPROVE) committee, which was adopted by the EPA under the 1999 Regional Haze Rule (RHR) and is referred to as the "1999 IMPROVE algorithm". This algorithm for estimating light extinction from particle speciation data tends to underestimate light extinction for the highest haze conditions and overestimate it for the lowest haze conditions, and does not include light extinction due to sea salt, which is important at sites near coastal areas. As a result of these limitations, the IMPROVE Steering Committee recently developed a new algorithm (the "new IMPROVE

algorithm”) for estimating light extinction from PM component concentrations, which provides a better correspondence between measured visibility and that calculated from PM component concentrations. A detailed description of the new IMPROVE algorithm and its implementation is presented in Section 3.4 of the Protocol.

Both the 1999 IMPROVE algorithm and the new IMPROVE algorithm were used to calculate the natural background light extinction at the Class I areas for the Mosaic New Wales BART modeling analysis. Visibility impacts were predicted at each PSD Class I area using receptors provided by the National Park Service (NPS), as presented in the BART protocol.

3.3 BART Exemption Modeling Results

Summaries of the maximum visibility impairment values for the Mosaic New Wales BART-eligible emissions units estimated using the 1999 IMPROVE algorithm are presented in Tables 3-1 and 3-2. These results are based upon the emission rates presented in Table 2-3 of the Protocol (prior to taking any reductions). The 98th percentile 24-hour average visibility impairment values (i.e., 8th highest) for the years 2001, 2002, and 2003, and the 22nd highest 24-hour average visibility impairment value over the 3 years, are presented in Table 3-1. This table also presents the number of days and receptors for which the visibility impairment was predicted to be greater than 0.5 dv. The eight highest visibility impairment values predicted at the PSD Class I areas for each year is presented in Table 3-2.

As shown in Tables 3-1 and 3-2, the highest, 8th highest visibility impairment values predicted over the 3-year period at the Chassahowitzka NWA and Everglades NP PSD Class I areas using the 1999 IMPROVE algorithm are higher than 0.5 dv.

Additional modeling was performed for both Class I areas using the new IMPROVE algorithm and the proposed emissions rates for Scenarios A and B. The 8th highest visibility impairment values for the New Wales facility BART-eligible emission units, estimated using the new IMPROVE algorithm and the proposed emissions reduction scenarios, are presented in Tables 3-3 through 3-6.

As shown in Tables 3-3 and 3-5, the 8th highest visibility impairment values for both emissions reduction scenarios, predicted for each year using the new IMPROVE algorithm, are lower than 0.5 dv. In addition, as shown in Tables 3-4 and 3-6, the 22nd highest 24-hour average visibility impairment value over the 3 years is also less than 0.5 dv. Based on these results, which demonstrate that the maximum visibility impairment values for the New Wales facility are predicted to be less than FDEP’s BART exemption

values for the New Wales facility are predicted to be less than FDEP's BART exemption criteria of 0.5 dv, an exemption from BART determination is requested for the Mosaic New Wales facility.

Based on these results, the New Wales facility is exempt from the BART requirements. Mosaic is proposing the following emissions limits for the BART-eligible units:

SCENARIO A

- SAM: SAP Nos. 1, 2, and 3 – 7.1 lb/hr for each.
- PM:
 - MAP – 7 lb/hr
 - DAP Plant No. 1 – 15 lb/hr
- Shutdown of the Multifos A and B Kilns system, which includes the following:
 - Multifos “A” Kiln Cooler (EU 032)
 - Multifos “B” Kiln Cooler (EU 033)
 - Multifos A and B Kilns in (EU 036) only.

SCENARIO B

- SO₂:
 - SAP Nos. 1, 2, and 3 – 400 lb/hr, 24-hour average for each; and
 - Multifos A and B Kilns – 25 lb/hr.
- SAM: SAP Nos. 1, 2, and 3 – 6.7 lb/hr for each.
- NO_x: SAP Nos. 1, 2, and 3 – 16 lb/hr for each.
- PM:
 - MAP – 7 lb/hr
 - DAP Plant No. 1 – 15 lb/hr
 - Multifos A and B Kilns – 25 lb/hr

The new limits for the SAPs will be demonstrated by the use of existing continuous emission monitoring systems for SO₂ at each of the SAPs, and through annual stack testing for SAM using EPA Method 8. Compliance with the NO_x limit will be demonstrated by stack testing once every 5 years using EPA Method 7E. All other limits for the MAP, DAP Plant No. 1, and Multifos A and B Kilns will be demonstrated by annual stack testing using EPA Method 5.

**TABLE 3-1
SUMMARY OF BART EXEMPTION MODELING RESULTS, MOSAIC FERTILIZER, LLC, NEW WALES FACILITY
1999 IMPROVE ALGORITHM**

Class I Area	Distance from Source to Nearest Class I Area Boundary (km)	Number of Days and Receptors with Visibility Impacts >0.5 dv									22 nd 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	104	30	113	0.757	25	113	0.838	38	113	0.957	0.896
Everglades NP	226	0	0	0.334	7	757	0.457	7	107	0.48	0.449

**TABLE 3-2
BART EXEMPTION ANALYSIS RESULTS FOR MOSAIC FERTILIZER, LLC, NEW WALES FACILITY
VISIBILITY IMPACT RANKINGS AT CLASS I AREAS
1999 IMPROVE ALGORITHM**

Class I Area	Predicted Change in Visibility Impact (dv)			
	Rank	2001	2002	2003
Chassahowitzka NWR	1	1.968	1.636	1.901
	2	1.556	1.008	1.230
	3	1.343	0.998	1.217
	4	0.948	0.985	1.150
	5	0.802	0.960	1.127
	6	0.778	0.957	1.112
	7	0.776	0.945	0.972
	8	0.757	0.838	0.957
Everglades NP	1	0.475	1.045	0.681
	2	0.454	0.918	0.612
	3	0.436	0.869	0.581
	4	0.430	0.861	0.529
	5	0.367	0.720	0.514
	6	0.348	0.676	0.505
	7	0.337	0.549	0.502
	8	0.334	0.457	0.480

TABLE 3-3
 SUMMARY OF BART EXEMPTION MODELING RESULTS - NEW IMPROVE ALGORITHM
 WITH PROPOSED 24-HOUR AVERAGE EMISSION LIMITS FROM SCENARIO A
 MOSAIC FERTILIZER, LLC, NEW WALES 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									22 nd 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	104	3	NA	0.394	7	NA	0.484	6	NA	0.490	0.473

TABLE 3-4
VISIBILITY IMPACT RANKINGS AT THE CNWA - NEW IMPROVE ALGORITHM
WITH PROPOSED 24-HOUR AVERAGE EMISSION LIMITS FROM SCENARIO A
MOSAIC NEW WALES FACILITY

Class I Area	Predicted Change in Visibility Impact (dv)			
	Rank	2001	2002	2003
Chassahowitzka NWA	1	1.075	0.922	1.036
	2	0.833	0.571	0.670
	3	0.722	0.539	0.633
	4	0.448	0.537	0.588
	5	0.441	0.527	0.583
	6	0.428	0.517	0.570
	7	0.422	0.514	0.493
	8	0.394	0.484	0.490

**TABLE 3-5
SUMMARY OF BART EXEMPTION MODELING RESULTS - NEW IMPROVE ALGORITHM
WITH PROPOSED 24-HOUR AVERAGE EMISSION LIMITS FROM SCENARIO B
MOSAIC FERTILIZER, LLC, NEW WALES 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									22 nd 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	104	3	NA	0.399	7	NA	0.467	7	NA	0.496	0.472

TABLE 3-6
VISIBILITY IMPACT RANKINGS AT THE CNWA - NEW IMPROVE ALGORITHM
WITH PROPOSED 24-HOUR AVERAGE EMISSION LIMITS FROM SCENARIO B
MOSAIC NEW WALES FACILITY

Class I Area	Predicted Change in Visibility Impact (dv)			
	Rank	2001	2002	2003
Chassahowitzka NWA	1	1.057	0.892	1.030
	2	0.823	0.549	0.654
	3	0.710	0.525	0.640
	4	0.483	0.523	0.594
	5	0.430	0.519	0.589
	6	0.417	0.509	0.571
	7	0.406	0.504	0.501
	8	0.399	0.467	0.496

4.0 REFERENCES

Guidelines for Best Available Retrofit Technology. Federal Register, Vol. 70, pages 39104-39172. August 1, 2005.

OAQPS Cost Control Manual, Fifth Edition, EPA-4531B-96-001. February 1996.

MANE-VU, March 2005. Assessment of Control Technology Options for BART-Eligible Sources; Northeast States for Coordinated Air Use Management, in partnership with the Mid-Atlantic/Northeast Visibility Union.

VISTAS, March 2006. Protocol for the Application of the CALPUFF Model for Analyses of Best Available Control Technology (BART), Revision 2, March 2006.

APPENDIX A

**AIR MODELING PROTOCOL TO EVALUATE BART OPTIONS FOR THE MOSAIC
NEW WALES FACILITY**

**AIR MODELING PROTOCOL
TO EVALUATE
BEST AVAILABLE RETROFIT
TECHNOLOGY (BART) OPTIONS
FOR
MOSAIC FERTILIZER NEW WALES FACILITY**

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1.0 INTRODUCTION

1.1 Objectives

Under the regional haze regulations, contained in Title 40, Part 51 of the Code of Federal Regulations (40 CFR 51), Subpart P – Protection of Visibility, the U.S. Environmental Protection Agency (EPA) has issued final rules and guidelines dated July 6, 2005, for Best Available Retrofit Technology (BART) determinations [Federal Register (FR), Volume 70, pages 39104-39172]. BART applies to certain large stationary sources known as BART-eligible sources. Sources are BART-eligible if they meet the following three criteria:

- Contains emissions units that are one of the 26 listed source categories in the guidance;
- Contains emissions units that were put in place between August 7, 1962 and August 7, 1977; and
- Potential emissions from these emissions units of at least 250 tons per year (TPY) of a visibility-impairing pollutant [sulfur dioxide (SO₂), nitrogen oxides (NO_x), and direct particulate matter of size equal to or less than 10 microns (PM₁₀)].

The Florida Department of Environmental Protection (FDEP) has adopted EPA's visibility protection rules and guidelines contained in 40 CFR 51, Subpart P. FDEP's BART Rules are described in 62-296.340 of the Florida Administrative Code (F.A.C.), effective January 31, 2007.

The basic tenet of the regional haze program is the achievement of natural visibility conditions in Prevention of Significant Deterioration (PSD) Class I areas by the year 2064. Florida has four PSD Class I areas while Georgia has two PSD Class I areas that can be affected by Florida sources [i.e., located in Florida or within 300 kilometers (km) of Florida].

BART is required for any BART-eligible source that FDEP determines emits any air pollutant that may "reasonably be anticipated to cause or contribute to any impairment of visibility in any Class I area." The BART guidelines establish a threshold value of 0.5 deciview (dv) for any single source for determining whether the source contributes to visibility impairment.

FDEP has identified Mosaic Fertilizer, LLC's New Wales facility (Facility ID 1050059) as a BART-eligible source with multiple BART-eligible emissions units.

Throughout this protocol the terms "source" and "facility" have the same meanings. The term "BART-eligible emissions unit" is defined as any single emissions unit that meets the criteria described above, except for the 250 TPY criterion, which applies to the entire BART-eligible source. A "BART-eligible source" is defined as the collection of all BART-eligible emissions units at a single facility. If a source has several emissions units, only those that meet the BART-eligible criteria are included in the definition of "BART-eligible source."

FDEP requires that the California Puff (CALPUFF) modeling system be used to determine visibility impacts from BART-eligible sources at the PSD Class I areas. A source-specific modeling protocol is required to be submitted by the affected sources to FDEP for review and approval.

The BART application for Mosaic New Wales, which was submitted to FDEP in January 2007, included a source-specific modeling and also a modeling protocol for all the BART-eligible Mosaic facilities. The protocol described the modeling procedures followed for performing the air modeling and included site-specific data for Mosaic's BART-eligible emissions units. The site-specific data included emissions unit locations, stack parameters, emission rates, and PM₁₀ speciation information.

This revised protocol includes only the New Wales facility, and is for the purpose of demonstrating that the New Wales facility meets the BART facility exemption criteria. The Protocol reflects proposed lower emission limits for the Sulfuric Acid Plants (SAP Nos. 1, 2, and 3), MAP, DAP Plant No. 1, and Multifos A and B Kilns at the facility. This protocol also includes revised PM emission rates from the material handling BART-eligible units (EUs 015, 023-026, 028, 030-035, 038, 052, and 055) at the facility. The revision is based on the revised exhaust flow rates and an outlet dust loading of 0.01 grains per standard cubic foot of air.

For guidance in preparing the air modeling protocol, the Visibility Improvement State and Tribal Association of the Southeast (VISTAS) has developed a "common" modeling protocol outline that describes the recommended procedures for performing a visibility impairment analysis under the BART regulations [see *Protocol for the Application of the CALPUFF Model for Analyses of Best Available Retrofit Technology (BART)*, December 22, 2005 (Revision 3-2 – August 31, 2006)]. This modeling protocol for the Mosaic New Wales facility follows the general procedures recommended by VISTAS.

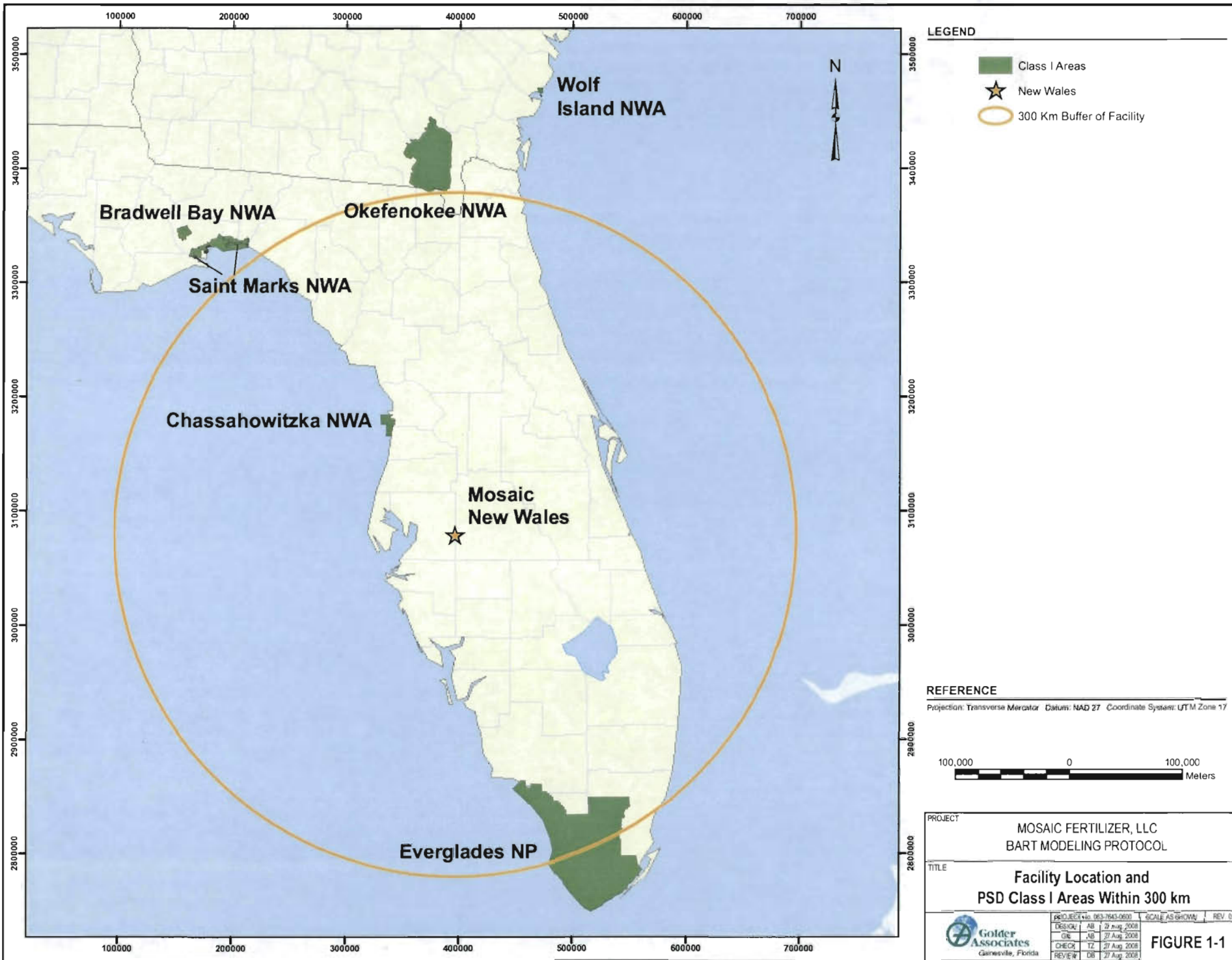
exempted from further BART analyses and (b) if refined (finer grid) CALPUFF analyses were to be undertaken, which Class I areas should be included.

For the screening analysis, the highest predicted 24-hour impairment value is compared to the 0.5 dv criteria. If the highest predicted impacts are found to be less than 0.5 dv, no further analysis is required. But if the highest impact is predicted to be greater than 0.5 dv, then a refined, finer grid, analysis may be performed.

The refined analysis, which is based on a finer grid subregional California Meteorological Model (CALMET) domain, is the definitive test for whether a source is subject to BART. In the refined analysis, the 98th percentile, i.e., the 8th highest 24-hour average visibility impairment value in 1 year or the 22nd highest 24-hour average visibility impairment value over 3 years combined, whichever is higher, is compared to the 0.5-dv exemption criterion.

The screening analysis is optional for large sources that will clearly exceed the initial screening thresholds or sources that are very close to the Class I areas, which will be better analyzed by a finer grid resolution. For the Mosaic New Wales BART analyses, only the refined analysis will be performed to determine whether the facility is exempt from BART. All Class I areas within 300 km will be included in the refined modeling analysis and modeling results will be presented for each evaluated Class I area.

If the BART exemption analysis reveals that the BART-eligible source is subject to BART control analysis, part of the BART review process involves evaluating the visibility benefits of different BART control measures. These benefits will be determined by the refined analysis, where CALPUFF will be executed with the baseline emission rates and again with emission rates reflective of BART control options.



2.0 SOURCE DESCRIPTION

2.1 Source Applicability

FDEP published a list of potential BART-eligible sources (updated January 11, 2007), which is based on a survey questionnaire sent by FDEP to selected facilities in Florida on November 4, 2002 and April 18, 2003. The FDEP list contains 68 potential BART-eligible emissions units at the New Wales facility. The New Wales facility is on the FDEP list since it is one of the 26 major source categories identified in the BART regulation (phosphate rock processing plants or chemical process plants) and has potential emissions of visibility impairment pollutants [i.e., SO₂, NO_x, and particulate matter (PM)] from its BART-eligible emissions units that are greater than 250 TPY.

From detailed information obtained from Mosaic, a BART-eligibility analysis was performed to verify the applicability of the BART rule to the New Wales facility, as well as the list of BART-eligible units. This analysis consisted of a three-step procedure.

First, the New Wales facility is a BART-eligible source since it is classified under the source category of "Phosphate Rock Processing Plants" or "Chemical Process Plants".

Second, each emissions unit was reviewed to determine which units met the date requirements for a BART-eligible unit. For each emissions unit, it was determined which units began operation after August 7, 1962, and also were in existence on August 7, 1977.

Third, if an emissions unit met the date requirements for BART eligibility, the potential emissions of visibility impairing pollutants from each unit were identified. At present, the visibility impairing pollutants include SO₂, NO_x, and PM₁₀. Other potential visibility impairing pollutants, such as volatile organic compounds (VOCs) and ammonia, have been determined by FDEP to have no significant effect on regional haze in Florida.

Based on this analysis, a revised list of BART-eligible emissions units at the Mosaic New Wales facility was prepared, which is presented in Table 2-1. The Fertilizer Truck/Rail Loadout No. 1 (EU 029) BART-eligible unit has been designated as an unregulated/insignificant emission unit and as a result, is excluded from the visibility modeling analysis.

As shown in Table 2-1, the potential annual SO₂, NO_x, and PM₁₀ emissions from the BART-eligible emissions units total more than 250 TPY for each pollutant. Because the emissions of one or more

pollutants are greater than the 250 TPY threshold, all of these pollutants will be included in the visibility impairment assessment for the facility. Since PM_{10} emissions from the non-fugitive emissions units are greater than 250 TPY, it is not necessary to quantify fugitive PM emissions from the BART-eligible emissions units for source applicability under the BART regulation. Only the visibility impairing pollutants of SO_2 , NO_x , and PM_{10} are required to be included in the visibility modeling analysis. Therefore, BART-eligible emissions units that do not emit these pollutants will not be included in the modeling analysis. In addition, FDEP is not requiring fugitive emissions to be included in the modeling unless the source is relatively close (i.e., 50 km) to a PSD Class I area.

Based on discussions with FDEP, if a BART-eligible emissions unit does not emit SO_2 , NO_x , or PM_{10} , the emissions unit is not required to undergo a BART control technology determination. Also, if a facility is more than 50 km from the nearest PSD Class I area, fugitive PM emissions from BART-eligible emissions units are not required to undergo BART control evaluation.

2.2 Stack Parameters

The stack height above ground, stack diameter, exit velocity, and exit temperature for the BART-eligible emissions units at the Mosaic New Wales facility are presented in Table 2-2. The facility location is provided in UTM coordinates and in the VISTAS domain Lambert Conformal Conic (LCC) coordinate system.

2.3 Emission Rates for Visibility Impairment Analyses

The EPA BART guidance indicates that the emission rate to be used for BART modeling is the highest 24-hour actual emission rate representative of normal operations for the modeling period. Depending on the availability of the source data, the source emissions information should be based on the following in order of priority, based on the BART common protocol:

- 24-hour maximum emissions based on continuous emission monitoring (CEM) data for the period 2001-2003,
- Facility stack test emissions,
- Potential to emit,
- Allowable permit limits, and
- AP-42 emission factors.

Emission rates for each emissions unit based on this hierarchy are presented in Table 2-3. However, Mosaic is proposing two scenarios (Scenarios A and B) of lowering 24-hour average emission rates from several BART-eligible units in order to reduce the visibility impact. The emission rates to be used in the visibility impairment analyses, which include the proposed 24-hour emissions limits for the SAPs, are presented in Tables 2-4 and 2-5, respectively, for Scenarios A and B.

2.4 PM Speciation

Based on the latest regulatory guidance, PM emissions by size category need to be considered in the appropriate species for the visibility analysis. The effect that each species has on visibility impairment is related to a parameter called the extinction coefficient. The higher the extinction coefficient, the greater the species' effect on visibility. Filterable PM is speciated into coarse (PMC), fine (PMF), and elemental carbon (EC), with default extinction efficiencies of 0.6, 1.0, and 10.0, respectively. PMC is PM with aerodynamic diameter between 10 microns and 2.5 microns. Both EC and PMF have aerodynamic diameters equal to or less than 2.5 microns. Condensable PM is composed of inorganic PM such as sulfate (SO_4) and organic PM such as secondary organic aerosols (SOA). The extinction efficiencies for these species are $3 \cdot f(\text{RH})$ and 4, respectively, where $f(\text{RH})$ is the relative humidity factor.

As shown in Table 2-1, total PM_{10} emissions from the BART-eligible emissions units at the New Wales facility are much lower than the SO_2 emissions. Since PM_{10} emissions are much lower than SO_2 emissions, and the PM speciation profiles for the major PM emission sources are not known, as a conservative approach, all PM_{10} emissions will be considered as organic PM with extinction efficiency of 4.0. Sulfuric acid (H_2SO_4) mist emissions from the SAPs will be considered as inorganic condensable PM and will be modeled as SO_4 with the extinction efficiency of $3 \cdot f(\text{RH})$.

2.5 Building Dimension

Based on discussions with FDEP, building downwash effects will not be considered in the modeling because these effects are considered to be minimal in assessing impacts as the distance of the nearest PSD Class I area, which is more than 50 km from the Mosaic New Wales facility.

TABLE 2-1
BART ELIGIBILITY ANALYSIS FOR MOSAIC FERTILIZER - NEW WALES
FACILITY ID 1050059

EU ID	Emission Unit	BART Category*	Dates				SO ₂ , NO _x , or PM Source? (Yes/No)	BART Eligible? (Yes/No)	Potential Emissions ^b			Comments	
			Start-Up Date	Initial Construction Date	In Existence on 8/7/1977? (Yes/No)	Began Operation After 8/7/1962? (Yes/No)			Meets BART Date Criteria? (Yes/No)	SO ₂ (TPY)	NO _x (TPY)		PM ₁₀ (TPY)
002	Sulfuric Acid Plant No. 1	13	1975	1973	Yes	Yes	Yes	Yes	Yes	2,172.0	63.5	--	
003	Sulfuric Acid Plant No. 2	13	1975	1973	Yes	Yes	Yes	Yes	Yes	2,172.0	63.5	--	
004	Sulfuric Acid Plant No. 3	13	1975	1973	Yes	Yes	Yes	Yes	Yes	2,172.0	63.5	--	
005	Ground Phosphate Rock Railcar Unloading	13											Shutdown
006	Ground Phosphate Rock Silo	13											Shutdown
008	Phosphoric Acid Plant (East)	13	1975	1973	Yes	Yes	Yes	No	NO	--	--	--	Only fluoride emissions
009	DAP Plant No. 1	13	1975	1973	Yes	Yes	Yes	Yes	Yes	127.0 ^c	44.5 ^c	125.3	
010	GTSP Plant	13											Replaced, Now EU078
011	MAP Plant	13	1975	1973	Yes	Yes	Yes	Yes	Yes	--	--	65.7	
012	GTSP Storage Building	13							NO				Shutdown
013	Auxiliary Boiler	13							NO				To be removed
015	Animal Feed Ingredients (AFI) Shipping/Truck Loading	13	1978	1976	Yes	Yes	Yes	Yes	Yes	--	--	15.8	
017	Phosphoric Acid Plant (West)	13	1975	1973	Yes	Yes	Yes	No	NO	--	--	--	Only fluoride emissions
021	Ground Phosphate Rock Bin	13											Shutdown
023	AFI Storage Silos (3) - "A" Side	13	1978	1976	Yes	Yes	Yes	Yes	Yes	--	--	20.8	
024	AFI Shipping Rail Car Loading	13	1978	1976	Yes	Yes	Yes	Yes	Yes	--	--	15.8	
025	AFI Limestone Storage Silos (2)	13	1978	1976	Yes	Yes	Yes	Yes	Yes	--	--	15.8	
026	AFI Silica Unloading and Storage	13	1978	1976	Yes	Yes	Yes	Yes	Yes	--	--	7.0	
027	AFI Plant	13	1978	1976	Yes	Yes	Yes	Yes	Yes	618.9 ^c	185.3 ^c	161.2	
028	AFI Storage Silos (3) - "B" Side	13	1978	1976	Yes	Yes	Yes	Yes	Yes	--	--	20.8	
029	Fertilizer Truck/Rail Loadout No. 1	13	--	--	--	--	--	--	--	--	--	--	unregulated/insignificant
030	Multifos Soda Ash Unloading System	13	1979	6/3/1977	Yes	Yes	Yes	Yes	Yes	--	--	0.44 ^d	
031	Multifos Soda Ash Conveying System	13	1979	6/3/1977	Yes	Yes	Yes	Yes	Yes	--	--	0.26 ^d	
032	Multifos "A" Kiln Cooler	13	1979	6/3/1977	Yes	Yes	Yes	Yes	Yes	--	--	5.69 ^d	
033	Multifos "B" Kiln Cooler	13	1979	6/3/1977	Yes	Yes	Yes	Yes	Yes	--	--	8.32 ^d	
034	Multifos A & B Kilns Milling & Sizing - West Bag	13	1979	6/3/1977	Yes	Yes	Yes	Yes	Yes	--	--	1.75 ^d	
035	Multifos A & B Kilns Milling & Sizing - East Bag	13	1979	6/3/1977	Yes	Yes	Yes	Yes	Yes	--	--	1.75 ^d	
036	Multifos A and B Kilns, Dryer and Blending Operation	13	1979	6/3/1977	Yes	Yes	Yes	Yes	Yes	1,426.9 ^c	200.0 ^c	130.7	
037	Fertilizer Truck Loadout No. 2	13		1980	No	Yes	No	--	NO	--	--	--	Did not exist on 8/7/1977
038	Multifos A&B Kilns Milling&Sizing - Surge Bin	13	1979	6/3/1977	Yes	Yes	Yes	Yes	Yes	--	--	3.9 ^d	
039	Phosphoric Acid Plant No. 3	13		1979	No	Yes	No	--	NO	--	--	--	Did not exist on 8/7/1977
041	Fertilizer Truck Loadout No. 3	13		1980	No	Yes	No	--	NO	--	--	--	Did not exist on 8/7/1977
042	Sulfuric Acid Plant #4	13	1982	1980	No	Yes	No	--	NO	--	--	--	Did not exist on 8/7/1977
043	Fertilizer Rail Loadout No. 2	13		1980	No	Yes	No	--	NO	--	--	--	Did not exist on 8/7/1977
044	Sulfuric Acid Plant #5	13	1982	1980	No	Yes	No	--	NO	--	--	--	Did not exist on 8/7/1977
045	DAP Plant #2--East Train	13		1980	No	Yes	No	--	NO	--	--	--	Did not exist on 8/7/1977
046	DAP Plant #2--West Train	13		1980	No	Yes	No	--	NO	--	--	--	Did not exist on 8/7/1977
047	DAP Plant #2 West Product Cooler	13		1980	No	Yes	No	--	NO	--	--	--	Did not exist on 8/7/1977
048	Uranium Recovery Operations -- Acid Clean Up	13	1980	1978	No	Yes	No	--	NO	--	--	--	Did not exist on 8/7/1977
049	Uranium Recovery Operations -- Solvent Extraction	13											Shutdown
050	Uranium Recovery Operations -- Uranium Refining	13											Shutdown
051	Uranium Recovery Operations -- Clay Storage	13											Shutdown
052	AFI Limestone Feed Bin	13	1978	1976	Yes	Yes	Yes	Yes	Yes	--	--	15.8	
053	Phosphoric Acid Clarification and Storage Area	13	1975	1973	Yes	Yes	Yes	--	NO	--	--	--	Only fluoride emissions
054	DAP Plant No. 1 Cooler	13											Removed
056	DAP Plant #2 East Product Cooler	13	1991	1990	No	Yes	No	--	NO	--	--	--	Did not exist on 8/7/1977
059	Fertilizer Rail Loadout No. 3	13		1980	No	Yes	No	--	NO	--	--	--	Did not exist on 8/7/1977
060	7500 Ton Rail Molten Storage Tank	13	1998	1997	No	Yes	No	--	NO	--	--	--	Did not exist on 8/7/1977
061	Molten Sulfur - 2000 Ton Tank No 2, south (removed)	13											Shutdown
062	5000 Ton Molten Storage Tank	13	1982	1980	No	Yes	No	--	NO	--	--	--	Did not exist on 8/7/1977
063	1500 Ton Truck Unloading Sulfur Pit	13	1975	1973	Yes	Yes	Yes	Yes	Yes	1.2	--	0.8	
064	350 Ton Truck Unloading Sulfur Pit	13	1982	1980	No	Yes	No	--	NO	--	--	--	Did not exist on 8/7/1977
065	Railcar Unloading Pit	13	1982	1980	No	Yes	No	--	NO	--	--	--	Did not exist on 8/7/1977
066	200 Ton Molten Sulfur Transfer Pit	13	1975	1973	Yes	Yes	Yes	Yes	Yes	0.4	--	0.4	
067	1500 Ton Truck Unloading Sulfur Pit, Front Vent	13	1975	1973	Yes	Yes	Yes	Yes	Yes	1.2	--	0.8	
068	1500 Ton Truck Unloading Sulfur Pit, Rear Vent	13	1975	1973	Yes	Yes	Yes	Yes	Yes	1.2	--	0.8	
069	350 Ton Truck Unloading Sulfur Pit, Vent	13	1982	1980	No	Yes	No	--	NO	--	--	--	Did not exist on 8/7/1977
070	Limestone Storage Silo/Rock Grinding	13		1996	No	Yes	No	--	NO	--	--	--	Did not exist on 8/7/1977
071	Phosphogypsum stack	13	1975	1973	Yes	Yes	Yes	No	NO	--	--	--	Only fluoride emissions
072	Facility-Wide Fugitive Emissions	13	1975	1973	Yes	Yes	Yes	Yes	NO	--	--	--	Fugitive emissions
074	Multifos C Kiln	13	10/26/99		No	Yes	No	--	NO	--	--	--	Did not exist on 8/7/1977
075	Multifos Kiln C Cooler Baghouse	13	10/26/99		No	Yes	No	--	NO	--	--	--	Did not exist on 8/7/1977
076	Multifos Kiln C Milling & Sizing Baghouse	13	10/26/99		No	Yes	No	--	NO	--	--	--	Did not exist on 8/7/1977
078	GRANULAR MAP PLANT	13	1/18/2001		No	Yes	No	--	NO	--	--	--	Did not exist on 8/7/1977
079	Molten sulfur pit - 200 ton (not constructed)	13		na									Source does not exist
080	Molten Sulfur Truck Loading (1 of 2 constructed)	13		2002	No	Yes	No	--	NO	--	--	--	Did not exist on 8/7/1977
081	89.5 MMBTU/hr. boiler (non-NSPS) - rental boiler	13											To be removed
Total TPY =										619.6			

^a BART Category 13 is "Phosphate Rock Processing Plants."

^b Permit No. 1050059-014-AV

^c See Appendix A for Calculation.

^d Based on stack test data and 8760 hr/yr operation.

TABLE 2-2
SUMMARY OF STACK AND OPERATING PARAMETERS AND LOCATIONS FOR THE BART-ELIGIBLE EMISSIONS UNITS
MOSAIC NEW WALES

EU ID	Emission Unit	Model ID	Stack Parameters ^a				Operating Parameters ^a				
			Height		Diameter		Flow Rate (acfm)	Exit Temperature		Velocity	
			ft	m	ft	m		°F	K	ft/s	m/s
002	Sulfuric Acid Plant No. 1	WALES2	200	60.96	8.5	2.59	139,680	157.2	342.7	41.0	12.50
003	Sulfuric Acid Plant No. 2	WALES3	200	60.96	8.5	2.59	131,990	152.1	339.8	38.8	11.82
004	Sulfuric Acid Plant No. 3	WALES4	200	60.96	8.5	2.59	143,948	162.5	345.6	42.3	12.89
009	DAP Plant No. 1	WALES9	133	40.54	7.0	2.13	168,647	158.5	343.4	73.0	22.26
011	MAP Plant	WALES11	120	36.58	4.0	1.22	43,246	173.8	351.9	57.4	17.48
015	Animal Feed Ingredients (AFI) Shipping/Truck Loading	WALES15 ^c	66	20.12	2.5	0.76	6,000	83.9	302.0	0.1	0.03 ^b
023	AFI Storage Silos (3) - "A" Side	WALES23 ^c	114	34.75	0.8	0.23	2,000	93.4	307.3	0.1	0.03 ^b
024	AFI Shipping Rail Car Loading	WALES24 ^c	103	31.39	2.5	0.76	6,000	90.6	305.7	0.1	0.03 ^b
025	AFI Limestone Storage Silos (2)	WALES25 ^c	119	36.27	1.2	0.37	8,000	102.7	312.4	0.1	0.03 ^b
026	AFI Silica Unloading and Storage	WALES26 ^c	18	5.49	0.7	0.21	6,000	154.8	341.4	0.1	0.03 ^b
027	AFI Plant	WALES27	172	52.43	8.0	2.44	221,554	153.1	340.5	73.5	22.39
028	AFI Storage Silos (3) - "B" Side	WALES28 ^c	114	34.75	0.8	0.23	2,000	84	302.0	0.1	0.03 ^b
030	Multifos Soda Ash Unloading System	WALES30 ^c	5	1.52	0.5	0.15	1,000	131	328.2	0.0	0.00
031	Multifos Soda Ash Conveying System	WALES31 ^c	105	32.00	0.8	0.23	2,000	105	313.7	0.1	0.03 ^b
032	Multifos "A" Kiln Cooler	WALES32 ^c	86	26.21	1.5	0.46	25,000	212	373.2	0.0	0.00
033	Multifos "B" Kiln Cooler	WALES33 ^c	86	26.21	1.5	0.46	25,000	260	399.8	0.0	0.00
034	Multifos A & B Kilns Milling & Sizing - West Bag Collector	WALES34 ^c	71	21.64	2.5	0.76	8,000	136	330.9	0.1	0.03 ^b
035	Multifos A & B Kilns Milling & Sizing - East Bag Collector	WALES35 ^c	65	19.81	1.1	0.34	8,000	89.3	305.0	0.1	0.03 ^b
036	Multifos A and B Kilns, Dryer and Blending Operation	WALES36	172	52.43	4.5	1.37	51,469	102.4	312.3	53.9	16.44
038	Multifos A&B Kilns Milling&Sizing - Surge Bin Bag Collector	WALES38 ^c	71	21.64	2.5	0.76	8,000	89.3	305.0	0.1	0.03 ^b
052	AFI Limestone Feed Bin	WALES52 ^c	116	35.36	0.9	0.27	2,000	99.8	310.8	0.1	0.03 ^b
055	MAP Plant Cooler	WALES55 ^c	51	15.54	4.3	1.31	2,000	131.2	328.3	0.1	0.03 ^b
063	1500 Ton Truck Unloading Sulfur Pit	WALES63 ^c	40	12.19	2.0	0.61	80	240	388.7	0.4	0.13
066	200 Ton Molten Sulfur Transfer Pit	WALES66 ^c	12	3.66	1.0	0.30	--	240	388.7	0.1	0.03 ^b
067	1500 Ton Truck Unloading Sulfur Pit, Front Vent	WALES67 ^c	10	3.05	1.0	0.30	--	90	305.4	0.1	0.03 ^b
068	1500 Ton Truck Unloading Sulfur Pit, Rear Vent	WALES68 ^c	10	3.05	1.0	0.30	--	90	305.4	0.1	0.03 ^b

^a Mosaic data.

^b Horizontal discharge, EUs 66, 67, and 68 have raincap.

^c Emission Units 15 to 26, 28 to 35, and 38 to 68 are modeled as one emission unit using the stack parameters of EU 68.

Note: All emissions units will be collocated for the purpose of modeling. The facility coordinates are as follows:

UTM Coordinates: Zone 17, 396.6 km East, 3,078.9 km North.

Lat/Long: 27° 49' 56" North, 82° 03' 00" West.

Lambert Conformal Conic (LCC) coordinate, VISTAS Domain: 1,482.32 km, -1,230.95 km

TABLE 2-3
SUMMARY OF MAXIMUM 24-HOUR AVERAGE EMISSION RATES FOR THE BART-ELIGIBLE EMISSIONS UNITS
MOSAIC NEW WALES

Source	EU ID	Model ID	PM ₁₀ lb/hr	NO _x lb/hr	SO ₂ lb/hr	H ₂ SO ₄ ^h lb/hr
Sulfuric Acid Plant No. 1	002	WALES2		14.5 ^b	422.9 ^b	12.1 ^b
Sulfuric Acid Plant No. 2	003	WALES3		14.5 ^b	422.9 ^b	12.1 ^b
Sulfuric Acid Plant No. 3	004	WALES4		15.0 ^b	438.1 ^b	12.5 ^b
DAP Plant No. 1	009	WALES9	26.8 ^a	10.2 ^c	29.0 ^c	0.37 ^c
MAP Plant	011	WALES11	15.0 ^a	--	--	--
Animal Feed Ingredients (AFI) Shipping/Truck Loading	015	WALES15	0.51 ^f	--	--	--
AFI Storage Silos (3) - "A" Side	023	WALES23	0.17 ^f	--	--	--
AFI Shipping Rail Car Loading	024	WALES24	0.51 ^f	--	--	--
AFI Limestone Storage Silos (2)	025	WALES25	0.69 ^f	--	--	--
AFI Silica Unloading and Storage	026	WALES26	0.51 ^f	--	--	--
AFI Plant	027	WALES27	36.8 ^a	42.3 ^c	141.3 ^c	1.8 ^c
AFI Storage Silos (3) - "B" Side	028	WALES28	0.17 ^f	--	--	--
Multifos Soda Ash Unloading System	030	WALES30	0.09 ^f	--	--	--
Multifos Soda Ash Conveying System	031	WALES31	0.17 ^f	--	--	--
Multifos "A" Kiln Cooler	032	WALES32	2.14 ^f	--	--	--
Multifos "B" Kiln Cooler	033	WALES33	2.14 ^f	--	--	--
Multifos A & B Kilns Milling & Sizing - West Bag Collector	034	WALES34	0.69 ^f	--	--	--
Multifos A & B Kilns Milling & Sizing - East Bag Collector	035	WALES35	0.69 ^f	--	--	--
Multifos A and B Kilns, Dryer and Blending Operation	036	WALES36	29.83 ^a	45.7 ^c	316.0 ^d	4.2 ^c
Multifos A&B Kilns Milling&Sizing - Surge Bin Bag Collector	038	WALES38	0.69 ^f	--	--	--
AFI Limestone Feed Bin	052	WALES52	0.17 ^f	--	--	--
MAP Plant Cooler	055	WALES55	1.71 ^f	--	--	--
1500 Ton Truck Unloading Sulfur Pit	063	WALES63	0.2 ^a	--	0.30 ^a	--
200 Ton Molten Sulfur Transfer Pit	066	WALES66	0.1 ^a	--	0.10 ^a	--
1500 Ton Truck Unloading Sulfur Pit, Front Vent	067	WALES67	0.2 ^a	--	0.30 ^a	--
1500 Ton Truck Unloading Sulfur Pit, Rear Vent	068	WALES68	0.2 ^a	--	0.30 ^a	--
Combined EU 15-26, 28-35, 38-68 ^e		COMBINED	11.75 ^c	--	--	--

^a Permit allowable emission rates from Permit 1050059-045-AV.

^b Based on maximum actual daily production rate during 2001-2003 and permit allowable emission limit in lb/ton H₂SO₄ production.

^c See Table 2-15 of January 2007 protocol.

^d Stack test data from 2001-2003.

^e Emission Units 15 to 26, 28 to 35, and 38 to 68 are modeled as one emission unit using the stack parameters of EU 68.

^f Based on 0.01 gr/scf and exhaust flow rates from Table 2-2.

TABLE 2-4
SUMMARY OF MAXIMUM 24-HOUR AVERAGE EMISSION RATES INCLUDING PROPOSED EMISSION LIMITS FOR SCENARIO A
USED IN BART MODELING
MOSAIC NEW WALES

Source	EU ID	Model ID	PM ₁₀ lb/hr	NO _x lb/hr	SO ₂ lb/hr	H ₂ SO ₄ lb/hr
Sulfuric Acid Plant No. 1	002	WALES2		14.5 ^a	422.9 ^b	7.1 ^d
Sulfuric Acid Plant No. 2	003	WALES3		14.5 ^a	422.9 ^b	7.1 ^d
Sulfuric Acid Plant No. 3	004	WALES4		14.5 ^a	438.1 ^b	7.1 ^d
DAP Plant No. 1	009	WALES9	15.0 ^d	2.8 ^c	0.02 ^c	0.00 ^c
MAP Plant	011	WALES11	7.0 ^d	--	--	--
Animal Feed Ingredients (AFI) Shipping/Truck Loading	015	WALES15	0.51 ^f	--	--	--
AFI Storage Silos (3) - "A" Side	023	WALES23	0.17 ^f	--	--	--
AFI Shipping Rail Car Loading	024	WALES24	0.51 ^f	--	--	--
AFI Limestone Storage Silos (2)	025	WALES25	0.69 ^f	--	--	--
AFI Silica Unloading and Storage	026	WALES26	0.51 ^f	--	--	--
AFI Plant	027	WALES27	36.8 ^a	37.8 ^c	0.08 ^c	0.0 ^c
AFI Storage Silos (3) - "B" Side	028	WALES28	0.17 ^f	--	--	--
Multifos Soda Ash Unloading System	030	WALES30	0.09 ^f	--	--	--
Multifos Soda Ash Conveying System	031	WALES31	0.17 ^f	--	--	--
Multifos "A" Kiln Cooler ^g	032	WALES32		--Shutdown--		
Multifos "B" Kiln Cooler ^g	033	WALES33		--Shutdown--		
Multifos A & B Kilns Milling & Sizing - West Bag Collector ^g	034	WALES34	0.69 ^f	--	--	--
Multifos A & B Kilns Milling & Sizing - East Bag Collector ^g	035	WALES35	0.69 ^f	--	--	--
Multifos A and B Kilns, Dryer and Blending Operation ^g	036	WALES36	10.0 ^h	--	--	--
Multifos A&B Kilns Milling&Sizing - Surge Bin Bag Collector ^g	038	WALES38	0.69 ^f	--	--	--
AFI Limestone Feed Bin	052	WALES52	0.17 ^f	--	--	--
MAP Plant Cooler	055	WALES55	1.71 ^f	--	--	--
1500 Ton Truck Unloading Sulfur Pit	063	WALES63	0.2 ^a	--	0.30 ^a	--
200 Ton Molten Sulfur Transfer Pit	066	WALES66	0.1 ^a	--	0.10 ^a	--
1500 Ton Truck Unloading Sulfur Pit, Front Vent	067	WALES67	0.2 ^a	--	0.30 ^a	--
1500 Ton Truck Unloading Sulfur Pit, Rear Vent	068	WALES68	0.2 ^a	--	0.30 ^a	--
Combined EU 15-26, 28-35, 38-68 ^e		COMBINED	7.47 ^c	--	--	--

^a Permit allowable emission rates from Permit 1050059-045-AV.

^b Based on maximum actual daily production rate during 2001-2003 and permit allowable emission limit in lb/ton H₂SO₄ production.

^c See Attachment A for calculation.

^d Based on proposed limit.

^e Emissions units 15 to 26, 28 to 35, and 38 to 68 are modeled as one emission unit using the stack parameters of EU 68.

^f Based on 0.01 grains/scf dust loading and exhaust flow rates from Table 2-2.

^g Based on proposed shutdown.

^h Emissions from only the blending operation, Multifos A and B Kilns would be shutdown.

TABLE 2-5
SUMMARY OF MAXIMUM 24-HOUR AVERAGE EMISSION RATES INCLUDING PROPOSED EMISSION LIMITS FOR SCENARIO B
USED IN BART MODELING
MOSAIC NEW WALES

Source	EU ID	Model ID	PM ₁₀ lb/hr	NO _x lb/hr	SO ₂ lb/hr	H ₂ SO ₄ lb/hr
Sulfuric Acid Plant No. 1	002	WALES2		16.0 ^a	400.0 ^a	6.7 ^a
Sulfuric Acid Plant No. 2	003	WALES3		16.0 ^a	400.0 ^a	6.7 ^a
Sulfuric Acid Plant No. 3	004	WALES4		16.0 ^a	400.0 ^a	6.7 ^a
DAP Plant No. 1	009	WALES9	15.0 ^a	2.8 ^c	0.02 ^c	0.00 ^c
MAP Plant	011	WALES11	7.0 ^a		--	--
Animal Feed Ingredients (AFI) Shipping/Truck Loading	015	WALES15	0.51 ^d	--	--	--
AFI Storage Silos (3) - "A" Side	023	WALES23	0.17 ^d	--	--	--
AFI Shipping Rail Car Loading	024	WALES24	0.51 ^d	--	--	--
AFI Limestone Storage Silos (2)	025	WALES25	0.69 ^d	--	--	--
AFI Silica Unloading and Storage	026	WALES26	0.51 ^d	--	--	--
AFI Plant	027	WALES27	31.4 ^b	37.8 ^c	0.08 ^c	0.0 ^c
AFI Storage Silos (3) - "B" Side	028	WALES28	0.17 ^d	--	--	--
Multifos Soda Ash Unloading System	030	WALES30	0.09 ^d	--	--	--
Multifos Soda Ash Conveying System	031	WALES31	0.17 ^d	--	--	--
Multifos "A" Kiln Cooler	032	WALES32	2.14 ^d	--	--	--
Multifos "B" Kiln Cooler	033	WALES33	2.14 ^d	--	--	--
Multifos A & B Kilns Milling & Sizing - West Bag Collector	034	WALES34	0.69 ^d	--	--	--
Multifos A & B Kilns Milling & Sizing - East Bag Collector	035	WALES35	0.69 ^d	--	--	--
Multifos A and B Kilns, Dryer and Blending Operation	036	WALES36	25.0 ^a	12.7 ^c	25.0 ^a	0.0 ^c
Multifos A&B Kilns Milling&Sizing - Surge Bin Bag Collector	038	WALES38	0.69 ^d	--	--	--
AFI Limestone Feed Bin	052	WALES52	0.17 ^d	--	--	--
MAP Plant Cooler	055	WALES55	1.71 ^d	--	--	--
1500 Ton Truck Unloading Sulfur Pit	063	WALES63	0.2 ^f	--	0.30 ^f	--
200 Ton Molten Sulfur Transfer Pit	066	WALES66	0.1 ^f	--	0.10 ^f	--
1500 Ton Truck Unloading Sulfur Pit, Front Vent	067	WALES67	0.2 ^f	--	0.30 ^f	--
1500 Ton Truck Unloading Sulfur Pit, Rear Vent	068	WALES68	0.2 ^f	--	0.30 ^f	--
Combined EU 15-26, 28-35, 38-68 ^e		COMBINED	11.75 ^c	--	--	--

^a Based on proposed limit.

^b Maximum of stack test data from the period 2004-2006.

^c See Attachment A for calculation.

^d Based on 0.01 grains/scf dust loading and exhaust flow rates from Table 2-2.

^e Emissions units 15 to 26, 28 to 35, and 38 to 68 are modeled as one emission unit using the stack parameters of EU 68.

^f Permit allowable emission rates from Permit 1050059-045-AV.

3.0 GEOPHYSICAL AND METEOROLOGICAL DATA

3.1 Modeling Domain and Terrain

CALMET data sets have been developed by EarthTech, Inc. that are based on the following 3 years of Fifth Generation Mesoscale Model (MM5) meteorological data assembled by VISTAS:

- 2001 MM5 data set at 12 km grid (developed by EPA),
- 2002 MM5 data set at 12 km grid (developed by VISTAS), and
- 2003 MM5 data set at 36 km grid (developed by Midwest Regional Planning Organization).

For the finer grid modeling analysis (refined analysis), the 4-km spacing Florida CALMET domain will be used. VISTAS has prepared a total of five sub-regional 4-km spacing CALMET domains. Domain 2 covers all Florida sources and Class I areas that can be potentially affected by the Florida sources.

Golder Associates Inc. (Golder) obtained these data sets from FDEP. As indicated in Section 1.3 of this protocol, the exemption modeling will be based on the finer grid modeling since the Mosaic New Wales facility is a large source that is likely to exceed the initial screening thresholds. Therefore, for the New Wales BART analyses, only the refined analysis will be performed to determine whether the source is exempt from BART.

3.2 Land Use and Meteorological Database

The CALMET meteorological domains to be used in the exemption modeling have been supplied by VISTAS. The CALMET data sets contain meteorological data and land use parameters for the three-dimensional modeling domain.

3.3 Air Quality Database

3.3.1 Ozone Concentrations

For these analyses, observed ozone data for 2001-2003 from CASTNet and Aerometric Information Retrieval System (AIRS) stations will be used. These data sets have been obtained from EarthTech's website as recommended by FDEP.

3.3.2 Ammonia Concentrations

A fixed monthly background ammonia concentration of 0.5 parts per billion (ppb) will be used based on FDEP's recommendation.

3.4 Natural Conditions at Class I Area

Based on VISTAS' recommendation, Visibility Method 6 will be used in all BART-related modeling, which computes extinction coefficients for hygroscopic species (modeled and background) using a monthly $f(RH)$ in lieu of calculating hourly RH factors. Monthly RH values from Table A-3 of EPA's *Guidance for Estimating Natural Visibility Conditions under the Regional Haze Rule* (Haze Guideline) will be used. Monthly RH factors for the Class I areas within 300 km of the Mosaic facilities are as follows:

Month	Chassahowitzka NWA	Everglades NP
January	3.8	2.7
February	3.5	2.6
March	3.4	2.6
April	3.2	2.4
May	3.3	2.4
June	3.9	2.7
July	3.9	2.6
August	4.2	2.9
September	4.1	3.0
October	3.9	2.8
November	3.7	2.6
December	3.9	2.7

Method 6 requires input of natural background (BK) concentrations of ammonium sulfate ($BKSO_4$), ammonium nitrate ($BKNO_3$), coarse particulates ($BKPMC$), organic carbon ($BKOC$), soil ($BKSOIL$), and elemental carbon ($BKEC$) in micrograms per cubic meter ($\mu g/m^3$). The model then calculates the natural background light extinction and haze index (HI) based on these values.

According to FDEP recommendations, the natural background light extinction may be based on HI values (in dv) for either the annual average or the 20-percent best visibility days provided by EPA in Appendix B of the Haze Guideline document (using the 10th percentile HI value). For Mosaic's BART analysis, the annual average HI values will be used to determine natural background light extinction of the Class I areas. The light extinction coefficient in inverse megameters (Mm^{-1}) is based on the concentration of the visibility impairing components and the extinction efficiency, in square meters per gram (m^2/g), for each component.

Per VISTAS and FDEP recommendations, the natural background light extinction that is equivalent to EPA-provided background HI values for each Class I area, based on the annual average, will be estimated using the following background values:

- Rayleigh scattering = $10 Mm^{-1}$;
- Concentrations of $BKSO_4$, $BKNO_3$, $BKPMC$, $BKOC$, and $BKEC$ = 0.0; and
- $BKSOIL$ concentration, which is estimated from the extinction coefficient that corresponds to EPA's HI value (corresponding to annual average) and then subtracting the Rayleigh scattering of $10 Mm^{-1}$ (assumes that the extinction efficiency of soil is $1 m^2/g$).

According to Appendix B of the Haze Guideline document, the annual average background light extinction coefficient for each PSD Class I area and corresponding calculated $BKSOIL$ concentrations are as follows:

- Chassahowitzka NWA – $21.45 Mm^{-1}$ (equivalent to 7.63 dv); $11.45 \mu g/m^3$
- Everglades NP – $20.77 Mm^{-1}$ (equivalent to 7.31 dv); $10.77 \mu g/m^3$

Currently, the atmospheric light extinction is estimated by an algorithm developed by the Interagency Monitoring of Protected Visual Environments (IMPROVE) committee, which was adopted by the EPA under the 1999 Regional Haze Rule (RHR). This algorithm for estimating light extinction from particle speciation data tends to underestimate light extinction for the highest haze conditions and overestimate it for the lowest haze conditions and does not include light extinction due to sea salt, which is important at sites near the sea coasts. As a result of these limitations, the IMPROVE Steering Committee recently developed a new algorithm (the "new IMPROVE algorithm") for estimating light extinction from particulate matter component concentrations, which provides a better correspondence between measured visibility and that calculated from particulate matter component concentrations.

The new algorithm splits the total sulfate, nitrate, and organic carbon compound concentrations into two fractions, representing small and large size distributions of those compounds. New terms added to the algorithm are light absorption by NO₂ gas and light scattering due to fine sea salt accompanied by its own hygroscopic scattering enhancement factor and Class I area specific Rayleigh scattering values rounded off to the nearest whole number. The EPA and the Federal Land Managers (FLMs) from the National Park Service and the U.S. Fish and Wildlife Service have determined that adding site-specific data (e.g., sea salt and site-specific Rayleigh scattering) to the old IMPROVE algorithm, for a hybrid approach, is not recommended and is allowing the optional use of the new IMPROVE algorithm.

Because one or more of the Class I areas within 300 km of the Mosaic New Wales facility are located near the sea coast, the new IMPROVE algorithm may additionally be used to calculate the natural background at these Class I areas. The new IMPROVE algorithm accounts for the background sea salt concentrations and site-specific Rayleigh scattering. Since the new IMPROVE equation cannot be directly implemented using the existing version of the CALPUFF model without additional post-processing or model revision, VISTAS has developed a methodology for implementing the new IMPROVE equation using existing CALPUFF/CALPOST output in a spreadsheet. This spreadsheet, known as the CALPOST-IMPROVE processor, will be used to re-calculate visibility impacts due to Mosaic New Wales's BART-eligible units in addition to the visibility impacts determined using the old IMPROVE equation.

It is assumed that ambient NO₂ concentrations due to Mosaic's BART eligible units would be very small, as to cause negligible light absorption. Therefore, light absorption by NO₂ gas, which is a new term added to the new IMPROVE algorithm, will not be considered for Mosaic New Wales's BART modeling analysis. The following Class I area specific Rayleigh scattering (in Mm⁻¹) and sea salt concentrations (in µg/m³) values will be used to evaluate the visibility impacts using the new CALPOST-IMPROVE processor:

- Chassahowitzka NWA – 11 Mm⁻¹ ; 0.08 µg/m³
- Everglades NP – 11 Mm⁻¹ ; 0.31 µg/m³

4.0 AIR QUALITY MODELING METHODOLOGY

For predicting maximum visibility impairment at the Class I Area, the CALPUFF modeling system will be used. For BART-related visibility impact assessments, Version 5.756 (060725) of the CALPUFF model is recommended for use by EPA and VISTAS. Recent technical enhancements, including changes to the over-water boundary layer formulation and coastal effects modules (sponsored by the Minerals Management Service), are included in this version. The CALPUFF model is a non-steady-state long-range transport Lagrangian puff dispersion model applicable for estimating visibility impacts. The methods and assumptions used in the CALPUFF model will be based on the latest recommendations for CALPUFF analysis as presented in the VISTAS modeling protocol, Interagency Workgroup on Air Quality Models (IWAQM) Phase 2 Summary Report and the Federal Land Managers' Air Quality Related Values Work Group (FLAG) document. This model is also maintained by EPA on the Support Center for Regulatory Air Models (SCRAM) website.

4.1 Modeling Domain Configuration

The 4-km spacing Florida domain will be used for the BART exemption modeling and if required, modeling to evaluate visibility benefits of different BART control measures. VISTAS has prepared five sub-regional 4-km spacing CALMET domains. Domain 2 covers sources in Florida and Class I areas that are affected by the sources in Florida.

4.2 CALMET Meteorological Domain

The refined CALMET domain to be used for the Mosaic BART modeling has been provided by FDEP. The major features used in preparing these CALMET data are described in Section 4.0 of the VISTAS BART modeling protocol.

4.3 CALPUFF Computational Domain and Receptors

The computational domain to be used for the refined modeling will be equal to the full extent of the meteorological domain. Visibility impacts will be predicted at each PSD Class I area using receptor locations provided by the FLMS. The receptors to be used for each of the PSD Class I areas are presented in Figures 4-1 and 4-2.

4.4 CALPUFF Modeling Options

The major CALPUFF modeling options recommended in the IWAQM guidance (EPA, 1988; Pages B-1 through B-8), in addition to the recommendations in Section 4.3.3 of the VISTAS BART modeling protocol, will be used. An example CALPUFF input file showing the default modeling options and modeling options to be used for Mosaic New Wales's BART analysis is presented in Attachment A.

4.5 Light Extinction and Haze Impact Calculations

The CALPOST program will be used to calculate the light extinction and the haze impact. The Method 6 technique, which is recommended by the BART guidance, will be used to compute change in light extinction.

4.6 Quality Assurance and Quality Control (QA/QC)

Quality assurance procedures will be established to ensure that the setup and execution of the CALPUFF model and processing of the modeling results satisfy the regulatory objectives of the BART program. The meteorological datasets to be used in the modeling were developed and provided by VISTAS and therefore, no further QA will be required for these.

The CALPUFF modeling options are described in Section 4.4. The site-specific source data will be independently confirmed by an independent modeler not involved in the initial setup of the modeling files. The verification will include:

- Units of measure;
- Verification of the correct source and receptor locations, including datum and projection;
- Confirmation of the switch selections relative to modeling guidance;
- Checks of the program switches and file names of the various processing steps; and
- Confirmation of the use of the proper version and level of each model program.

In addition, all the data and program files needed to reproduce the modeling results will be supplied with the modeling report.

The source and emission data will be independently verified by Golder and Mosaic. The source coordinates and related projection/datum parameters will be checked using the CALPUFF GUI's COORDS software and other comparable coordinate translation software such as CORPSCON and National Park Services Conversion Utilities software.

The POSTUTIL and CALPOST post-processor input files will be carefully checked to make sure of the following:

- Appropriate CALPUFF concentrations files are used in the POSTUTIL run;
- The PM species categories are computed using the appropriate fractions;
- Background light extinction computation method selected as Method 6;
- Correct monthly relative humidity adjustment factors used for the appropriate Class I area;
- Background light extinction values as described in Section 3.4 of this protocol;
- Appropriate species names for coarse and fine PM;
- Appropriate Rayleigh scattering term used; and
- Appropriate Class I receptors selected for each Class I area-specific CALPOST run.

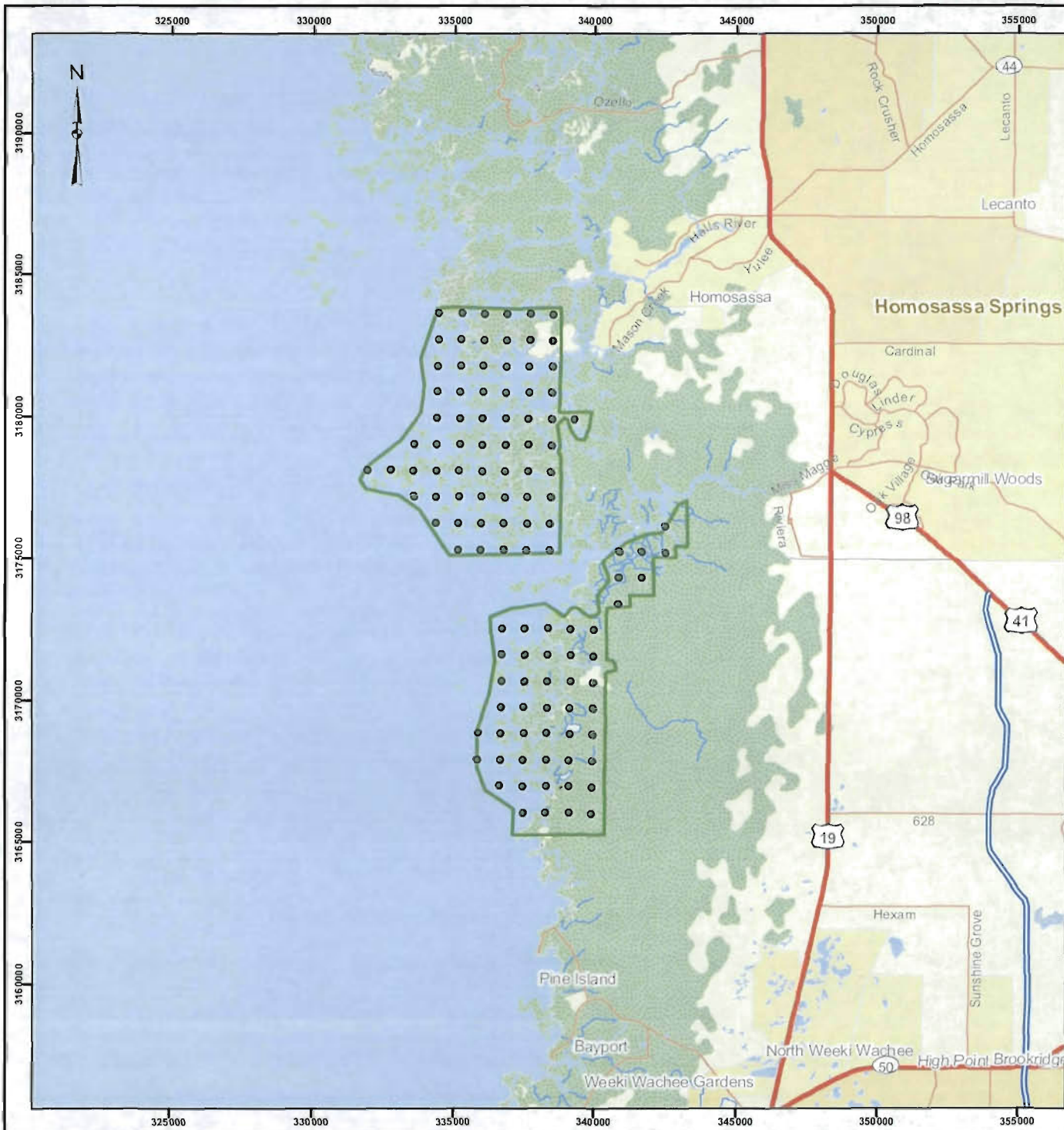
4.7 Modeling Report

A modeling report will be submitted containing the following information:

- Map of source location and Class I areas within 300 km of the source;
- Table showing visibility impacts at each Class I area within 300 km of the source, which would include the following:
 - 8th highest impact each year;
 - number of days and number of receptors with visibility impacts more than 0.5 dv for each year; and
 - 22nd highest impact over a period of three years.
- For the refined modeling analysis, a table showing the eight highest visibility impairment values ranked in a descending order for the prime Class I area(s) of interest.

If Mosaic New Wales elects to demonstrate that its impacts meet the BART exemption criteria, the predicted visibility impairment results for the exemption case will be presented. If the facility is not exempt, the predicted visibility impairment results for the base emission case and all evaluated BART

emission scenarios will be included in the report to show the effect on visibility for each proposed control technology. Final recommendations for BART will also be presented, based on the analysis results of the five evaluation criteria presented in the regulation.



LEGEND

- 113 Receptor Grid
- Class I Boundary

REFERENCE

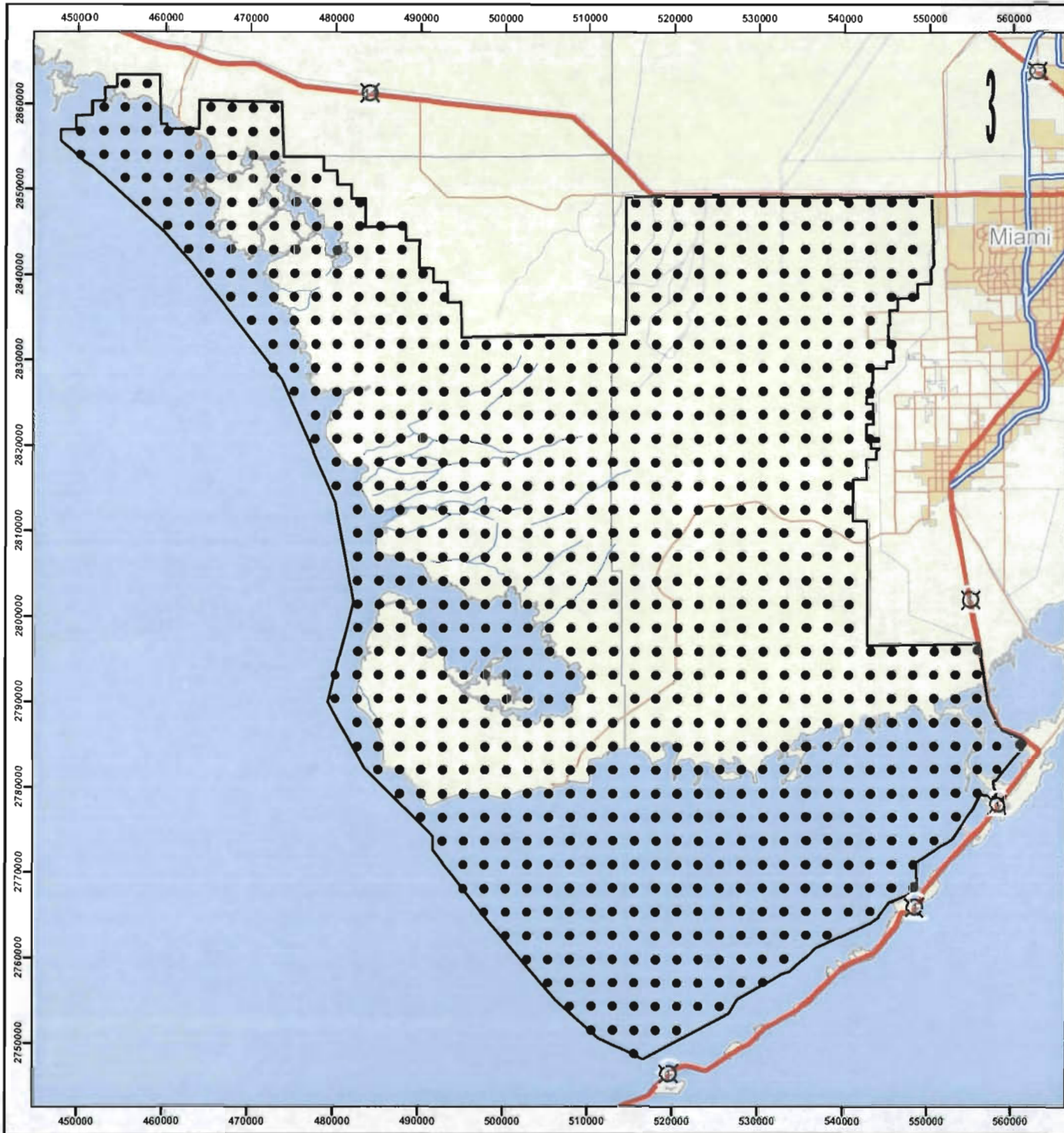
Projection: Transverse Mercator Datum: NAD 27 Coordinate System: UTM Zone 17

PROJECT MOSAIC FERTILIZER, LLC
BART MODELING PROTOCOL

TITLE Chassahowitzka NWA Receptor Grid

<p>Golder Associates Gainesville, Florida</p>	PROJECT No. 063-7643-0000	SCALE AS SHOWN	REV. 0
	DESIGN: AB 27 Apr 2008		
	GIS: AB 27 Apr 2008		

FIGURE 4-1



LEGEND

Everglades NP

- 901 Receptor Grid
- Class 1 Boundary

REFERENCE

Projection: Transverse Mercator Datum: NAD 27 Coordinate System: UTM Zone 17



PROJECT: MOSAIC FERTILIZER, LLC
BART MODELING PROTOCOL

TITLE: Everglades NP Receptor Grid



PROJECT No.	SCALE AS SHOWN	REV. 0
DESIGN: AB	26-Apr-2006	
GIS: AB	26-Apr-2006	

FIGURE 4-2

ATTACHMENT A

DETAILED EMISSION CALCULATIONS

TABLE A-1
MAXIMUM EMISSION RATES DUE TO NG COMBUSTION FOR THE DAP PLANT NO. 1 DRYER (EU 009)
MOSAIC NEW WALES

Pollutant	Maximum Heat Input Rate (MMBtu/hr)	Hourly Natural Gas Usage ^a (10 ⁶ scf/hr)	Annual Natural Gas Usage ^a (10 ⁶ scf/yr)	Annual Operating Hours (hrs/yr)	AP-42 Emissions Factor ^b	Emission Rate	
						Hourly (lb/hr)	Annual (TPY)
SO ₂	27.7	0.028	242.7	8,760	0.6 lb/10 ⁶ ft ³	0.02	0.07
NO _x	27.7	0.028	242.7	8,760	100 lb/10 ⁶ ft ³	2.77	12.1
CO	27.7	0.028	242.7	8,760	84 lb/10 ⁶ ft ³	2.33	10.2
VOC	27.7	0.028	242.7	8,760	5.5 lb/10 ⁶ ft ³	0.15	0.67

Footnotes:

^a Based on the heat content of natural gas of 1,000 Btu/scf.

^b Emission factors are based on AP-42, Section 1.4, July 1998.

TABLE A-2
MAXIMUM EMISSION RATES DUE TO NG COMBUSTION FOR THE AFI PLANT DRYER (EU 027)
MOSAIC NEW WALES

Pollutant	Maximum Heat Input Rate (MMBtu/hr)	Hourly Natural Gas Usage ^a (10 ⁶ scf/hr)	Annual Natural Gas Usage ^a (10 ⁶ scf/yr)	Annual Operating Hours (hrs/yr)	AP-42 Emissions Factor ^b	Emission Rate	
						Hourly (lb/hr)	Annual (TPY)
SO ₂	135	0.135	1,182.6	8,760	0.6 lb/10 ⁶ ft ³	0.08	0.35
NO _x	135	0.135	1,182.6	8,760	280 lb/10 ⁶ ft ³	37.8	165.6
CO	135	0.135	1,182.6	8,760	84 lb/10 ⁶ ft ³	11.3	49.7
VOC	135	0.135	1,182.6	8,760	5.5 lb/10 ⁶ ft ³	0.74	3.25

Footnotes:

^a Based on the heat content of natural gas of 1,000 Btu/scf.

^b Emission factors are based on AP-42, Section 1.4, July 1998.

TABLE A-3
MAXIMUM EMISSION RATES DUE TO NG COMBUSTION FOR THE MULTIFOS A AND B KILNS & DRYER (EU 036)
MOSAIC NEW WALES

Pollutant	Maximum Heat Input Rate ^a (MMBtu/hr)	Hourly Natural Gas Usage ^b (10 ⁶ scf/hr)	Annual Natural Gas Usage ^c (10 ⁶ scf/yr)	Annual Operating Hours (hrs/yr)	AP-42 Emissions Factor ^b	Emission Rate	
						Hourly (lb/hr)	Annual (TPY)
SO ₂	127	0.127	1,112.5	8,760	0.6 lb/10 ⁶ ft ³	0.08	0.33
NO _x	127	0.127	1,112.5	8,760	100 lb/10 ⁶ ft ³	12.7	55.6
CO	127	0.127	1,112.5	8,760	84 lb/10 ⁶ ft ³	10.7	46.7
VOC	127	0.127	1,112.5	8,760	5.5 lb/10 ⁶ ft ³	0.70	3.06

Footnotes:

^a Maximum heat input based on maximum heat inputs of 15 MMBtu/hr to the dryer and 56 MMBtu/hr to each of the kilns.

^b Based on the heat content of natural gas of 1,000 Btu/scf.

^c Emission factors are based on AP-42, Section 1.4, July 1998.

ATTACHMENT B

EXAMPLE CALPUFF INPUT FILE

EXAMPLE FACILITY XYZ - CALPUFF
 IMPACTS AT SOURCE-SPECIFIC CLASS I AREAS
 4-km FLORIDA DOMAIN (VISTAS REFINED DOMAIN 2), 2001
 ----- Run title (3 lines) -----

CALPUFF MODEL CONTROL FILE

INPUT GROUP: 0 -- Input and Output File Names

Default Name	Type	File Name
CALMET.DAT	input	* METDAT = *
or		
ISCMET.DAT	input	* ISCDAT = *
or		
PLMMET.DAT	input	* PLMDAT = *
or		
PROFILE.DAT	input	* PRFDAT = *
SURFACE.DAT	input	* SFCDAT = *
RESTARTB.DAT	input	* RSTARTB= *

CALPUFF.LST	output	! PUFLLST = PUFFEXP.LST !
CONC.DAT	output	! CONDAT = PUFFEXP.CON !
DFLX.DAT	output	* DFDAT = *
WFLX.DAT	output	* WFDAT = *
VISB.DAT	output	* VISDAT = *
TK2D.DAT	output	* T2DDAT = *
RHO2D.DAT	output	* RHODAT = *
RESTARTE.DAT	output	* RSTARTE= *

Emission Files

PTEMARB.DAT	input	* PTDAT = *
VOLEMARB.DAT	input	* VOLDAT = *
BAEMARB.DAT	input	* ARDAT = *
LNEMARB.DAT	input	* LNDAT = *

Other Files

OZONE.DAT	input	! OZDAT =C:\BARTHRO3\2001FLOz.DAT !
VD.DAT	input	* VDDAT = *
CHEM.DAT	input	* CHEMDAT= *
H2O2.DAT	input	* H2O2DAT= *
HILL.DAT	input	* HILDAT= *
HILLRCT.DAT	input	* RCTDAT= *
COASTLN.DAT	input	* CSTDAT= *
FLUXBDY.DAT	input	* BDYDAT= *
BCON.DAT	input	* BCNDAT= *
DEBUG.DAT	output	* DEBUG = *
MASSFLX.DAT	output	* FLXDAT= *
MASSBAL.DAT	output	* BALDAT= *
FOG.DAT	output	* FOGDAT= *

All file names will be converted to lower case if LCFILES = T
 Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
 T = lower case ! LCFILES = T !
 F = UPPER CASE

NOTE: (1) file/path names can be up to 70 characters in length

Provision for multiple input files

Number of CALMET.DAT files for run (NMETDAT)	Default: 1	! NMETDAT = 36 !
Number of PTEMARB.DAT files for run (NPTDAT)	Default: 0	! NPTDAT = 0 !
Number of BAEMARB.DAT files for run (NARDAT)		

Default: 0 ! NARDAT = 0 !

Number of VOLEMARB.DAT files for run (NVOLDAT)

Default: 0 ! NVOLDAT = 0 !

!END!

Subgroup (0a)

The following CALMET.DAT filenames are processed in sequence if NMETDAT>1

Default Name	Type	File Name
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-01A.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-01B.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-01C.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-02A.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-02B.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-02C.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-03A.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-03B.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-03C.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-04A.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-04B.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-04C.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-05A.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-05B.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-05C.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-06A.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-06B.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-06C.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-07A.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-07B.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-07C.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-08A.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-08B.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-08C.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-09A.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-09B.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-09C.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-10A.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-10B.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-10C.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-11A.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-11B.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-11C.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-12A.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-12B.DAT ! !END!
CALMET.DAT	input	! METDAT =E:\FLA4KM\2001\MET2001-DOM2-12C.DAT ! !END!

INPUT GROUP: 1 -- General run control parameters

Option to run all periods found
in the met. file (METRUN) Default: 0 ! METRUN = 0 !

METRUN = 0 - Run period explicitly defined below
METRUN = 1 - Run all periods in met. file

Starting date: Year (IBYR) -- No default ! IBYR = 2001 !
(used only if Month (IBMO) -- No default ! IBMO = 1 !
METRUN = 0) Day (IBDY) -- No default ! IBDY = 1 !
Hour (IBHR) -- No default ! IBHR = 1 !

Base time zone (XBTZ) -- No default ! XBTZ = 5.0 !
PST = 8., MST = 7.
CST = 6., EST = 5.

Length of run (hours) (IRLG) -- No default ! IRLG = 8760 !

Number of chemical species (NSPEC)
Default: 5 ! NSPEC = 11 !

1 = yes (slug model used)

Transitional plume rise modeled ?
(MTRANS) Default: 1 ! MTRANS = 1 !
0 = no (i.e., final rise only)
1 = yes (i.e., transitional rise computed)

Stack tip downwash? (MTIP) Default: 1 ! MTIP = 1 !
0 = no (i.e., no stack tip downwash)
1 = yes (i.e., use stack tip downwash)

Vertical wind shear modeled above
stack top? (MSHEAR) Default: 0 ! MSHEAR = 0 !
0 = no (i.e., vertical wind shear not modeled)
1 = yes (i.e., vertical wind shear modeled)

Puff splitting allowed? (MSPLIT) Default: 0 ! MSPLIT = 0 !
0 = no (i.e., puffs not split)
1 = yes (i.e., puffs are split)

Chemical mechanism flag (MCHEM) Default: 1 ! MCHEM = 1 !
0 = chemical transformation not modeled
1 = transformation rates computed internally (MESOPUFF II scheme)
2 = user-specified transformation rates used
3 = transformation rates computed internally (RIVAD/ARM3 scheme)
4 = secondary organic aerosol formation computed (MESOPUFF II scheme for OH)

Aqueous phase transformation flag (MAQCHEM)
(Used only if MCHEM = 1, or 3) Default: 0 ! MAQCHEM = 0 !
0 = aqueous phase transformation not modeled
1 = transformation rates adjusted for aqueous phase reactions

Wet removal modeled ? (MWET) Default: 1 ! MWET = 1 !
0 = no
1 = yes

Dry deposition modeled ? (MDRY) Default: 1 ! MDRY = 1 !
0 = no
1 = yes
(dry deposition method specified for each species in Input Group 3)

Method used to compute dispersion coefficients (MDISP) Default: 3 ! MDISP = 3 !
1 = dispersion coefficients computed from measured values of turbulence, sigma v, sigma w
2 = dispersion coefficients from internally calculated sigma v, sigma w using micrometeorological variables (u*, w*, L, etc.)
3 = PG dispersion coefficients for RURAL areas (computed using the ISCST multi-segment approximation) and MP coefficients in urban areas
4 = same as 3 except PG coefficients computed using the MESOPUFF II eqns.
5 = CTDM sigmas used for stable and neutral conditions. For unstable conditions, sigmas are computed as in MDISP = 3, described above. MDISP = 5 assumes that measured values are read

Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
(Used only if MDISP = 1 or 5) Default: 3 ! MTURBVW = 3 !
1 = use sigma-v or sigma-theta measurements from PROFILE.DAT to compute sigma-y (valid for METFM = 1, 2, 3, 4)
2 = use sigma-w measurements from PROFILE.DAT to compute sigma-z (valid for METFM = 1, 2, 3, 4)

- 3 = use both sigma-(v/theta) and sigma-w from PROFILE.DAT to compute sigma-y and sigma-z (valid for METFM = 1, 2, 3, 4)
- 4 = use sigma-theta measurements from PLMMET.DAT to compute sigma-y (valid only if METFM = 3)

Back-up method used to compute dispersion when measured turbulence data are missing (MDISP2)

Default: 3 ! MDISP2 = 3 !

(used only if MDISP = 1 or 5)

- 2 = dispersion coefficients from internally calculated sigma v, sigma w using micrometeorological variables (u*, w*, L, etc.)
- 3 = PG dispersion coefficients for RURAL areas (computed using the ISCST multi-segment approximation) and MP coefficients in urban areas
- 4 = same as 3 except PG coefficients computed using the MESOPUFF II eqns.

PG sigma-y,z adj. for roughness? (MROUGH)

Default: 0 ! MROUGH = 0 !

- 0 = no
- 1 = yes

Partial plume penetration of elevated inversion? (MPARTL)

Default: 1 ! MPARTL = 1 !

- 0 = no
- 1 = yes

Strength of temperature inversion provided in PROFILE.DAT extended records? (MTINV)

Default: 0 ! MTINV = 0 !

- 0 = no (computed from measured/default gradients)
- 1 = yes

PDF used for dispersion under convective conditions? (MPDF)

Default: 0 ! MPDF = 0 !

- 0 = no
- 1 = yes

Sub-Grid TIBL module used for shore line? (MSGTIBL)

Default: 0 ! MSGTIBL = 0 !

- 0 = no
- 1 = yes

Boundary conditions (concentration) modeled? (MBCON)

Default: 0 ! MBCON = 0 !

- 0 = no
- 1 = yes

Analyses of fogging and icing impacts due to emissions from arrays of mechanically-forced cooling towers can be performed using CALPUFF in conjunction with a cooling tower emissions processor (CTEMISS) and its associated postprocessors. Hourly emissions of water vapor and temperature from each cooling tower cell are computed for the current cell configuration and ambient conditions by CTEMISS. CALPUFF models the dispersion of these emissions and provides cloud information in a specialized format for further analysis. Output to FOG.DAT is provided in either 'plume mode' or 'receptor mode' format.

Configure for FOG Model output? (MFOG)

Default: 0 ! MFOG = 0 !

- 0 = no
- 1 = yes - report results in PLUME Mode format
- 2 = yes - report results in RECEPTOR Mode format

Test options specified to see if
they conform to regulatory
values? (MREG)

Default: 1 ! MREG = 1 !

0 = NO checks are made
1 = Technical options must conform to USEPA
Long Range Transport (LRT) guidance

METEM	1 or 2
AVET	60. (min)
PGTIME	60. (min)
MGAUSS	1
MCTADJ	3
MTRANS	1
MTIP	1
MCHEM	1 or 3 (if modeling SOx, NOx)
MWET	1
MDRY	1
MDISP	2 or 3
MPDF	0 if MDISP=3 1 if MDISP=2
MROUGH	0
MPARTL	1
SYTDEP	550. (m)
MHFTSZ	0

!END!

INPUT GROUP: 3a, 3b -- Species list

Subgroup (3a)

The following species are modeled:

```
! CSPEC =      SO2 !           !END!
! CSPEC =      SO4 !           !END!
! CSPEC =      NOX !           !END!
! CSPEC =      HNO3 !          !END!
! CSPEC =      NO3 !           !END!
! CSPEC =      PM0063 !        !END!
! CSPEC =      PM0100 !        !END!
! CSPEC =      PM0125 !        !END!
! CSPEC =      PM0250 !        !END!
! CSPEC =      PM0600 !        !END!
! CSPEC =      PM1000 !        !END!
```

SPECIES NAME (Limit: 12 Characters in length)	MODELED (0=NO, 1=YES)	EMITTED (0=NO, 1=YES)	Dry DEPOSITED (0=NO, 1=COMPUTED-GAS 2=COMPUTED-PARTICLE 3=USER-SPECIFIED)	OUTPUT GROUP NUMBER (0=NONE, 1=1st CGRUP, 2=2nd CGRUP, 3= etc.)
! SO2 =	1,	1,	1,	0 !
! SO4 =	1,	1,	2,	0 !
! NOX =	1,	1,	1,	0 !
! HNO3 =	1,	0,	1,	0 !
! NO3 =	1,	0,	2,	0 !
! PM0063 =	1,	1,	2,	1 !
! PM0100 =	1,	1,	2,	1 !
! PM0125 =	1,	1,	2,	1 !
! PM0250 =	1,	1,	2,	1 !
! PM0600 =	1,	1,	2,	1 !
! PM1000 =	1,	1,	2,	1 !

!END!

Subgroup (3b)

The following names are used for Species-Groups in which results for certain species are combined (added) prior to output. The CGRUP name will be used as the species name in output files. Use this feature to model specific particle-size distributions by treating each size-range as a separate species. Order must be consistent with 3(a) above.

! CGRUP = PM10 ! !END!

INPUT GROUP: 4 -- Map Projection and Grid control parameters

Projection for all (X,Y):

Map projection

(PMAP) Default: UTM ! PMAP = LCC !

UTM : Universal Transverse Mercator
TTM : Tangential Transverse Mercator
LCC : Lambert Conformal Conic
PS : Polar Stereographic
EM : Equatorial Mercator
LAZA : Lambert Azimuthal Equal Area

False Easting and Northing (km) at the projection origin

(Used only if PMAP= TTM, LCC, or LAZA)

(FEAST) Default=0.0 ! FEAST = 0.000 !
(FNORTH) Default=0.0 ! FNORTH = 0.000 !

UTM zone (1 to 60)

(Used only if PMAP=UTM)

(IUTMZN) No Default ! IUTMZN = 0 !

Hemisphere for UTM projection?

(Used only if PMAP=UTM)

(UTMHEM) Default: N ! UTMHEM = N !

N : Northern hemisphere projection
S : Southern hemisphere projection

Latitude and Longitude (decimal degrees) of projection origin

(Used only if PMAP= TTM, LCC, PS, EM, or LAZA)

(RLAT0) No Default ! RLAT0 = 40N !
(RLON0) No Default ! RLON0 = 97W !

TTM : RLON0 identifies central (true N/S) meridian of projection
RLAT0 selected for convenience
LCC : RLON0 identifies central (true N/S) meridian of projection
RLAT0 selected for convenience
PS : RLON0 identifies central (grid N/S) meridian of projection
RLAT0 selected for convenience
EM : RLON0 identifies central meridian of projection
RLAT0 is REPLACED by 0.0N (Equator)
LAZA: RLON0 identifies longitude of tangent-point of mapping plane
RLAT0 identifies latitude of tangent-point of mapping plane

Matching parallel(s) of latitude (decimal degrees) for projection

(Used only if PMAP= LCC or PS)

(XLAT1) No Default ! XLAT1 = 33N !
(XLAT2) No Default ! XLAT2 = 45N !

LCC : Projection cone slices through Earth's surface at XLAT1 and XLAT2
PS : Projection plane slices through Earth at XLAT1
(XLAT2 is not used)

Note: Latitudes and longitudes should be positive, and include a letter N,S,E, or W indicating north or south latitude, and east or west longitude. For example,
35.9 N Latitude = 35.9N
118.7 E Longitude = 118.7E

Datum-region

The Datum-Region for the coordinates is identified by a character string. Many mapping products currently available use the model of the Earth known as the World Geodetic System 1984 (WGS-84). Other local models may be in use, and their selection in CALMET will make its output consistent with local mapping products. The list of Datum-Regions with official transformation parameters is provided by the National Imagery and Mapping Agency (NIMA).

NIMA Datum - Regions(Examples)

WGS-84	WGS-84 Reference Ellipsoid and Geoid, Global coverage (WGS84)
NAS-C	NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS (NAD27)
NAR-C	NORTH AMERICAN 1983 GRS 80 Spheroid, MEAN FOR CONUS (NAD83)
NWS-84	NWS 6370KM Radius, Sphere
ESR-S	ESRI REFERENCE 6371KM Radius, Sphere

Datum-region for output coordinates
 (DATUM) Default: WGS-G ! DATUM = NWS-84 !

METEOROLOGICAL Grid:

Rectangular grid defined for projection PMAP,
 with X the Easting and Y the Northing coordinate

No. X grid cells (NX)	No default	! NX = 263 !
No. Y grid cells (NY)	No default	! NY = 206 !
No. vertical layers (NZ)	No default	! NZ = 10 !
Grid spacing (DGRIDKM)	No default	! DGRIDKM = 4. !
	Units: km	

Cell face heights
 (ZFACE(nz+1)) No defaults
 Units: m

! ZFACE = 0.,20.,40.,80.,160.,320.,640.,1200.,2000.,3000.,4000. !

Reference Coordinates
 of SOUTHWEST corner of
 grid cell(1, 1):

X coordinate (XORIGKM)	No default	! XORIGKM = 721.995 !
Y coordinate (YORIGKM)	No default	! YORIGKM = -1598.000 !
	Units: km	

COMPUTATIONAL Grid:

The computational grid is identical to or a subset of the MET. grid. The lower left (LL) corner of the computational grid is at grid point (IBCOMP, JBCOMP) of the MET. grid. The upper right (UR) corner of the computational grid is at grid point (IECOMP, JECOMP) of the MET. grid. The grid spacing of the computational grid is the same as the MET. grid.

X index of LL corner (IBCOMP) (1 <= IBCOMP <= NX)	No default	! IBCOMP = 1 !
Y index of LL corner (JBCOMP) (1 <= JBCOMP <= NY)	No default	! JBCOMP = 1 !
X index of UR corner (IECOMP) (1 <= IECOMP <= NX)	No default	! IECOMP = 263 !
Y index of UR corner (JECOMP) (1 <= JECOMP <= NY)	No default	! JECOMP = 206 !

SAMPLING Grid (GRIDDED RECEPTORS):

The lower left (LL) corner of the sampling grid is at grid point (IBSAMP, JBSAMP) of the MET. grid. The upper right (UR) corner of the

sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
 The sampling grid must be identical to or a subset of the computational
 grid. It may be a nested grid inside the computational grid.
 The grid spacing of the sampling grid is DGRIDKM/MESH DN.

```

Logical flag indicating if gridded
receptors are used (LSAMP)      Default: T      ! LSAMP = F !
(T=yes, F=no)

X index of LL corner (IBSAMP)    No default     ! IBSAMP = 1  !
(IBCAMP <= IBSAMP <= IECOMP)

Y index of LL corner (JBSAMP)    No default     ! JBSAMP = 1  !
(JBCOMP <= JBSAMP <= JECOMP)

X index of UR corner (IESAMP)    No default     ! IESAMP = 263 !
(IBCAMP <= IESAMP <= IECOMP)

Y index of UR corner (JESAMP)    No default     ! JESAMP = 206 !
(JBCOMP <= JESAMP <= JECOMP)

Nesting factor of the sampling
grid (MESH DN)                  Default: 1      ! MESH DN = 1  !
(MESH DN is an integer >= 1)
  
```

!END!

 INPUT GROUP: 5 -- Output Options

FILE	DEFAULT VALUE	VALUE THIS RUN
Concentrations (ICON)	1	! ICON = 1 !
Dry Fluxes (IDRY)	1	! IDRY = 0 !
Wet Fluxes (IWET)	1	! IWET = 0 !
Relative Humidity (IVIS) (relative humidity file is required for visibility analysis)	1	! IVIS = 0 !
Use data compression option in output file? (LCOMPRS)	Default: T	! LCOMPRS = T !

*
 0 = Do not create file, 1 = create file

DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

```

Mass flux across specified boundaries
for selected species reported hourly?
(IMFLX)      Default: 0      ! IMFLX = 0  !
0 = no
1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
are specified in Input Group 0)
  
```

```

Mass balance for each species
reported hourly?
(IMBAL)      Default: 0      ! IMBAL = 0  !
0 = no
1 = yes (MASSBAL.DAT filename is
specified in Input Group 0)
  
```

LINE PRINTER OUTPUT OPTIONS:

```

Print concentrations (ICPRT)    Default: 0      ! ICPRT = 0  !
Print dry fluxes (IDPRT)       Default: 0      ! IDPRT = 0  !
Print wet fluxes (IWPRT)       Default: 0      ! IWPRT = 0  !
  
```

(0 = Do not print, 1 = Print)

Concentration print interval
(ICFRQ) in hours Default: 1 ! ICFRQ = 24 !
Dry flux print interval
(IDFRQ) in hours Default: 1 ! IDFRQ = 1 !
Wet flux print interval
(IWFRQ) in hours Default: 1 ! IWFRQ = 1 !

Units for Line Printer Output
(IPRTU) Default: 1 ! IPRTU = 3 !
 for for
 Concentration Deposition
1 = g/m**3 g/m**2/s
2 = mg/m**3 mg/m**2/s
3 = ug/m**3 ug/m**2/s
4 = ng/m**3 ng/m**2/s
5 = Odour Units

Messages tracking progress of run
written to the screen ?
(IMESG) Default: 2 ! IMESG = 2 !
0 = no
1 = yes (advection step, puff ID)
2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)

SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

MASS FLUX -- SPECIES /GROUP ON DISK?	---- CONCENTRATIONS ----		----- DRY FLUXES -----		----- WET FLUXES -----		---
	PRINTED?	SAVED ON DISK?	PRINTED?	SAVED ON DISK?	PRINTED?	SAVED ON DISK?	
! SO2 =	0,	1,	0,	1,	0,	1,	0 !
! SO4 =	0,	1,	0,	1,	0,	1,	0 !
! NOX =	0,	1,	0,	1,	0,	1,	0 !
! HNO3 =	0,	1,	0,	1,	0,	1,	0 !
! NO3 =	0,	1,	0,	1,	0,	1,	0 !
! PM10 =	0,	1,	0,	1,	0,	1,	0 !

OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

Logical for debug output
(LDEBUG) Default: F ! LDEBUG = F !
First puff to track
(IPFDEB) Default: 1 ! IPFDEB = 1 !
Number of puffs to track
(NPFDEB) Default: 1 ! NPFDEB = 1 !
Met. period to start output
(NN1) Default: 1 ! NN1 = 1 !
Met. period to end output
(NN2) Default: 10 ! NN2 = 10 !

!END!

INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs

Subgroup (6a)

Number of terrain features (NHILL) Default: 0 ! NHILL = 0 !
Number of special complex terrain

```

receptors (NCTREC) Default: 0 ! NCTREC = 0 !

Terrain and CTSG Receptor data for
CTSG hills input in CTDM format ?
(MHILL) No Default ! MHILL = 2 !
1 = Hill and Receptor data created
  by CTDM processors & read from
  HILL.DAT and HILLRCT.DAT files
2 = Hill data created by OPTHILL &
  input below in Subgroup (6b);
  Receptor data in Subgroup (6c)

Factor to convert horizontal dimensions Default: 1.0 ! XHILL2M = 1. !
to meters (MHILL=1)

Factor to convert vertical dimensions Default: 1.0 ! ZHILL2M = 1. !
to meters (MHILL=1)

X-origin of CTDM system relative to No Default ! XCTDMKM = 0.0E00 !
CALPUFF coordinate system, in Kilometers (MHILL=1)

Y-origin of CTDM system relative to No Default ! YCTDMKM = 0.0E00 !
CALPUFF coordinate system, in Kilometers (MHILL=1)

```

! END !

Subgroup (6b)

1 **
HILL information

HILL AMAX1 NO. (m)	XC AMAX2 (km)	YC (km)	THETAH (deg.)	ZGRID (m)	RELIEF (m)	EXPO 1 (m)	EXPO 2 (m)	SCALE 1 (m)	SCALE 2 (m)	(m)
----	----	----	-----	-----	-----	-----	-----	-----	-----	-----

Subgroup (6c)

COMPLEX TERRAIN RECEPTOR INFORMATION

XRCT (km)	YRCT (km)	ZRCT (m)	XHH
-----	-----	-----	-----

1

Description of Complex Terrain Variables:

XC, YC = Coordinates of center of hill
THETAH = Orientation of major axis of hill (clockwise from North)
ZGRID = Height of the 0 of the grid above mean sea level
RELIEF = Height of the crest of the hill above the grid elevation
EXPO 1 = Hill-shape exponent for the major axis
EXPO 2 = Hill-shape exponent for the major axis
SCALE 1 = Horizontal length scale along the major axis
SCALE 2 = Horizontal length scale along the minor axis
AMAX = Maximum allowed axis length for the major axis
BMAX = Maximum allowed axis length for the major axis

XRCT, YRCT = Coordinates of the complex terrain receptors
ZRCT = Height of the ground (MSL) at the complex terrain Receptor
XHH = Hill number associated with each complex terrain receptor
(NOTE: MUST BE ENTERED AS A REAL NUMBER)

**

NOTE: DATA for each hill and CTSG receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

 INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases

SPECIES COEFFICIENT NAME (dimensionless)	DIFFUSIVITY (cm**2/s)	ALPHA STAR	REACTIVITY	MESOPHYLL RESISTANCE (s/cm)	HENRY'S LAW
! SO2 =	0.1509,	1000,	8,	0,	0.04 !
! NOX =	0.1656,	1,	8,	5,	3.5 !
! HNO3 =	0.1628,	1,	18,	0,	0.0000008 !

!END!

 INPUT GROUP: 8 -- Size parameters for dry deposition of particles

For SINGLE SPECIES, the mean and standard deviation are used to compute a deposition velocity for NINT (see group 9) size-ranges, and these are then averaged to obtain a mean deposition velocity.

For GROUPED SPECIES, the size distribution should be explicitly specified (by the 'species' in the group), and the standard deviation for each should be entered as 0. The model will then use the deposition velocity for the stated mean diameter.

SPECIES NAME	GEOMETRIC MASS MEAN DIAMETER (microns)	GEOMETRIC STANDARD DEVIATION (microns)
! SO4 =	0.48,	2. !
! NO3 =	0.48,	2. !
! PM0063 =	0.63,	0. !
! PM0100 =	1.00,	0. !
! PM0125 =	1.25,	0. !
! PM0250 =	2.50,	0. !
! PM0600 =	6.00,	0. !
! PM1000 =	10.00,	0. !

!END!

 INPUT GROUP: 9 -- Miscellaneous dry deposition parameters

Reference cuticle resistance (s/cm)
 (RCUTR) Default: 30 ! RCUTR = 30.0 !
 Reference ground resistance (s/cm)
 (RGR) Default: 10 ! RGR = 10.0 !
 Reference pollutant reactivity
 (REACTR) Default: 8 ! REACTR = 8.0 !

Number of particle-size intervals used to
 evaluate effective particle deposition velocity
 (NINT) Default: 9 ! NINT = 9 !

Vegetation state in unirrigated areas
 (IVEG) Default: 1 ! IVEG = 1 !
 IVEG=1 for active and unstressed vegetation
 IVEG=2 for active and stressed vegetation

IVEG=3 for inactive vegetation

!END!

INPUT GROUP: 10 -- Wet Deposition Parameters

Scavenging Coefficient -- Units: (sec)**(-1)

Pollutant	Liquid Precip.	Frozen Precip.
! SO2 =	3.0E-05,	0.0E00 !
! SO4 =	1.0E-04,	3.0E-05 !
! HNO3 =	6.0E-05,	0.0E00 !
! NO3 =	1.0E-04,	3.0E-05 !
! PM0063 =	1.0E-04,	3.0E-05 !
! PM0100 =	1.0E-04,	3.0E-05 !
! PM0125 =	1.0E-04,	3.0E-05 !
! PM0250 =	1.0E-04,	3.0E-05 !
! PM0600 =	1.0E-04,	3.0E-05 !
! PM1000 =	1.0E-04,	3.0E-05 !

!END!

INPUT GROUP: 11 -- Chemistry Parameters

Ozone data input option (MOZ) Default: 1 ! MOZ = 1 !
(Used only if MCHEM = 1, 3, or 4)
0 = use a monthly background ozone value
1 = read hourly ozone concentrations from
the OZONE.DAT data file

Monthly ozone concentrations
(Used only if MCHEM = 1, 3, or 4 and
MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
(BCKO3) in ppb Default: 12*80.
! BCKO3 = 12*50. !

Monthly ammonia concentrations
(Used only if MCHEM = 1, or 3)
(BCKNH3) in ppb Default: 12*10.
! BCKNH3 = 12*0.5 !

Nighttime SO2 loss rate (RNITE1)
in percent/hour Default: 0.2 ! RNITE1 = .2 !

Nighttime NOx loss rate (RNITE2)
in percent/hour Default: 2.0 ! RNITE2 = 2.0 !

Nighttime HNO3 formation rate (RNITE3)
in percent/hour Default: 2.0 ! RNITE3 = 2.0 !

H2O2 data input option (MH2O2) Default: 1 ! MH2O2 = 1 !
(Used only if MAQCHEM = 1)
0 = use a monthly background H2O2 value
1 = read hourly H2O2 concentrations from
the H2O2.DAT data file

Monthly H2O2 concentrations
(Used only if MAQCHEM = 1 and
MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
(BCKH2O2) in ppb Default: 12*1.
! BCKH2O2 = 12*1 !

--- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
 (used only if MCHM = 4)

The SOA module uses monthly values of:
 Fine particulate concentration in ug/m³ (BCKPMF)
 Organic fraction of fine particulate (OFRAC)
 VOC / NOX ratio (after reaction) (VCNX)

to characterize the air mass when computing
 the formation of SOA from VOC emissions.

Typical values for several distinct air mass types are:

Month	1	2	3	4	5	6	7	8	9	10	11	12
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Clean Continental												
BCKPMF	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
OFRAC	.15	.15	.20	.20	.20	.20	.20	.20	.20	.20	.20	.15
VCNX	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.
Clean Marine (surface)												
BCKPMF	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5
OFRAC	.25	.25	.30	.30	.30	.30	.30	.30	.30	.30	.30	.25
VCNX	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.
Urban - low biogenic (controls present)												
BCKPMF	30.	30.	30.	30.	30.	30.	30.	30.	30.	30.	30.	30.
OFRAC	.20	.20	.25	.25	.25	.25	.25	.25	.20	.20	.20	.20
VCNX	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
Urban - high biogenic (controls present)												
BCKPMF	60.	60.	60.	60.	60.	60.	60.	60.	60.	60.	60.	60.
OFRAC	.25	.25	.30	.30	.30	.55	.55	.55	.35	.35	.35	.25
VCNX	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.
Regional Plume												
BCKPMF	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.
OFRAC	.20	.20	.25	.35	.25	.40	.40	.40	.30	.30	.30	.20
VCNX	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.
Urban - no controls present												
BCKPMF	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
OFRAC	.30	.30	.35	.35	.35	.55	.55	.55	.35	.35	.35	.30
VCNX	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
Default: Clean Continental												
! BCKPMF	= 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !											
! OFRAC	= 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.15 !											
! VCNX	= 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00 !											

!END!

 INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters

Horizontal size of puff (m) beyond which
 time-dependent dispersion equations (Heffter)
 are used to determine sigma-y and
 sigma-z (SYTDEP) Default: 550. ! SYTDEP = 5.5E02 !

Switch for using Heffter equation for sigma z
 as above (0 = Not use Heffter; 1 = use Heffter
 (MHFTSZ) Default: 0 ! MHFTSZ = 0 !

Stability class used to determine plume
 growth rates for puffs above the boundary
 layer (JSUP) Default: 5 ! JSUP = 5 !

Vertical dispersion constant for stable
 conditions (k1 in Eqn. 2.7-3) (CONK1) Default: 0.01 ! CONK1 = .01 !

Vertical dispersion constant for neutral/
unstable conditions (k2 in Eqn. 2.7-4)
(CONK2)

Default: 0.1 ! CONK2 = .1 !

Factor for determining Transition-point from
Schulman-Scire to Huber-Snyder Building Downwash
scheme (SS used for Hs < Hb + TBD * HL)

(TBD)

Default: 0.5 ! TBD = .5 !

TBD < 0 ==> always use Huber-Snyder
TBD = 1.5 ==> always use Schulman-Scire
TBD = 0.5 ==> ISC Transition-point

Range of land use categories for which
urban dispersion is assumed

(IURB1, IURB2)

Default: 10 ! IURB1 = 10 !
19 ! IURB2 = 19 !

Site characterization parameters for single-point Met data files -----
(needed for METFM = 2,3,4)

Land use category for modeling domain
(ILANDUIN)

Default: 20 ! ILANDUIN = 20 !

Roughness length (m) for modeling domain
(Z0IN)

Default: 0.25 ! Z0IN = .25 !

Leaf area index for modeling domain
(XLAIN)

Default: 3.0 ! XLAIN = 3.0 !

Elevation above sea level (m)
(ELEVIN)

Default: 0.0 ! ELEVIN = .0 !

Latitude (degrees) for met location
(XLATIN)

Default: -999. ! XLATIN = -999.0 !

Longitude (degrees) for met location
(XLONIN)

Default: -999. ! XLONIN = -999.0 !

Specialized information for interpreting single-point Met data files -----

Anemometer height (m) (Used only if METFM = 2,3)
(ANEMHT)

Default: 10. ! ANEMHT = 10.0 !

Form of lateral turbulence data in PROFILE.DAT file
(Used only if METFM = 4 or MTURBVW = 1 or 3)

(ISIGMAV)

Default: 1 ! ISIGMAV = 1 !

0 = read sigma-theta
1 = read sigma-v

Choice of mixing heights (Used only if METFM = 4)
(IMIXCTDM)

Default: 0 ! IMIXCTDM = 0 !

0 = read PREDICTED mixing heights
1 = read OBSERVED mixing heights

Maximum length of a slug (met. grid units)
(MXMLEN)

Default: 1.0 ! MXMLEN = 1.0 !

Maximum travel distance of a puff/slug (in
grid units) during one sampling step
(XSAMLEN)

Default: 1.0 ! XSAMLEN = 1.0 !

Maximum Number of slugs/puffs release from
one source during one time step

(MXNEW)

Default: 99 ! MXNEW = 99 !

Maximum Number of sampling steps for
one puff/slug during one time step

(MXSAM)

Default: 99 ! MXSAM = 99 !

Number of iterations used when computing
the transport wind for a sampling step
that includes gradual rise (for CALMET
and PROFILE winds)

(NCOUNT)

Default: 2 ! NCOUNT = 2 !

Minimum sigma y for a new puff/slug (m)
(SYMIN) Default: 1.0 ! SYMIN = 1.0 !

Minimum sigma z for a new puff/slug (m)
(SZMIN) Default: 1.0 ! SZMIN = 1.0 !

Default minimum turbulence velocities: sigma-v and sigma-w
for each stability class over land and over water (m/s)
(SVMIN(12) and SWMIN(12))

Stab Class :	LAND						WATER					
	A	B	C	D	E	F	A	B	C	D	E	F
Default SVMIN :	.50,	.50,	.50,	.50,	.50,	.50,	.37,	.37,	.37,	.37,	.37,	.37
Default SWMIN :	.20,	.12,	.08,	.06,	.03,	.016,	.20,	.12,	.08,	.06,	.03,	.016

! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500, 0.500, 0.370, 0.370, 0.370, 0.370, 0.370, 0.370!
! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016, 0.200, 0.120, 0.080, 0.060, 0.030, 0.016!

Divergence criterion for dw/dz across puff
used to initiate adjustment for horizontal
convergence (1/s)

Partial adjustment starts at CDIV(1), and
full adjustment is reached at CDIV(2)
(CDIV(2))

Default: 0.0,0.0 ! CDIV = .0, .0 !

Minimum wind speed (m/s) allowed for
non-calm conditions. Also used as minimum
speed returned when using power-law
extrapolation toward surface
(WSCALM)

Default: 0.5 ! WSCALM = .5 !

Maximum mixing height (m)
(XMAXZI)

Default: 3000. ! XMAXZI = 3000.0 !

Minimum mixing height (m)
(XMINZI)

Default: 50. ! XMINZI = 50.0 !

Default wind speed classes --
5 upper bounds (m/s) are entered;
the 6th class has no upper limit
(WSCAT(5))

Default :
ISC RURAL : 1.54, 3.09, 5.14, 8.23, 10.8 (10.8+)

Wind Speed Class :	1	2	3	4	5
	---	---	---	---	---
! WSCAT =	1.54,	3.09,	5.14,	8.23,	10.80 !

Default wind speed profile power-law
exponents for stabilities 1-6
(PLX0(6))

Default : ISC RURAL values
ISC RURAL : .07, .07, .10, .15, .35, .55
ISC URBAN : .15, .15, .20, .25, .30, .30

Stability Class :	A	B	C	D	E	F
	---	---	---	---	---	---
! PLX0 =	0.07,	0.07,	0.10,	0.15,	0.35,	0.55 !

Default potential temperature gradient
for stable classes E, F (degK/m)
(PTG0(2))

Default: 0.020, 0.035
! PTG0 = 0.020, 0.035 !

Default plume path coefficients for
each stability class (used when option
for partial plume height terrain adjustment
is selected -- MCTADJ=3)
(PPC(6))

Stability Class :	A	B	C	D	E	F
Default PPC :	.50,	.50,	.50,	.50,	.35,	.35.
	---	---	---	---	---	---
! PPC =	0.50,	0.50,	0.50,	0.50,	0.35,	0.35 !

Slug-to-puff transition criterion factor
equal to sigma-y/length of slug
(SL2PF)

Default: 10. ! SL2PF = 10.0 !

Puff-splitting control variables -----

VERTICAL SPLIT

Number of puffs that result every time a puff
is split - nsplit=2 means that 1 puff splits
into 2

(NSPLIT) Default: 3 ! NSPLIT = 3 !

Time(s) of a day when split puffs are eligible to
be split once again; this is typically set once
per day, around sunset before nocturnal shear develops.
24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)

0=do not re-split 1=eligible for re-split
(IRESPLIT(24)) Default: Hour 17 = 1
! IRESPLIT = 0,0 !

Split is allowed only if last hour's mixing
height (m) exceeds a minimum value

(ZISPLIT) Default: 100. ! ZISPLIT = 100.0 !

Split is allowed only if ratio of last hour's
mixing ht to the maximum mixing ht experienced
by the puff is less than a maximum value (this
postpones a split until a nocturnal layer develops)

(ROLDMAX) Default: 0.25 ! ROLDMAX = 0.25 !

HORIZONTAL SPLIT

Number of puffs that result every time a puff
is split - nsplith=5 means that 1 puff splits
into 5

(NSPLITH) Default: 5 ! NSPLITH = 5 !

Minimum sigma-y (Grid Cells Units) of puff
before it may be split

(SYSPLITH) Default: 1.0 ! SYSPLITH = 1.0 !

Minimum puff elongation rate (SYSPLITH/hr) due to
wind shear, before it may be split

(SHSPLITH) Default: 2. ! SHSPLITH = 2.0 !

Minimum concentration (g/m³) of each
species in puff before it may be split
Enter array of NSPEC values; if a single value is
entered, it will be used for ALL species

(CNSPLITH) Default: 1.0E-07 ! CNSPLITH = 1.0E-07 !

Integration control variables -----

Fractional convergence criterion for numerical SLUG
sampling integration

(EPSSLUG) Default: 1.0e-04 ! EPSSLUG = 1.0E-04 !

Fractional convergence criterion for numerical AREA
source integration

(EPSAREA) Default: 1.0e-06 ! EPSAREA = 1.0E-06 !

Trajectory step-length (m) used for numerical rise
integration

(DSRISE) Default: 1.0 ! DSRISE = 1.0 !

!END!

INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters

 Subgroup (13a)

Number of point sources with parameters provided below (NPT1) No default ! NPT1 = 1 !

Units used for point source emissions below (IPTU) Default: 1 ! IPTU = 3 !

- 1 = g/s
- 2 = kg/hr
- 3 = lb/hr
- 4 = tons/yr
- 5 = Odour Unit * m**3/s (vol. flux of odour compound)
- 6 = Odour Unit * m**3/min
- 7 = metric tons/yr

Number of source-species combinations with variable emissions scaling factors provided below in (13d) (NSPT1) Default: 0 ! NSPT1 = 0 !

Number of point sources with variable emission parameters provided in external file (NPT2) No default ! NPT2 = 0 !

(If NPT2 > 0, these point source emissions are read from the file: PTEMARB.DAT)

!END!

 Subgroup (13b)

a
 POINT SOURCE: CONSTANT DATA

Source No.	X Coordinate (km)	Y Coordinate (km)	Stack Height (m)	Base Elevation (m)	Stack Diameter (m)	Exit Vel. (m/s)	Exit Temp. (deg. K)	Bldg. Dwash	Emission Rates
					*****SO2****SO4****NOX****HNO3**NO3**PM10				

Project-Specific Source Input

a
 Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

- SRCNAM is a 12-character name for a source (No default)
- X is an array holding the source data listed by the column headings (No default)
- SIGYZI is an array holding the initial sigma-y and sigma-z (m) (Default: 0.,0.)
- FMFAC is a vertical momentum flux factor (0. or 1.0) used to represent the effect of rain-caps or other physical configurations that reduce momentum rise associated with the actual exit velocity. (Default: 1.0 -- full momentum used)

b
 0. = No building downwash modeled, 1. = downwash modeled
 NOTE: must be entered as a REAL number (i.e., with decimal point)

c
 An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by IPTU (e.g. 1 for g/s).

 Subgroup (13c)

 BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH

Source No. Effective building width and height (in meters) every 10 degrees ^a

```

1 ! SRCNAM = BLR2      !
1 ! HEIGHT = 11.28, 11.28, 11.28, 11.28, 11.28, 11.28,
      11.28, 11.28, 11.28, 7.93, 7.93, 7.93,
      7.93, 7.93, 7.93, 11.28, 11.28, 11.28,
      11.28, 11.28, 11.28, 11.28, 11.28, 11.28,
      11.28, 11.28, 11.28, 7.93, 7.93, 7.93,
      7.93, 7.93, 7.93, 11.28, 11.28, 11.28 !
1 ! WIDTH = 45.44, 44.94, 43.07, 42.54, 44.67, 45.45,
      44.85, 42.89, 39.62, 26.50, 21.73, 16.30,
      13.98, 19.63, 24.68, 38.82, 42.34, 44.57,
      45.44, 44.94, 43.07, 42.54, 44.67, 45.45,
      44.85, 42.89, 39.62, 26.50, 21.73, 16.30,
      13.98, 19.63, 24.68, 38.82, 42.34, 44.57 !
1 ! LENGTH = 35.15, 29.61, 23.18, 21.80, 28.39, 34.13,
      38.82, 42.34, 44.57, 36.22, 36.50, 35.67,
      35.03, 36.30, 36.47, 44.85, 42.89, 39.62,
      35.15, 29.61, 23.18, 21.80, 28.39, 34.13,
      38.82, 42.34, 44.57, 36.22, 36.50, 35.67,
      35.03, 36.30, 36.47, 44.85, 42.89, 39.62 !
1 ! XBADJ = -42.73, -41.87, -39.73, -39.27, -41.93, -43.32,
      -43.39, -42.14, -39.62, -19.16, -19.34, -18.93,
      -18.59, -19.17, -19.16, -7.22, -2.31, 2.68,
      7.58, 12.25, 16.55, 17.47, 13.54, 9.19,
      4.57, -0.19, -4.95, -17.06, -17.16, -16.74,
      -16.44, -17.13, -17.30, -37.63, -40.58, -42.30 !
1 ! YBADJ = 13.16, 8.60, 3.77, -1.18, -6.08, -10.81,
      -15.20, -19.14, -22.49, 0.34, 0.15, -0.04,
      -0.23, -0.41, -0.58, -23.98, -20.97, -17.33,
      -13.16, -8.60, -3.77, 1.18, 6.08, 10.81,
      15.20, 19.14, 22.49, -0.34, -0.15, 0.04,
      0.23, 0.41, 0.58, 23.98, 20.97, 17.33 !
  
```

!END!

^a
 Each pair of width and height values is treated as a separate input subgroup and therefore must end with an input group terminator.

 Subgroup (13d)

 POINT SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission rates given in 13b. Factors entered multiply the rates in 13b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

IVARY determines the type of variation, and is source-specific:
 (IVARY) Default: 0

- 0 = Constant
- 1 = Diurnal cycle (24 scaling factors: hours 1-24)
- 2 = Monthly cycle (12 scaling factors: months 1-12)
- 3 = Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
- 4 = Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12)
- 5 = Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

 a
 Data for each species are treated as a separate input subgroup
 and therefore must end with an input group terminator.

 INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters

 Subgroup (14a)

Number of polygon area sources with
 parameters specified below (NAR1) No default ! NAR1 = 0 !

Units used for area source
 emissions below (IARU) Default: 1 ! IARU = 1 !

- 1 = g/m**2/s
- 2 = kg/m**2/hr
- 3 = lb/m**2/hr
- 4 = tons/m**2/yr
- 5 = Odour Unit * m/s (vol. flux/m**2 of odour compound)
- 6 = Odour Unit * m/min
- 7 = metric tons/m**2/yr

Number of source-species
 combinations with variable
 emissions scaling factors
 provided below in (14d) (NSAR1) Default: 0 ! NSAR1 = 0 !

Number of buoyant polygon area sources
 with variable location and emission
 parameters (NAR2) No default ! NAR2 = 0 !
 (If NAR2 > 0, ALL parameter data for
 these sources are read from the file: BAEMARB.DAT)

!END!

 Subgroup (14b)

 AREA SOURCE: CONSTANT DATA a

Source No.	Effect. Height (m)	Base Elevation (m)	Initial Sigma z (m)	Emission Rates
-----	-----	-----	-----	-----

 a
 Data for each source are treated as a separate input subgroup
 and therefore must end with an input group terminator.

b
 An emission rate must be entered for every pollutant modeled.
 Enter emission rate of zero for secondary pollutants that are
 modeled, but not emitted. Units are specified by IARU
 (e.g. 1 for g/m**2/s).

 Subgroup (14c)

 COORDINATES (UTM-km) FOR EACH VERTEX(4) OF EACH POLYGON

Source

a

combinations with variable
emissions scaling factors
provided below in (15c) (NSLN1) Default: 0 ! NSLN1 = 0 !

Maximum number of segments used to model
each line (MXNSEG) Default: 7 ! MXNSEG = 7 !

The following variables are required only if NLINES > 0. They are
used in the buoyant line source plume rise calculations.

Number of distances at which transitional rise is computed	Default: 6	! NLRISE = 6 !
Average building length (XL)	No default (in meters)	! XL = .0 !
Average building height (HBL)	No default (in meters)	! HBL = .0 !
Average building width (WBL)	No default (in meters)	! WBL = .0 !
Average line source width (WML)	No default (in meters)	! WML = .0 !
Average separation between buildings (DXL)	No default (in meters)	! DXL = .0 !
Average buoyancy parameter (FPRIMEL)	No default (in m**4/s**3)	! FPRIMEL = .0 !

!END!

Subgroup (15b)

BUOYANT LINE SOURCE: CONSTANT DATA

Source No.	Beg. X Coordinate (km)	Beg. Y Coordinate (km)	End. X Coordinate (km)	End. Y Coordinate (km)	Release Height (m)	Base Elevation (m)	Emission Rates
-----	-----	-----	-----	-----	-----	-----	-----

a
Data for each source are treated as a separate input subgroup
and therefore must end with an input group terminator.

b
An emission rate must be entered for every pollutant modeled.
Enter emission rate of zero for secondary pollutants that are
modeled, but not emitted. Units are specified by ILNTU
(e.g. 1 for g/s).

Subgroup (15c)

BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission
rates given in 15b. Factors entered multiply the rates in 15b.
Skip sources here that have constant emissions.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

0 =	Constant
1 =	Diurnal cycle (24 scaling factors: hours 1-24)
2 =	Monthly cycle (12 scaling factors: months 1-12)
3 =	Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)

- 4 = Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12)
- 5 = Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

a
Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters

Subgroup (16a)

Number of volume sources with parameters provided in 16b,c (NVL1) No default ! NVL1 = 0 !

Units used for volume source emissions below in 16b (IVLU) Default: 1 ! IVLU = 1 !

- 1 = g/s
- 2 = kg/hr
- 3 = lb/hr
- 4 = tons/yr
- 5 = Odour Unit * m**3/s (vol. flux of odour compound)
- 6 = Odour Unit * m**3/min
- 7 = metric tons/yr

Number of source-species combinations with variable emissions scaling factors provided below in (16c) (NSVL1) Default: 0 ! NSVL1 = 0 !

Number of volume sources with variable location and emission parameters (NVL2) No default ! NVL2 = 0 !

(If NVL2 > 0, ALL parameter data for these sources are read from the VOLEMARB.DAT file(s))

!END!

Subgroup (16b)

a
VOLUME SOURCE: CONSTANT DATA

X UTM Coordinate (km)	Y UTM Coordinate (km)	Effect. Height (m)	Base Elevation (m)	Initial Sigma y (m)	Initial Sigma z (m)	b Emission Rates
-----	-----	-----	-----	-----	-----	-----

a
Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

b
An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are

modeled, but not emitted. Units are specified by IVLU
(e.g. 1 for g/s).

Subgroup (16c)

a
VOLUME SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission rates given in 16b. Factors entered multiply the rates in 16b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

IVARY determines the type of variation, and is source-specific:

(IVARY) Default: 0
0 = Constant
1 = Diurnal cycle (24 scaling factors: hours 1-24)
2 = Monthly cycle (12 scaling factors: months 1-12)
3 = Hour & Season (4 groups of 24 hourly scaling factors,
where first group is DEC-JAN-FEB)
4 = Speed & Stab. (6 groups of 6 scaling factors, where
first group is Stability Class A,
and the speed classes have upper
bounds (m/s) defined in Group 12
5 = Temperature (12 scaling factors, where temperature
classes have upper bounds (C) of:
0, 5, 10, 15, 20, 25, 30, 35, 40,
45, 50, 50+)

a
Data for each species are treated as a separate input subgroup
and therefore must end with an input group terminator.

INPUT GROUPS: 17a & 17b -- Non-gridded (discrete) receptor information

Subgroup (17a)

Number of non-gridded receptors (NREC) No default ! NREC = 744 !

!END!

Subgroup (17b)

a
NON-GRIDDED (DISCRETE) RECEPTOR DATA

Receptor No.	X Coordinate (km)	Y Coordinate (km)	Ground Elevation (m)	Height Above Ground (m)
-----------------	-------------------------	-------------------------	----------------------------	-------------------------------

RECEPTORS OBTAINED FROM THE NPS/FWS EXTRACTION PROGRAM
ALL RECEPTORS ARE LCC (KM)

PROJECT-SPECIFIC CLASS I AREA RECEPTORS

a
Data for each receptor are treated as a separate input subgroup
and therefore must end with an input group terminator.

b
Receptor height above ground is optional. If no value is entered,
the receptor is placed on the ground.

APPENDIX B

APPLICATION FOR AIR PERMIT – LONG FORM



Department of Environmental Protection

RECEIVED

OCT 03 2008

Division of Air Resource Management

APPLICATION FOR AIR PERMIT - LONG FORM

BUREAU OF AIR REGULATION

I. APPLICATION INFORMATION

Air Construction Permit – Use this form to apply for an air construction permit at a facility operating under a federally enforceable state air operation permit (FESOP) or Title V air permit. Also use this form to apply for an air construction permit:

- For a proposed project subject to prevention of significant deterioration (PSD) review, nonattainment area (NAA) new source review, or maximum achievable control technology (MACT) review; or
- Where the applicant proposes to assume a restriction on the potential emissions of one or more pollutants to escape a federal program requirement such as PSD review, NAA new source review, Title V, or MACT; or
- Where the applicant proposes to establish, revise, or renew a plantwide applicability limit (PAL).

Air Operation Permit – Use this form to apply for:

- an initial federally enforceable state air operation permit (FESOP); or
- an initial/revise/renewal Title V air operation permit.

Air Construction Permit & Title V Air Operation Permit (Concurrent Processing Option) – Use this form to apply for both an air construction permit and a revised or renewal Title V air operation permit incorporating the proposed project.

To ensure accuracy, please see form instructions.

Identification of Facility

1. Facility Owner/Company Name: Mosaic Fertilizer, LLC.	
2. Site Name: New Wales Plant	
3. Facility Identification Number: 1050059	
4. Facility Location...: Street Address or Other Locator: 3095 Highway 640 City: Mulberry County: Polk Zip Code: 33860	
5. Relocatable Facility? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6. Existing Title V Permitted Facility? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Application Contact

1. Application Contact Name: David Turley, Environmental Superintendent	
2. Application Contact Mailing Address... Organization/Firm: Mosaic Fertilizer, LLC Street Address: 3095 Highway 640 City: Mulberry State: FL Zip Code: 33860	
3. Application Contact Telephone Numbers... Telephone: (863) 428- 7153 ext. Fax: (863) 428-	
4. Application Contact Email Address: David.Turley@mosaicco.com	

Application Processing Information (DEP Use)

1. Date of Receipt of Application: 10/3/08	3. PSD Number (if applicable):
2. Project Number(s): 1050059-061-AL	4. Siting Number (if applicable):

APPLICATION INFORMATION

Purpose of Application

This application for air permit is submitted to obtain: (Check one)

Air Construction Permit

- Air construction permit.
- Air construction permit to establish, revise, or renew a plantwide applicability limit (PAL).
- Air construction permit to establish, revise, or renew a plantwide applicability limit (PAL), and separate air construction permit to authorize construction or modification of one or more emissions units covered by the PAL.

Air Operation Permit

- Initial Title V air operation permit.
- Title V air operation permit revision.
- Title V air operation permit renewal.
- Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is required.
- Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is not required.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit (Concurrent Processing)

- Air construction permit and Title V permit revision, incorporating the proposed project.
- Air construction permit and Title V permit renewal, incorporating the proposed project.

Note: By checking one of the above two boxes, you, the applicant, are requesting concurrent processing pursuant to Rule 62-213.405, F.A.C. In such case, you must also check the following box:

- I hereby request that the department waive the processing time requirements of the air construction permit to accommodate the processing time frames of the Title V air operation permit.

Application Comment

This application is to implement lower emission limits for the purpose of obtaining a BART exemption for the Mosaic New Wales BART-eligible source. Application forms are provided for two scenarios (Senario A and B) that will comply with the BART exemption criteria.

APPLICATION INFORMATION

Scope of Application

Emissions Unit ID Number	Description of Emissions Unit	Air Permit Type	Air Permit Proc. Fee
002	Sulfuric Acid Plant No. 1	AC1F	
003	Sulfuric Acid Plant No. 2	AC1F	
004	Sulfuric Acid Plant No. 3	AC1F	
009	DAP Plant No. 1	AC1F	
011	MAP Prill Plant	AC1F	
027	AFI Granulation Plant	AC1F	
036	Multifos A and B Kilns, Dryer and Blending Operation	AC1F	

Application Processing Fee

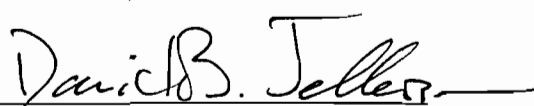
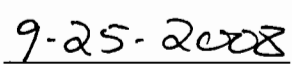
Check one: Attached - Amount: \$ _____

Not Applicable

APPLICATION INFORMATION

Owner/Authorized Representative Statement

Complete if applying for an air construction permit or an initial FESOP.

1. Owner/Authorized Representative Name : David B. Jellerson, Assistant Vice President, Environmental
2. Owner/Authorized Representative Mailing Address... Organization/Firm: Mosaic Fertilizer, LLC Street Address: P. O. Box 2000 City: Mulberry State: FL Zip Code: 33860
3. Owner/Authorized Representative Telephone Numbers... Telephone: (863) 428 - 2500 ext. Fax: (863) 428-2676
4. Owner/Authorized Representative E-mail Address: david.jellerson@mosaicco.com
5. Owner/Authorized Representative Statement: <i>I, the undersigned, am the owner or authorized representative of the corporation, partnership, or other legal entity submitting this air permit application. To the best of my knowledge, the statements made in this application are true, accurate and complete, and any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department.</i>  Signature  Date

APPLICATION INFORMATION

Application Responsible Official Certification

Complete if applying for an initial/revised/renewal Title V permit or concurrent processing of an air construction permit and a revised/renewal Title V permit. If there are multiple responsible officials, the "application responsible official" need not be the "primary responsible official."

1. Application Responsible Official Name:
2. Application Responsible Official Qualification (Check one or more of the following options, as applicable): <input type="checkbox"/> For a corporation, the president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities applying for or subject to a permit under Chapter 62-213, F.A.C. <input type="checkbox"/> For a partnership or sole proprietorship, a general partner or the proprietor, respectively. <input type="checkbox"/> For a municipality, county, state, federal, or other public agency, either a principal executive officer or ranking elected official. <input type="checkbox"/> The designated representative at an Acid Rain source.
3. Application Responsible Official Mailing Address... Organization/Firm: Street Address: City: State: Zip Code:
4. Application Responsible Official Telephone Numbers... Telephone: () - ext. Fax: () -
5. Application Responsible Official Email Address:
6. Application Responsible Official Certification: <i>I, the undersigned, am a responsible official of the Title V source addressed in this air permit application. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof and all other applicable requirements identified in this application to which the Title V source is subject. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department, and I will promptly notify the department upon sale or legal transfer of the facility or any permitted emissions unit. Finally, I certify that the facility and each emissions unit are in compliance with all applicable requirements to which they are subject, except as identified in compliance plan(s) submitted with this application.</i> _____ Signature _____ Date

APPLICATION INFORMATION

Professional Engineer Certification

1. Professional Engineer Name: **David A. Buff**
 Registration Number: **19011**

2. Professional Engineer Mailing Address...
 Organization/Firm: **Golder Associates Inc.****
 Street Address: **6241 NW 23rd Street, Suite 500**
 City: **Gainesville** State: **FL** Zip Code: **32653**

3. Professional Engineer Telephone Numbers...
 Telephone: **(352) 336-5600** ext. **545** Fax: **(352) 336-6603**

4. Professional Engineer Email Address: **dbuff@golder.com**

5. Professional Engineer Statement:
I, the undersigned, hereby certify, except as particularly noted herein, that:*
 (1) *To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this application for air permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and*
 (2) *To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.*
 (3) *If the purpose of this application is to obtain a Title V air operation permit (check here , if so), I further certify that each emissions unit described in this application for air permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance plan and schedule is submitted with this application.*
 (4) *If the purpose of this application is to obtain an air construction permit (check here , if so) or concurrently process and obtain an air construction permit and a Title V air operation permit revision or renewal for one or more proposed new or modified emissions units (check here , if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.*
 (5) *If the purpose of this application is to obtain an initial air operation permit or operation permit revision or renewal for one or more newly constructed or modified emissions units (check here , if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.*

Signature: David A. Buff Date: 9/30/08

(seal)

* Attach any exception to certification statement.

** Board of Professional Engineers Certificate of Authorization #00001670

SCENARIO A

EMISSIONS UNIT INFORMATION

Section [1]
SAP Nos. 1, 2, and 3

III. EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Application - For Title V air operation permitting only, emissions units are classified as regulated, unregulated, or insignificant. If this is an application for an initial, revised or renewal Title V air operation permit, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each regulated and unregulated emissions unit addressed in this application. Some of the subsections comprising the Emissions Unit Information Section of the form are optional for unregulated emissions units. Each such subsection is appropriately marked. Insignificant emissions units are required to be listed at Section II, Subsection C.

Air Construction Permit or FESOP Application - For air construction permitting or federally enforceable state air operation permitting, emissions units are classified as either subject to air permitting or exempt from air permitting. The concept of an "unregulated emissions unit" does not apply. If this is an application for an air construction permit or FESOP, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air permitting are required to be listed at Section II, Subsection C.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit Application - Where this application is used to apply for both an air construction permit and a revised or renewal Title V air operation permit, each emissions unit is classified as either subject to air permitting or exempt from air permitting for air construction permitting purposes, and as regulated, unregulated, or insignificant for Title V air operation permitting purposes. A separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit addressed in this application that is subject to air construction permitting and for each such emissions unit that is a regulated or unregulated unit for purposes of Title V permitting. (An emissions unit may be exempt from air construction permitting but still be classified as an unregulated unit for Title V purposes.) Emissions units classified as insignificant for Title V purposes are required to be listed at Section II, Subsection C.

If submitting the application form in hard copy, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application must be indicated in the space provided at the top of each page.

EMISSIONS UNIT INFORMATION

Section [1]
SAP Nos. 1, 2, and 3

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.)
- The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.
- The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in this Section: (Check one)			
<input checked="" type="checkbox"/> This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).			
<input type="checkbox"/> This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.			
<input type="checkbox"/> This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.			
2. Description of Emissions Unit Addressed in this Section: Sulfuric Acid Plant (SAP) Nos. 1, 2, and 3			
3. Emissions Unit Identification Number: 002, 003, and 004			
4. Emissions Unit Status Code: A	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code: 28
8. Federal Program Applicability: (Check all that apply)			
<input type="checkbox"/> Acid Rain Unit			
<input type="checkbox"/> CAIR Unit			
<input type="checkbox"/> Hg Budget Unit			
9. Package Unit: Manufacturer:		Model Number:	
10. Generator Nameplate Rating:			
11. Emissions Unit Comment: Proposed emissions limits for each of SAP Nos. 1, 2, and 3 in order to meet Best Available Retrofit Technology (BART) exemption criteria.			

EMISSIONS UNIT INFORMATION

Section [1]
SAP Nos. 1, 2, and 3

B. EMISSIONS UNIT CAPACITY INFORMATION
(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate:		
2. Maximum Production Rate:	10,200 tons/day 100% H ₂ SO ₄	
3. Maximum Heat Input Rate:	million Btu/hr	
4. Maximum Incineration Rate:	pounds/hr tons/day	
5. Requested Maximum Operating Schedule:	24 hours/day 52 weeks/year	7 days/week 8,760 hours/year
6. Operating Capacity/Schedule Comment:	Production rate of each of the three SAPs is 3,400 tons/day 100% H ₂ SO ₄ .	

EMISSIONS UNIT INFORMATION

Section [1]
 SAP Nos. 1, 2, and 3

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): Industrial Processes; Chemical Manufacturing; Sulfuric Acid (Contact Process); Absorber at 99.9% Conversion		
2. Source Classification Code (SCC): 3-01-023-01		3. SCC Units: Tons 100% H₂SO₄ Produced
4. Maximum Hourly Rate: 425	5. Maximum Annual Rate: 3,723,000	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment: Maximum rate based on 3,400 TPD of 100% H₂SO₄. Maximum rate is total for all three SAPs.		

Segment Description and Rate: Segment ____ of ____

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):		3. SCC Units:
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

EMISSIONS UNIT INFORMATION

POLLUTANT DETAIL INFORMATION

Section [1]
SAP Nos. 1, 2, and 3

Page [1] of [1]
Sulfuric Acid Mist – SAM

**F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION –
POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS**

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: SAM		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 21.3 lb/hour 93.3 tons/year		4. Synthetically Limited? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year			
6. Emission Factor: 7.1 lb/hr each SAP Reference: Requested Limit per SAP.		7. Emissions Method Code: 0	
8.a. Baseline Actual Emissions (if required): tons/year		8.b. Baseline 24-month Period: From: To:	
9.a. Projected Actual Emissions (if required): tons/year		9.b. Projected Monitoring Period: <input type="checkbox"/> 5 years <input type="checkbox"/> 10 years	
10. Calculation of Emissions: Annual Emissions = 7.1 lb/hr x 8,760 hrs/yr / 2,000 lb/ton = 31.1 TPY each SAP Total for EU = 7.1 lb/hr x 3 = 21.3 lb/hr 31.1 TPY x 3 = 93.3 TPY			
11. Potential, Fugitive, and Actual Emissions Comment:			

**F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION -
ALLOWABLE EMISSIONS**

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 3

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: 7.1 lb/hr	4. Equivalent Allowable Emissions: 7.1 lb/hour 31.1 tons/year
5. Method of Compliance: EPA Methods 6 or 6C	
6. Allowable Emissions Comment (Description of Operating Method): Allowable emissions for SAP No. 1 in order to meet BART exemption criteria.	

Allowable Emissions Allowable Emissions 2 of 3

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: 7.1 lb/hr	4. Equivalent Allowable Emissions: 7.1 lb/hour 31.1 tons/year
5. Method of Compliance: EPA Methods 6 or 6C	
6. Allowable Emissions Comment (Description of Operating Method): Allowable emissions for SAP No. 2 in order to meet BART exemption criteria.	

Allowable Emissions Allowable Emissions 3 of 3

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: 7.1 lb/hr	4. Equivalent Allowable Emissions: 7.1 lb/hour 31.1 tons/year
5. Method of Compliance: EPA Methods 6 or 6C	
6. Allowable Emissions Comment (Description of Operating Method): Allowable emissions for SAP No. 3 in order to meet BART exemption criteria.	

EMISSIONS UNIT INFORMATION

Section [3]

SAP Nos. 1, 2, and 3 SAPs

I. EMISSIONS UNIT ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1. Process Flow Diagram: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input checked="" type="checkbox"/> Attached, Document ID: <u>NW-EU1-11</u> <input type="checkbox"/> Previously Submitted, Date _____
2. Fuel Analysis or Specification: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date _____
3. Detailed Description of Control Equipment: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date _____
4. Procedures for Startup and Shutdown: (Required for all operation permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date _____ <input checked="" type="checkbox"/> Not Applicable (construction application)
5. Operation and Maintenance Plan: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date _____ <input checked="" type="checkbox"/> Not Applicable
6. Compliance Demonstration Reports/Records: <input type="checkbox"/> Attached, Document ID: _____ Test Date(s)/Pollutant(s) Tested: _____ <input type="checkbox"/> Previously Submitted, Date: _____ Test Date(s)/Pollutant(s) Tested: _____ <input type="checkbox"/> To be Submitted, Date (if known): _____ Test Date(s)/Pollutant(s) Tested: _____ <input checked="" type="checkbox"/> Not Applicable Note: For FESOP applications, all required compliance demonstration records/reports must be submitted at the time of application. For Title V air operation permit applications, all required compliance demonstration reports/records must be submitted at the time of application, or a compliance plan must be submitted at the time of application.
7. Other Information Required by Rule or Statute: <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable

EMISSIONS UNIT INFORMATION

Section [3]

SAP Nos. 1, 2, and 3 SAPs

I. EMISSIONS UNIT ADDITIONAL INFORMATION (CONTINUED)

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(10) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
2. Good Engineering Practice Stack Height Analysis (Rules 62-212.400(4)(d) and 62-212.500(4)(f), F.A.C.): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
3. Description of Stack Sampling Facilities: (Required for proposed new stack sampling facilities only) <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable

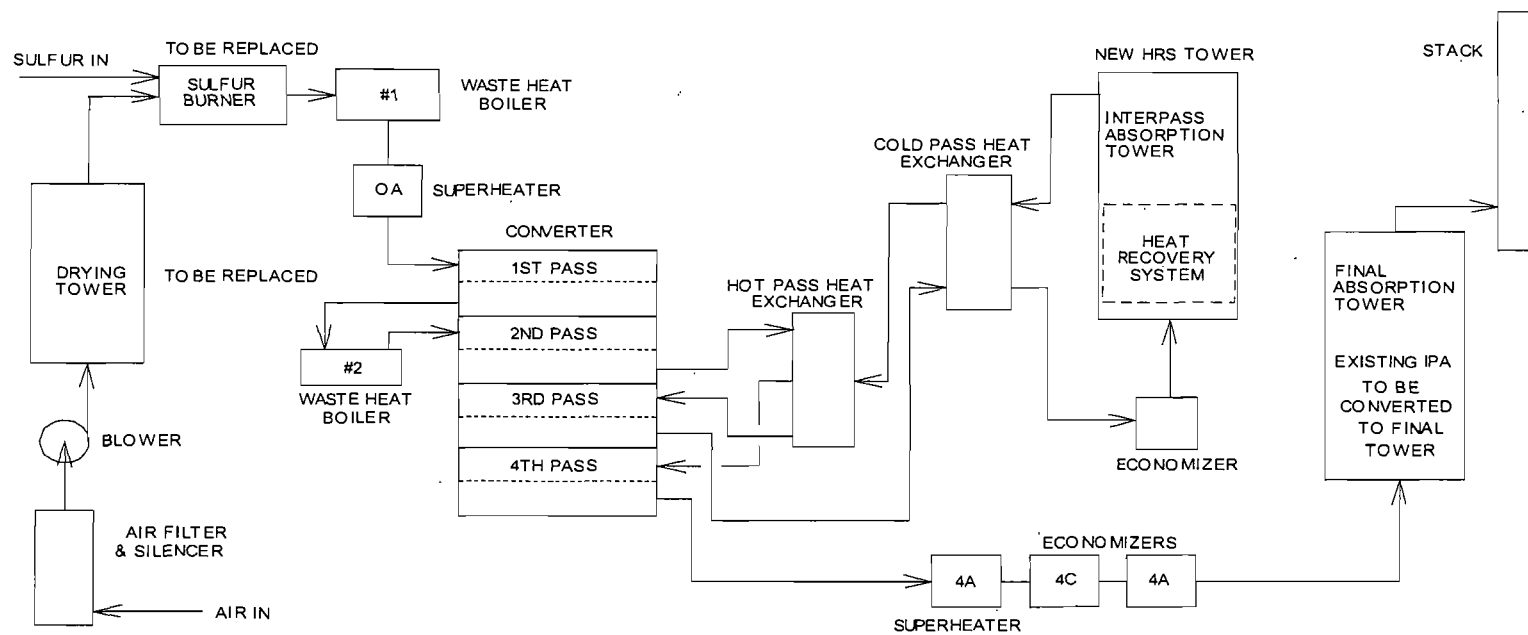
Additional Requirements for Title V Air Operation Permit Applications

1. Identification of Applicable Requirements: <input type="checkbox"/> Attached, Document ID: _____
2. Compliance Assurance Monitoring: <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable
3. Alternative Methods of Operation: <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable
4. Alternative Modes of Operation (Emissions Trading): <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable

Additional Requirements Comment

--

Flow Diagram



Control Equipment Description

The Sulfuric Acid Plant consists of a double absorption system. Acid Mist emissions are controlled by a demister.

Attachment NW-EU1-11a

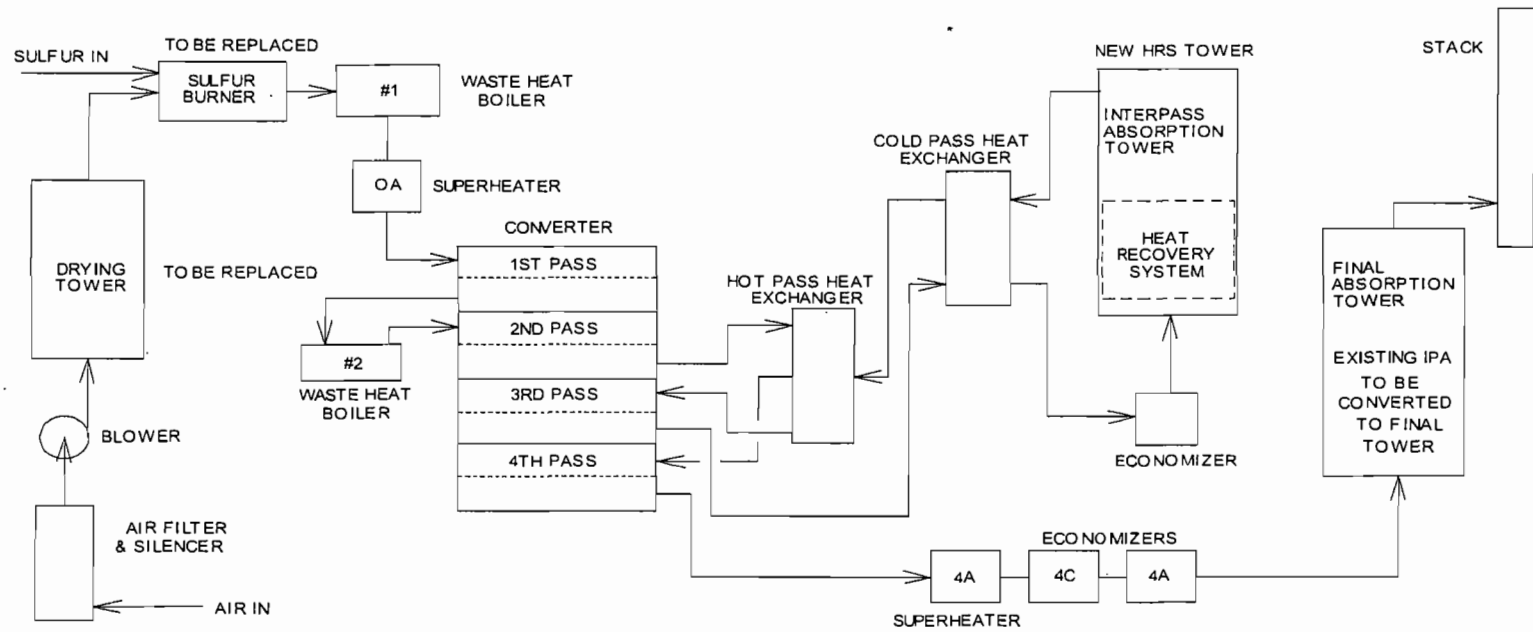
Emission Unit: Sulfuric Acid Plant No. 1

ID No.: 002

Facility: Mosaic Fertilizer LLC New Wales Plant

ID No.: 1050059

Flow Diagram



Control Equipment Description

The Sulfuric Acid Plant consists of a double absorption system. Acid Mist emissions are controlled by a demister.

Attachment NW-EU1-11b

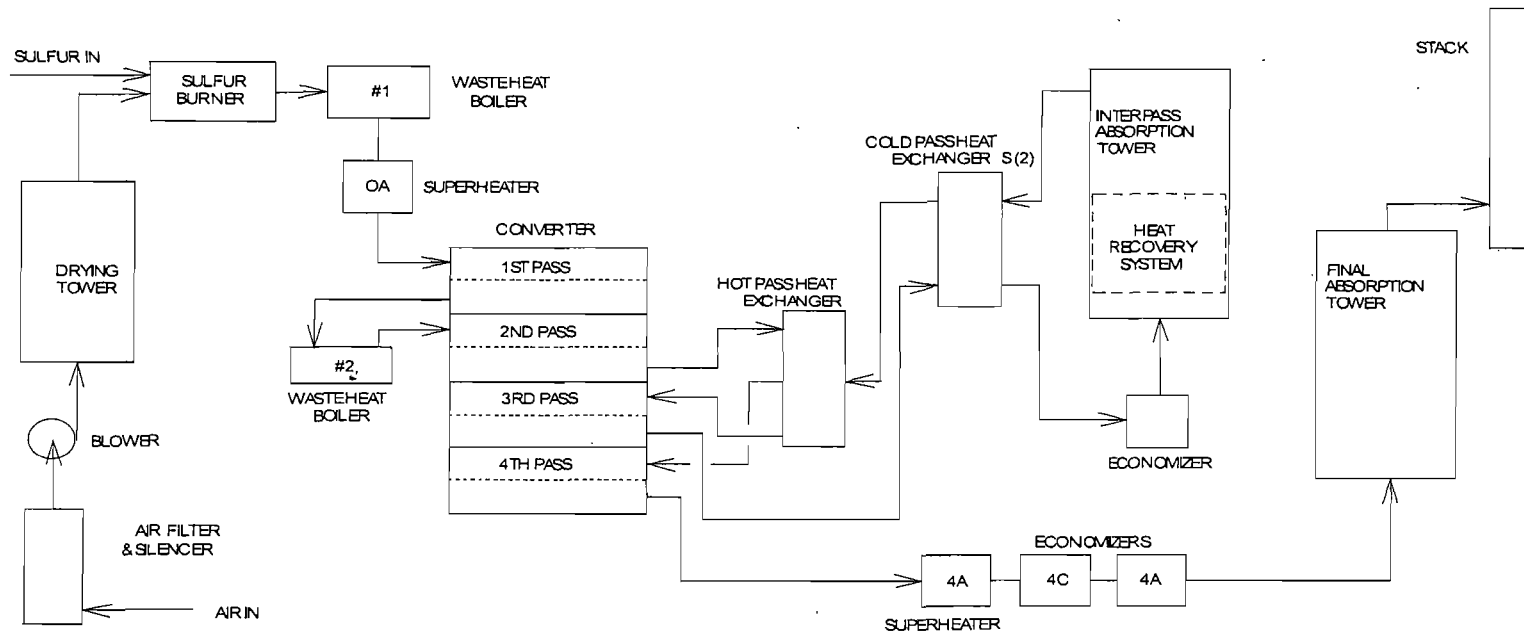
Emission Unit: **Sulfuric Acid Plant No. 2**

ID No.: **003**

Facility: **Mosaic Fertilizer LLC New Wales Plant**

ID No.: **1050059**

Flow Diagram



Control Equipment Description

The Sulfuric Acid Plant consists of a double absorption system. Acid Mist emissions are controlled by a demister. This plant is equipped with a heat recovery system in its interpass absorber.

Attachment NW-EU1-11c

Emission Unit: **Sulfuric Acid Plant No. 3**

ID No.: **004**

Facility: **Mosaic Fertilizer LLC New Wales Plant**

ID No.: **1050059**

EMISSIONS UNIT INFORMATION

Section [1]
DAP Plant No. 1

III. EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Application - For Title V air operation permitting only, emissions units are classified as regulated, unregulated, or insignificant. If this is an application for an initial, revised or renewal Title V air operation permit, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each regulated and unregulated emissions unit addressed in this application. Some of the subsections comprising the Emissions Unit Information Section of the form are optional for unregulated emissions units. Each such subsection is appropriately marked. Insignificant emissions units are required to be listed at Section II, Subsection C.

Air Construction Permit or FESOP Application - For air construction permitting or federally enforceable state air operation permitting, emissions units are classified as either subject to air permitting or exempt from air permitting. The concept of an "unregulated emissions unit" does not apply. If this is an application for an air construction permit or FESOP, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air permitting are required to be listed at Section II, Subsection C.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit Application - Where this application is used to apply for both an air construction permit and a revised or renewal Title V air operation permit, each emissions unit is classified as either subject to air permitting or exempt from air permitting for air construction permitting purposes, and as regulated, unregulated, or insignificant for Title V air operation permitting purposes. A separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit addressed in this application that is subject to air construction permitting and for each such emissions unit that is a regulated or unregulated unit for purposes of Title V permitting. (An emissions unit may be exempt from air construction permitting but still be classified as an unregulated unit for Title V purposes.) Emissions units classified as insignificant for Title V purposes are required to be listed at Section II, Subsection C.

If submitting the application form in hard copy, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application must be indicated in the space provided at the top of each page.

EMISSIONS UNIT INFORMATION

Section [1]
DAP Plant No. 1

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.)
- The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.
- The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in this Section: (Check one)
- This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).
- This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.
- This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Description of Emissions Unit Addressed in this Section:
Diammonium Phosphate (DAP) Plant No. 1

3. Emissions Unit Identification Number: **009**

4. Emissions Unit Status Code: A	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code: 28
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8. Federal Program Applicability: (Check all that apply)

- Acid Rain Unit
- CAIR Unit
- Hg Budget Unit

9. Package Unit:
Manufacturer: _____ Model Number: _____

10. Generator Nameplate Rating:

11. Emissions Unit Comment:
Proposed emission limits for the DAP Plant No. 1 in order to meet Best Available Retrofit Technology (BART) exemption criteria.

Only natural gas fuel proposed for the DAP Plant No. 1 dryer.

EMISSIONS UNIT INFORMATION

**Section [1]
DAP Plant No. 1**

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): Industrial Processes; In-Process Fuel Use; Natural Gas; General		
2. Source Classification Code (SCC): 3-90-006-99	3. SCC Units: Million cubic feet burned	
4. Maximum Hourly Rate: 0.028	5. Maximum Annual Rate: 242.7	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit: 1,000
10. Segment Comment: Maximum rate based on maximum heat input rate for the boiler of 27.7 MMBtu/hr.		

Segment Description and Rate: Segment ____ of ____

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

**F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION --
POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS**

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: PM		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 15.0 lb/hour 65.7 tons/year		4. Synthetically Limited? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year			
6. Emission Factor: 15.0 lb/hr Reference: Requested Limit for DAP Plant No. 1		7. Emissions Method Code: 0	
8.a. Baseline Actual Emissions (if required): tons/year		8.b. Baseline 24-month Period: From: To:	
9.a. Projected Actual Emissions (if required): tons/year		9.b. Projected Monitoring Period: <input type="checkbox"/> 5 years <input type="checkbox"/> 10 years	
10. Calculation of Emissions: Annual Emissions = 15 lb/hr x 8,760 hrs/yr /2,000 lb/ton = 65.7 TPY			
11. Potential, Fugitive, and Actual Emissions Comment:			

EMISSIONS UNIT INFORMATION

POLLUTANT DETAIL INFORMATION

Section [1]
DAP Plant No. 1

Page [2] of [2]
Particulate Matter - PM

**F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION -
ALLOWABLE EMISSIONS**

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: 15.0 lb/hr	4. Equivalent Allowable Emissions: 15.0 lb/hour 65.7 tons/year
5. Method of Compliance: EPA Method 5	
6. Allowable Emissions Comment (Description of Operating Method): Allowable emissions in order to meet BART exemption criteria.	

Allowable Emissions Allowable Emissions ____ of ____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions ____ of ____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

EMISSIONS UNIT INFORMATION

Section [1]
MAP Plant

III. EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Application - For Title V air operation permitting only, emissions units are classified as regulated, unregulated, or insignificant. If this is an application for an initial, revised or renewal Title V air operation permit, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each regulated and unregulated emissions unit addressed in this application. Some of the subsections comprising the Emissions Unit Information Section of the form are optional for unregulated emissions units. Each such subsection is appropriately marked. Insignificant emissions units are required to be listed at Section II, Subsection C.

Air Construction Permit or FESOP Application - For air construction permitting or federally enforceable state air operation permitting, emissions units are classified as either subject to air permitting or exempt from air permitting. The concept of an "unregulated emissions unit" does not apply. If this is an application for an air construction permit or FESOP, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air permitting are required to be listed at Section II, Subsection C.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit Application - Where this application is used to apply for both an air construction permit and a revised or renewal Title V air operation permit, each emissions unit is classified as either subject to air permitting or exempt from air permitting for air construction permitting purposes, and as regulated, unregulated, or insignificant for Title V air operation permitting purposes. A separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit addressed in this application that is subject to air construction permitting and for each such emissions unit that is a regulated or unregulated unit for purposes of Title V permitting. (An emissions unit may be exempt from air construction permitting but still be classified as an unregulated unit for Title V purposes.) Emissions units classified as insignificant for Title V purposes are required to be listed at Section II, Subsection C.

If submitting the application form in hard copy, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application must be indicated in the space provided at the top of each page.

EMISSIONS UNIT INFORMATION

**Section [1]
MAP Plant**

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.)
- The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.
 - The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in this Section: (Check one)			
<input checked="" type="checkbox"/> This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).			
<input type="checkbox"/> This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.			
<input type="checkbox"/> This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.			
2. Description of Emissions Unit Addressed in this Section: Monoammonium Phosphate (MAP) Prill Plant			
3. Emissions Unit Identification Number: 011			
4. Emissions Unit Status Code: A	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code: 28
8. Federal Program Applicability: (Check all that apply)			
<input type="checkbox"/> Acid Rain Unit			
<input type="checkbox"/> CAIR Unit			
<input type="checkbox"/> Hg Budget Unit			
9. Package Unit: Manufacturer:		Model Number:	
10. Generator Nameplate Rating:			
11. Emissions Unit Comment: Proposed emissions limits for the MAP Prill Plant in order to meet Best Available Retrofit Technology (BART) exemption criteria.			

EMISSIONS UNIT INFORMATION

POLLUTANT DETAIL INFORMATION

Section [1]
MAP Plant

Page [2] of [2]
Particulate Matter - PM

**F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION –
POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS**
(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: PM		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 7.0 lb/hour 30.7 tons/year		4. Synthetically Limited? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year			
6. Emission Factor: 7.0 lb/hr Reference: Requested Limit for MAP Plant		7. Emissions Method Code: 0	
8.a. Baseline Actual Emissions (if required): tons/year		8.b. Baseline 24-month Period: From: To:	
9.a. Projected Actual Emissions (if required): tons/year		9.b. Projected Monitoring Period: <input type="checkbox"/> 5 years <input type="checkbox"/> 10 years	
10. Calculation of Emissions: Annual Emissions = 7 lb/hr x 8,760 hrs/yr /2,000 lb/ton = 30.7 TPY			
11. Potential, Fugitive, and Actual Emissions Comment:			

EMISSIONS UNIT INFORMATION

Section [1]
MAP Plant

POLLUTANT DETAIL INFORMATION

Page [2] of [2]
Particulate Matter - PM

**F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION -
ALLOWABLE EMISSIONS**

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: 7.0 lb/hr	4. Equivalent Allowable Emissions: 7.0 lb/hour 30.7 tons/year
5. Method of Compliance: EPA Method 5	
6. Allowable Emissions Comment (Description of Operating Method): Allowable emissions in order to meet BART exemption criteria.	

Allowable Emissions Allowable Emissions ____ of ____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions ____ of ____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

EMISSIONS UNIT INFORMATION

Section [1]

AFI Plant

III. EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Application - For Title V air operation permitting only, emissions units are classified as regulated, unregulated, or insignificant. If this is an application for an initial, revised or renewal Title V air operation permit, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each regulated and unregulated emissions unit addressed in this application. Some of the subsections comprising the Emissions Unit Information Section of the form are optional for unregulated emissions units. Each such subsection is appropriately marked. Insignificant emissions units are required to be listed at Section II, Subsection C.

Air Construction Permit or FESOP Application - For air construction permitting or federally enforceable state air operation permitting, emissions units are classified as either subject to air permitting or exempt from air permitting. The concept of an "unregulated emissions unit" does not apply. If this is an application for an air construction permit or FESOP, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air permitting are required to be listed at Section II, Subsection C.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit Application - Where this application is used to apply for both an air construction permit and a revised or renewal Title V air operation permit, each emissions unit is classified as either subject to air permitting or exempt from air permitting for air construction permitting purposes, and as regulated, unregulated, or insignificant for Title V air operation permitting purposes. A separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit addressed in this application that is subject to air construction permitting and for each such emissions unit that is a regulated or unregulated unit for purposes of Title V permitting. (An emissions unit may be exempt from air construction permitting but still be classified as an unregulated unit for Title V purposes.) Emissions units classified as insignificant for Title V purposes are required to be listed at Section II, Subsection C.

If submitting the application form in hard copy, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application must be indicated in the space provided at the top of each page.

EMISSIONS UNIT INFORMATION

Section [1]

AFI Plant

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.)

The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in this Section: (Check one)

This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Description of Emissions Unit Addressed in this Section:
Animal Feed Ingredient (AFI) Granulation Plant

3. Emissions Unit Identification Number: **027**

4. Emissions Unit Status Code:
A

5. Commence Construction Date:

6. Initial Startup Date:

7. Emissions Unit Major Group SIC Code: **28**

8. Federal Program Applicability: (Check all that apply)

Acid Rain Unit

CAIR Unit

Hg Budget Unit

9. Package Unit:

Manufacturer:

Model Number:

10. Generator Nameplate Rating:

11. Emissions Unit Comment:

Proposed method of operation for the AFI Plant in order to meet Best Available Retrofit Technology (BART) exemption criteria.

Only natural gas fuel proposed for the AFI Plant dryer.

EMISSIONS UNIT INFORMATION

Section [1]
AFI Plant

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): Industrial Processes; In-Process Fuel Use; Natural Gas; General		
2. Source Classification Code (SCC): 3-90-006-99		3. SCC Units: Million cubic feet burned
4. Maximum Hourly Rate: 0.135	5. Maximum Annual Rate: 1,182.6	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit: 1,000
10. Segment Comment: Maximum rate based on maximum heat input rate for the boiler of 135 MMBtu/hr.		

Segment Description and Rate: Segment ____ of ____

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):		3. SCC Units:
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

SCENARIO B

EMISSIONS UNIT INFORMATION

Section [1]
SAP Nos. 1, 2, and 3

III. EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Application - For Title V air operation permitting only, emissions units are classified as regulated, unregulated, or insignificant. If this is an application for an initial, revised or renewal Title V air operation permit, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each regulated and unregulated emissions unit addressed in this application. Some of the subsections comprising the Emissions Unit Information Section of the form are optional for unregulated emissions units. Each such subsection is appropriately marked. Insignificant emissions units are required to be listed at Section II, Subsection C.

Air Construction Permit or FESOP Application - For air construction permitting or federally enforceable state air operation permitting, emissions units are classified as either subject to air permitting or exempt from air permitting. The concept of an "unregulated emissions unit" does not apply. If this is an application for an air construction permit or FESOP, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air permitting are required to be listed at Section II, Subsection C.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit Application - Where this application is used to apply for both an air construction permit and a revised or renewal Title V air operation permit, each emissions unit is classified as either subject to air permitting or exempt from air permitting for air construction permitting purposes, and as regulated, unregulated, or insignificant for Title V air operation permitting purposes. A separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit addressed in this application that is subject to air construction permitting and for each such emissions unit that is a regulated or unregulated unit for purposes of Title V permitting. (An emissions unit may be exempt from air construction permitting but still be classified as an unregulated unit for Title V purposes.) Emissions units classified as insignificant for Title V purposes are required to be listed at Section II, Subsection C.

If submitting the application form in hard copy, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application must be indicated in the space provided at the top of each page.

EMISSIONS UNIT INFORMATION

Section [1]
SAP Nos. 1, 2, and 3

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.) <input type="checkbox"/> The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit. <input type="checkbox"/> The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in this Section: (Check one) <input checked="" type="checkbox"/> This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent). <input type="checkbox"/> This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions. <input type="checkbox"/> This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.			
2. Description of Emissions Unit Addressed in this Section: Sulfuric Acid Plant (SAP) Nos. 1, 2, and 3			
3. Emissions Unit Identification Number: 002, 003, and 004			
4. Emissions Unit Status Code: A	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code: 28
8. Federal Program Applicability: (Check all that apply) <input type="checkbox"/> Acid Rain Unit <input type="checkbox"/> CAIR Unit <input type="checkbox"/> Hg Budget Unit			
9. Package Unit: Manufacturer:		Model Number:	
10. Generator Nameplate Rating:			
11. Emissions Unit Comment: Proposed emissions limits for each of SAP Nos. 1, 2, and 3 in order to meet Best Available Retrofit Technology (BART) exemption criteria. Production capacity of each Nos. 1, 2, and 3 SAP proposed to be limited to 3,200 tons/day (TPD) of 100% H₂SO₄.			

EMISSIONS UNIT INFORMATION

Section [1]
SAP Nos. 1, 2, and 3

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate:		
2. Maximum Production Rate:	9,600 tons/day 100% H₂SO₄	
3. Maximum Heat Input Rate:	million Btu/hr	
4. Maximum Incineration Rate:	pounds/hr tons/day	
5. Requested Maximum Operating Schedule:	24 hours/day 52 weeks/year	7 days/week 8,760 hours/year
6. Operating Capacity/Schedule Comment:	Production rate of each of the three SAPs is 3,200 tons/day.	

EMISSIONS UNIT INFORMATION

Section [1]
SAP Nos. 1, 2, and 3

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): Industrial Processes; Chemical Manufacturing; Sulfuric Acid (Contact Process); Absorber at 99.9% Conversion		
2. Source Classification Code (SCC): 3-01-023-01	3. SCC Units: Tons 100% H ₂ SO ₄ Produced	
4. Maximum Hourly Rate: 400	5. Maximum Annual Rate: 3,504,000	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment: Maximum rates based on 3,200 TPD of 100% H ₂ SO ₄ . Maximum rate is total for all three SAPs.		

Segment Description and Rate: Segment ____ of ____

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

EMISSIONS UNIT INFORMATION

POLLUTANT DETAIL INFORMATION

Section [1]
SAP Nos. 1, 2, and 3

Page [1] of [3]
Sulfur Dioxide – SO₂

**F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION –
POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS
(Optional for unregulated emissions units.)**

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: SO₂		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 1,200 lb/hour 5,256 tons/year		4. Synthetically Limited? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year			
6. Emission Factor: 400 lb/hr, 24-hr daily average each SAP Reference: Requested Limit per SAP.		7. Emissions Method Code: 0	
8.a. Baseline Actual Emissions (if required): tons/year		8.b. Baseline 24-month Period: From: To:	
9.a. Projected Actual Emissions (if required): tons/year		9.b. Projected Monitoring Period: <input type="checkbox"/> 5 years <input type="checkbox"/> 10 years	
10. Calculation of Emissions: Annual Emissions = 400 lb/hr x 8,760 hrs/yr / 2,000 lb/ton = 1,752 TPY per SAP Total for EU = 1,752 TPY per SAP x 3 SAPs = 5, 256 TPY			
11. Potential, Fugitive, and Actual Emissions Comment:			

EMISSIONS UNIT INFORMATION

POLLUTANT DETAIL INFORMATION

Section [1]
SAP Nos. 1, 2, and 3

Page [1] of [3]
Sulfur Dioxide – SO₂

**F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION -
ALLOWABLE EMISSIONS**

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 3

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: 400 lb/hr, 24-hr average	4. Equivalent Allowable Emissions: 400 lb/hour 1,752 tons/year
5. Method of Compliance: Continuous Emission Monitoring System for SO₂	
6. Allowable Emissions Comment (Description of Operating Method): Allowable emissions based on 24-hour daily average, in order to meet BART exemption criteria. Allowable emissions for each SAP No. 1.	

Allowable Emissions Allowable Emissions 2 of 3

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: 400 lb/hr, 24-hr average	4. Equivalent Allowable Emissions: 400 lb/hour 1,752 tons/year
5. Method of Compliance: Continuous Emission Monitoring System for SO₂	
6. Allowable Emissions Comment (Description of Operating Method): Allowable emissions based on 24-hour daily average, in order to meet BART exemption criteria. Allowable emissions for each SAP No. 2.	

Allowable Emissions Allowable Emissions 3 of 3

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: 400 lb/hr, 24-hr average	4. Equivalent Allowable Emissions: 400 lb/hour 1,752 tons/year
5. Method of Compliance: Continuous Emission Monitoring System for SO₂	
6. Allowable Emissions Comment (Description of Operating Method): Allowable emissions based on 24-hour daily average, in order to meet BART exemption criteria. Allowable emissions for each SAP No. 3.	

EMISSIONS UNIT INFORMATION

POLLUTANT DETAIL INFORMATION

Section [1]
SAP Nos. 1, 2, and 3

Page [2] of [3]
Sulfuric Acid Mist – SAM

**F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION –
POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS**

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: SAM		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 20.1 lb/hour 88.0 tons/year		4. Synthetically Limited? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year			
6. Emission Factor: 6.7 lb/hr per SAP Reference: Requested Limit per SAP.		7. Emissions Method Code: 0	
8.a. Baseline Actual Emissions (if required): tons/year		8.b. Baseline 24-month Period: From: To:	
9.a. Projected Actual Emissions (if required): tons/year		9.b. Projected Monitoring Period: <input type="checkbox"/> 5 years <input type="checkbox"/> 10 years	
10. Calculation of Emissions: 6.7 lb/hr x 8,760 hrs/yr / 2,000 lb/ton = 29.3 TPY per SAP Total for EU = 29.3 TPY per SAP x 3 SAPs = 88.0 TPY			
11. Potential, Fugitive, and Actual Emissions Comment:			

EMISSIONS UNIT INFORMATION

POLLUTANT DETAIL INFORMATION

Section [1]
SAP Nos. 1, 2, and 3

Page [2] of [3]
Sulfuric Acid Mist – SAM

**F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION -
ALLOWABLE EMISSIONS**

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 3

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: 6.7 lb/hr	4. Equivalent Allowable Emissions: 6.7 lb/hour 29.3 tons/year
5. Method of Compliance: EPA Methods 6 or 6C	
6. Allowable Emissions Comment (Description of Operating Method): Allowable emissions in order to meet BART exemption criteria. Allowable emissions for each SAP No. 1.	

Allowable Emissions Allowable Emissions 2 of 3

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: 6.7 lb/hr	4. Equivalent Allowable Emissions: 6.7 lb/hour 29.3 tons/year
5. Method of Compliance: EPA Methods 6 or 6C	
6. Allowable Emissions Comment (Description of Operating Method): Allowable emissions in order to meet BART exemption criteria. Allowable emissions for each SAP No. 2.	

Allowable Emissions Allowable Emissions 3 of 3

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: 6.7 lb/hr	4. Equivalent Allowable Emissions: 6.7 lb/hour 29.3 tons/year
5. Method of Compliance: EPA Methods 6 or 6C	
6. Allowable Emissions Comment (Description of Operating Method): Allowable emissions in order to meet BART exemption criteria. Allowable emissions for each SAP No. 3.	

EMISSIONS UNIT INFORMATION

POLLUTANT DETAIL INFORMATION

Section [1]
SAP Nos. 1, 2, and 3

Page [3] of [3]
Nitrogen Oxides - NO_x

**F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION –
POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS
(Optional for unregulated emissions units.)**

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: NO_x		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 48 lb/hour 210.3 tons/year		4. Synthetically Limited? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year			
6. Emission Factor: 16.0 lb/hr per SAP Reference: Requested Limit per SAP.		7. Emissions Method Code: 0	
8.a. Baseline Actual Emissions (if required): tons/year		8.b. Baseline 24-month Period: From: To:	
9.a. Projected Actual Emissions (if required): tons/year		9.b. Projected Monitoring Period: <input type="checkbox"/> 5 years <input type="checkbox"/> 10 years	
10. Calculation of Emissions: Annual Emissions = 16.0 lb/hr x 8,760 hrs/yr / 2,000 lb/ton = 70.1 TPY per SAP Total for EU = 70.1 TPY per SAP x 3 SAPs = 210.3 TPY			
11. Potential, Fugitive, and Actual Emissions Comment:			

EMISSIONS UNIT INFORMATION

POLLUTANT DETAIL INFORMATION

Section [1]
SAP Nos. 1, 2, and 3

Page [3] of [3]
Nitrogen Oxides - NO_x

**F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION -
ALLOWABLE EMISSIONS**

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 3

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: 16.0 lb/hr	4. Equivalent Allowable Emissions: 16.0 lb/hour 70.1 tons/year
5. Method of Compliance: EPA Method 7E	
6. Allowable Emissions Comment (Description of Operating Method): Allowable emissions in order to meet BART exemption criteria. Allowable emissions for each SAP No. 1.	

Allowable Emissions Allowable Emissions 2 of 3

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: 16.0 lb/hr	4. Equivalent Allowable Emissions: 16.0 lb/hour 70.1 tons/year
5. Method of Compliance: EPA Method 7E	
6. Allowable Emissions Comment (Description of Operating Method): Allowable emissions in order to meet BART exemption criteria. Allowable emissions for each SAP No. 2.	

Allowable Emissions Allowable Emissions 3 of 3

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: 16.0 lb/hr	4. Equivalent Allowable Emissions: 16.0 lb/hour 70.1 tons/year
5. Method of Compliance: EPA Method 7E	
6. Allowable Emissions Comment (Description of Operating Method): Allowable emissions in order to meet BART exemption criteria. Allowable emissions for each SAP No. 3.	

EMISSIONS UNIT INFORMATION

Section [3]

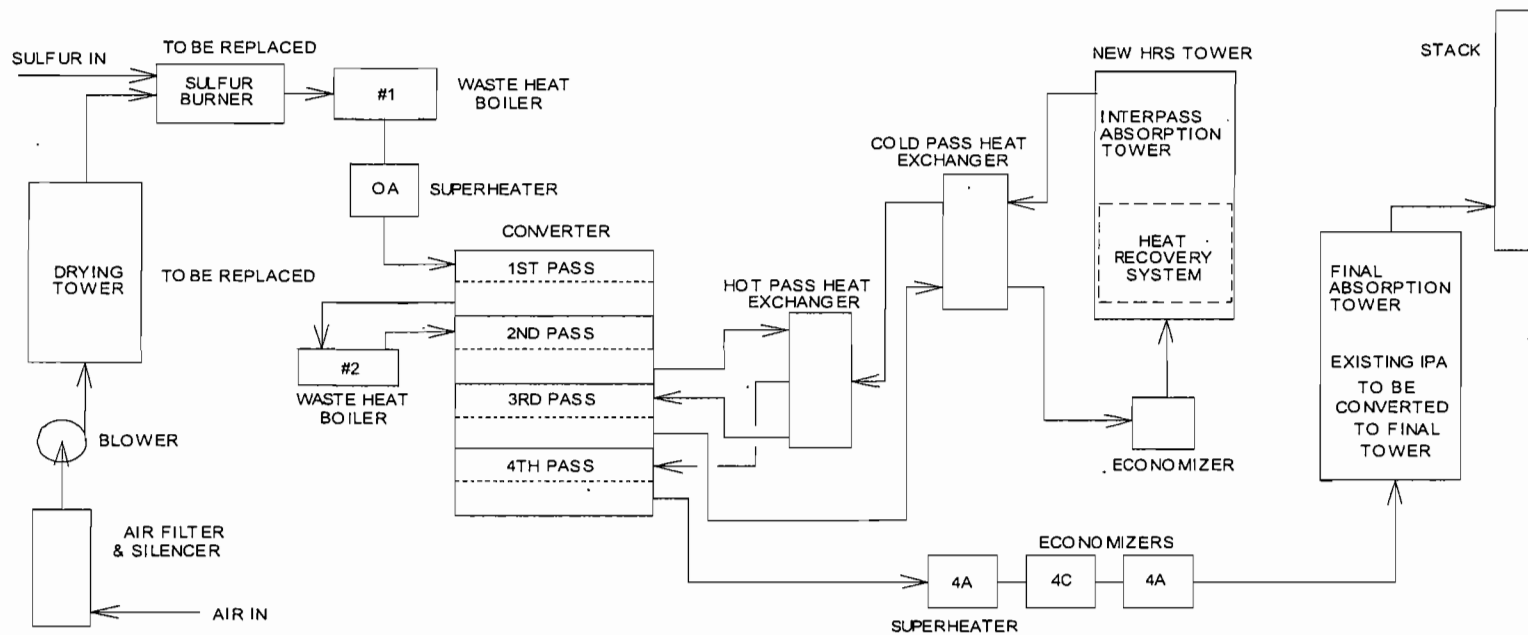
SAP Nos. 1, 2, and 3 SAPs

I. EMISSIONS UNIT ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1. Process Flow Diagram: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input checked="" type="checkbox"/> Attached, Document ID: <u>NW-EU1-11</u> <input type="checkbox"/> Previously Submitted, Date _____
2. Fuel Analysis or Specification: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date _____
3. Detailed Description of Control Equipment: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date _____
4. Procedures for Startup and Shutdown: (Required for all operation permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date _____ <input checked="" type="checkbox"/> Not Applicable (construction application)
5. Operation and Maintenance Plan: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date _____ <input checked="" type="checkbox"/> Not Applicable
6. Compliance Demonstration Reports/Records: <input type="checkbox"/> Attached, Document ID: _____ Test Date(s)/Pollutant(s) Tested: _____ <input type="checkbox"/> Previously Submitted, Date: _____ Test Date(s)/Pollutant(s) Tested: _____ <input type="checkbox"/> To be Submitted, Date (if known): _____ Test Date(s)/Pollutant(s) Tested: _____ <input checked="" type="checkbox"/> Not Applicable Note: For FESOP applications, all required compliance demonstration records/reports must be submitted at the time of application. For Title V air operation permit applications, all required compliance demonstration reports/records must be submitted at the time of application, or a compliance plan must be submitted at the time of application.
7. Other Information Required by Rule or Statute: <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable

Flow Diagram



Control Equipment Description

The Sulfuric Acid Plant consists of a double absorption system. Acid Mist emissions are controlled by a demister.

Attachment NW-EU1-I1a

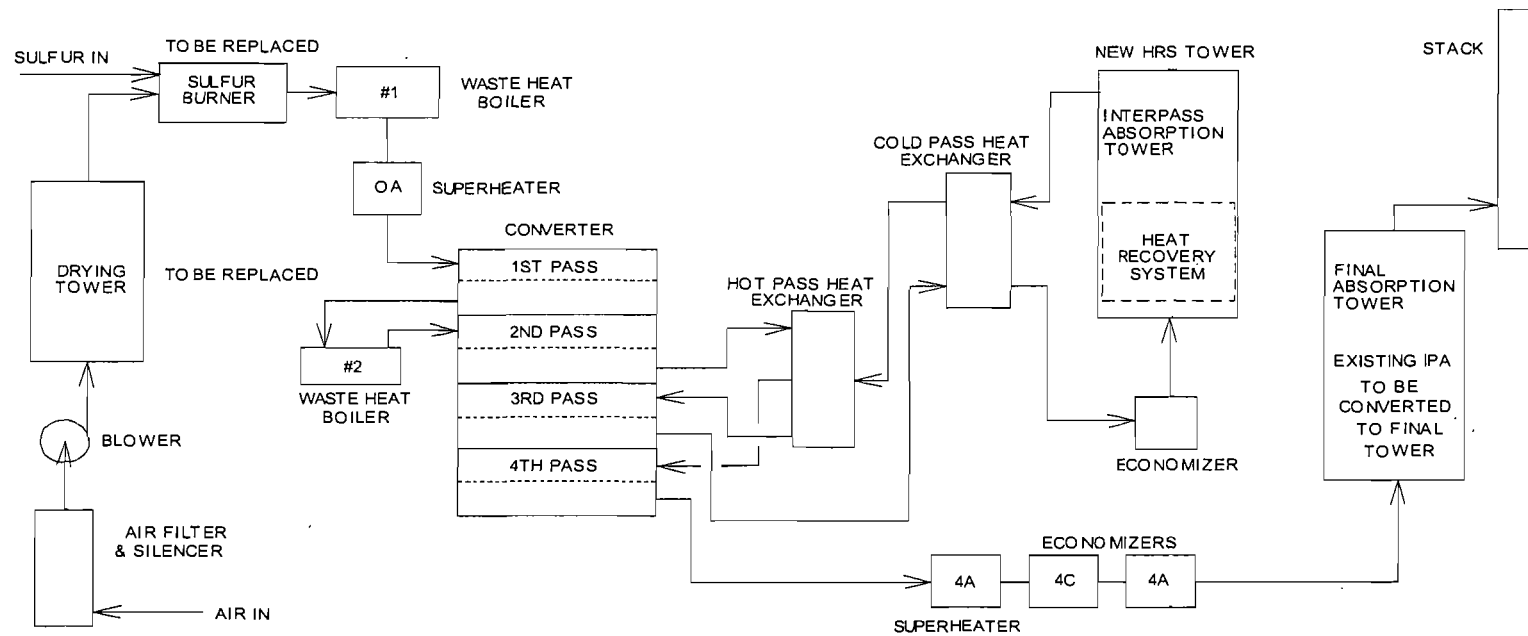
Emission Unit: **Sulfuric Acid Plant No. 1**

ID No.: **002**

Facility: **Mosaic Fertilizer LLC New Wales Plant**

ID No.: **1050059**

Flow Diagram



Control Equipment Description

The Sulfuric Acid Plant consists of a double absorption system. Acid Mist emissions are controlled by a demister.

Attachment NW-EU1-I1b

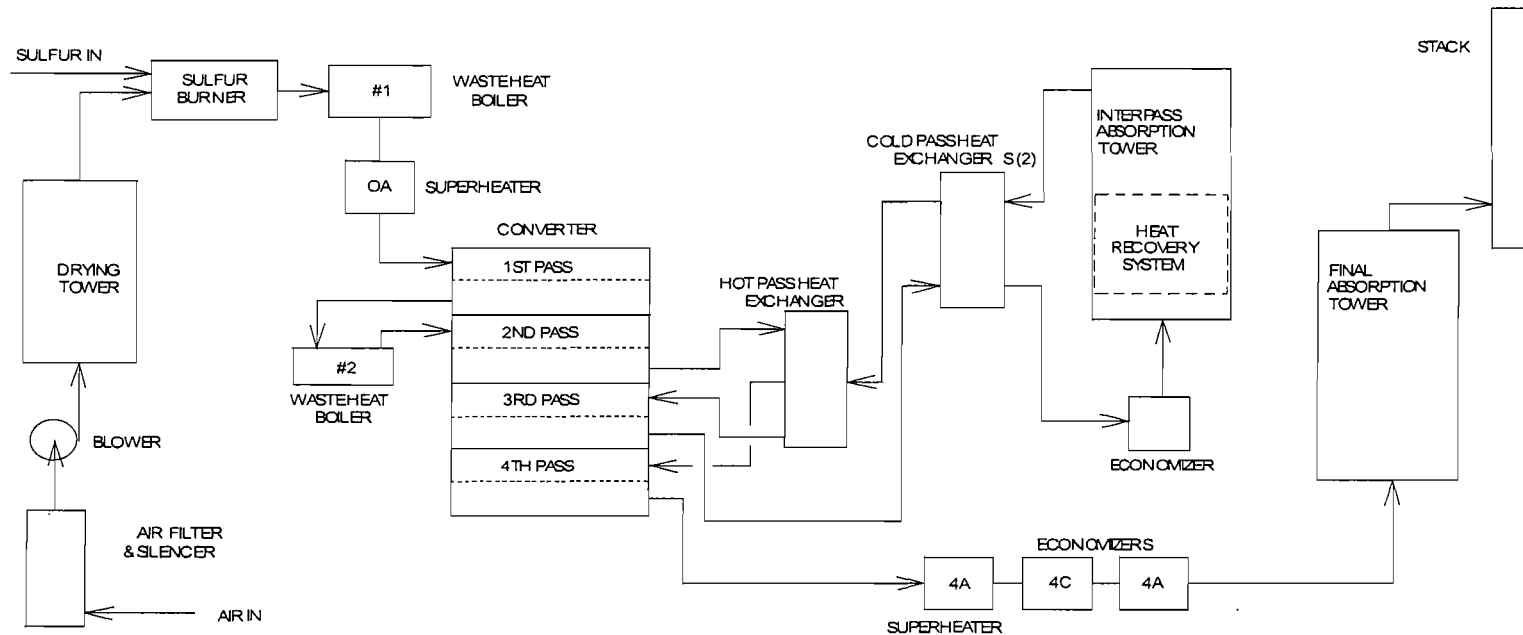
Emission Unit: **Sulfuric Acid Plant No. 2**

ID No.: **003**

Facility: **Mosaic Fertilizer LLC New Wales Plant**

ID No.: **1050059**

Flow Diagram



Control Equipment Description

The Sulfuric Acid Plant consists of a double absorption system. Acid Mist emissions are controlled by a demister. This plant is equipped with a heat recovery system in its interpass absorber.

Attachment NW-EU1-I1c

Emission Unit: **Sulfuric Acid Plant No. 3**

ID No.: **004**

Facility: **Mosaic Fertilizer LLC New Wales Plant**

ID No.: **1050059**

EMISSIONS UNIT INFORMATION

Section [1]
DAP Plant No. 1

III. EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Application - For Title V air operation permitting only, emissions units are classified as regulated, unregulated, or insignificant. If this is an application for an initial, revised or renewal Title V air operation permit, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each regulated and unregulated emissions unit addressed in this application. Some of the subsections comprising the Emissions Unit Information Section of the form are optional for unregulated emissions units. Each such subsection is appropriately marked. Insignificant emissions units are required to be listed at Section II, Subsection C.

Air Construction Permit or FESOP Application - For air construction permitting or federally enforceable state air operation permitting, emissions units are classified as either subject to air permitting or exempt from air permitting. The concept of an "unregulated emissions unit" does not apply. If this is an application for an air construction permit or FESOP, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air permitting are required to be listed at Section II, Subsection C.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit Application - Where this application is used to apply for both an air construction permit and a revised or renewal Title V air operation permit, each emissions unit is classified as either subject to air permitting or exempt from air permitting for air construction permitting purposes, and as regulated, unregulated, or insignificant for Title V air operation permitting purposes. A separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit addressed in this application that is subject to air construction permitting and for each such emissions unit that is a regulated or unregulated unit for purposes of Title V permitting. (An emissions unit may be exempt from air construction permitting but still be classified as an unregulated unit for Title V purposes.) Emissions units classified as insignificant for Title V purposes are required to be listed at Section II, Subsection C.

If submitting the application form in hard copy, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application must be indicated in the space provided at the top of each page.

EMISSIONS UNIT INFORMATION

Section [1]
DAP Plant No. 1

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.) <input type="checkbox"/> The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit. <input type="checkbox"/> The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in this Section: (Check one) <input checked="" type="checkbox"/> This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent). <input type="checkbox"/> This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions. <input type="checkbox"/> This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.			
2. Description of Emissions Unit Addressed in this Section: Diammonium Phosphate (DAP) Plant No. 1			
3. Emissions Unit Identification Number: 009			
4. Emissions Unit Status Code: A	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code: 28
8. Federal Program Applicability: (Check all that apply) <input type="checkbox"/> Acid Rain Unit <input type="checkbox"/> CAIR Unit <input type="checkbox"/> Hg Budget Unit			
9. Package Unit: Manufacturer:		Model Number:	
10. Generator Nameplate Rating:			
11. Emissions Unit Comment: Proposed emission limits for the DAP Plant No. 1 in order to meet Best Available Retrofit Technology (BART) exemption criteria. Only natural gas fuel proposed for the DAP Plant No. 1 dryer.			

EMISSIONS UNIT INFORMATION

Section [1]
DAP Plant No. 1

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): Industrial Processes; In-Process Fuel Use; Natural Gas; General		
2. Source Classification Code (SCC): 3-90-006-99		3. SCC Units: Million cubic feet burned
4. Maximum Hourly Rate: 0.028	5. Maximum Annual Rate: 242.7	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit: 1,000
10. Segment Comment: Maximum rate based on maximum heat input rate for the boiler of 27.7 MMBtu/hr.		

Segment Description and Rate: Segment ____ of ____

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):		3. SCC Units:
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

EMISSIONS UNIT INFORMATION

POLLUTANT DETAIL INFORMATION

Section [1]
DAP Plant No. 1

Page [2] of [2]
Particulate Matter - PM

**F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION –
POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS**

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: PM		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 15.0 lb/hour 65.7 tons/year		4. Synthetically Limited? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year			
6. Emission Factor: 15.0 lb/hr Reference: Requested Limit for DAP Plant No. 1		7. Emissions Method Code: 0	
8.a. Baseline Actual Emissions (if required): tons/year		8.b. Baseline 24-month Period: From: To:	
9.a. Projected Actual Emissions (if required): tons/year		9.b. Projected Monitoring Period: <input type="checkbox"/> 5 years <input type="checkbox"/> 10 years	
10. Calculation of Emissions: Annual Emissions = 15 lb/hr x 8,760 hrs/yr /2,000 lb/ton = 65.7 TPY			
11. Potential, Fugitive, and Actual Emissions Comment:			

EMISSIONS UNIT INFORMATION

POLLUTANT DETAIL INFORMATION

Section [1]
DAP Plant No. 1

Page [2] of [2]
Particulate Matter - PM

**F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION -
ALLOWABLE EMISSIONS**

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: 15.0 lb/hr	4. Equivalent Allowable Emissions: 15.0 lb/hour 65.7 tons/year
5. Method of Compliance: EPA Method 5	
6. Allowable Emissions Comment (Description of Operating Method): Allowable emissions in order to meet BART exemption criteria.	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

EMISSIONS UNIT INFORMATION

Section [1]
MAP Plant

III. EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Application - For Title V air operation permitting only, emissions units are classified as regulated, unregulated, or insignificant. If this is an application for an initial, revised or renewal Title V air operation permit, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each regulated and unregulated emissions unit addressed in this application. Some of the subsections comprising the Emissions Unit Information Section of the form are optional for unregulated emissions units. Each such subsection is appropriately marked. Insignificant emissions units are required to be listed at Section II, Subsection C.

Air Construction Permit or FESOP Application - For air construction permitting or federally enforceable state air operation permitting, emissions units are classified as either subject to air permitting or exempt from air permitting. The concept of an "unregulated emissions unit" does not apply. If this is an application for an air construction permit or FESOP, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air permitting are required to be listed at Section II, Subsection C.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit Application - Where this application is used to apply for both an air construction permit and a revised or renewal Title V air operation permit, each emissions unit is classified as either subject to air permitting or exempt from air permitting for air construction permitting purposes, and as regulated, unregulated, or insignificant for Title V air operation permitting purposes. A separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit addressed in this application that is subject to air construction permitting and for each such emissions unit that is a regulated or unregulated unit for purposes of Title V permitting. (An emissions unit may be exempt from air construction permitting but still be classified as an unregulated unit for Title V purposes.) Emissions units classified as insignificant for Title V purposes are required to be listed at Section II, Subsection C.

If submitting the application form in hard copy, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application must be indicated in the space provided at the top of each page.

EMISSIONS UNIT INFORMATION

Section [1]

MAP Plant

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.)
- The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.
- The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in this Section: (Check one)
- This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).
- This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.
- This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Description of Emissions Unit Addressed in this Section:
Monoammonium Phosphate (MAP) Prill Plant

3. Emissions Unit Identification Number: **011**

4. Emissions Unit Status Code: A	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code: 28
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8. Federal Program Applicability: (Check all that apply)

- Acid Rain Unit
- CAIR Unit
- Hg Budget Unit

9. Package Unit:
Manufacturer: _____ Model Number: _____

10. Generator Nameplate Rating: _____

11. Emissions Unit Comment:
Proposed emissions limits for the MAP Prill Plant in order to meet Best Available Retrofit Technology (BART) exemption criteria.

EMISSIONS UNIT INFORMATION

POLLUTANT DETAIL INFORMATION

Section [1]
MAP Plant

Page [2] of [2]
Particulate Matter - PM

**F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION –
POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS**

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: PM		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 7.0 lb/hour 30.7 tons/year		4. Synthetically Limited? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year			
6. Emission Factor: 7.0 lb/hr Reference: Requested Limit for MAP Plant		7. Emissions Method Code: 0	
8.a. Baseline Actual Emissions (if required): tons/year		8.b. Baseline 24-month Period: From: To:	
9.a. Projected Actual Emissions (if required): tons/year		9.b. Projected Monitoring Period: <input type="checkbox"/> 5 years <input type="checkbox"/> 10 years	
10. Calculation of Emissions: Annual Emissions = 7 lb/hr x 8,760 hrs/yr /2,000 lb/ton = 30.7 TPY			
11. Potential, Fugitive, and Actual Emissions Comment:			

EMISSIONS UNIT INFORMATION

POLLUTANT DETAIL INFORMATION

Section [1]
MAP Plant

Page [2] of [2]
Particulate Matter - PM

**F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION -
ALLOWABLE EMISSIONS**

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: 7.0 lb/hr	4. Equivalent Allowable Emissions: 7.0 lb/hour 30.7 tons/year
5. Method of Compliance: EPA Method 5	
6. Allowable Emissions Comment (Description of Operating Method): Allowable emissions in order to meet BART exemption criteria.	

Allowable Emissions Allowable Emissions ____ of ____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions ____ of ____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

EMISSIONS UNIT INFORMATION

Section [1]

AFI Plant

III. EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Application - For Title V air operation permitting only, emissions units are classified as regulated, unregulated, or insignificant. If this is an application for an initial, revised or renewal Title V air operation permit, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each regulated and unregulated emissions unit addressed in this application. Some of the subsections comprising the Emissions Unit Information Section of the form are optional for unregulated emissions units. Each such subsection is appropriately marked. Insignificant emissions units are required to be listed at Section II, Subsection C.

Air Construction Permit or FESOP Application - For air construction permitting or federally enforceable state air operation permitting, emissions units are classified as either subject to air permitting or exempt from air permitting. The concept of an "unregulated emissions unit" does not apply. If this is an application for an air construction permit or FESOP, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air permitting are required to be listed at Section II, Subsection C.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit Application - Where this application is used to apply for both an air construction permit and a revised or renewal Title V air operation permit, each emissions unit is classified as either subject to air permitting or exempt from air permitting for air construction permitting purposes, and as regulated, unregulated, or insignificant for Title V air operation permitting purposes. A separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit addressed in this application that is subject to air construction permitting and for each such emissions unit that is a regulated or unregulated unit for purposes of Title V permitting. (An emissions unit may be exempt from air construction permitting but still be classified as an unregulated unit for Title V purposes.) Emissions units classified as insignificant for Title V purposes are required to be listed at Section II, Subsection C.

If submitting the application form in hard copy, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application must be indicated in the space provided at the top of each page.

EMISSIONS UNIT INFORMATION

Section [1]

AFI Plant

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.) <input type="checkbox"/> The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit. <input type="checkbox"/> The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in this Section: (Check one) <input checked="" type="checkbox"/> This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent). <input type="checkbox"/> This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions. <input type="checkbox"/> This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.			
2. Description of Emissions Unit Addressed in this Section: Animal Feed Ingredient (AFI) Granulation Plant			
3. Emissions Unit Identification Number: 027			
4. Emissions Unit Status Code: A	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code: 28
8. Federal Program Applicability: (Check all that apply) <input type="checkbox"/> Acid Rain Unit <input type="checkbox"/> CAIR Unit <input type="checkbox"/> Hg Budget Unit			
9. Package Unit: Manufacturer:		Model Number:	
10. Generator Nameplate Rating:			
11. Emissions Unit Comment: Proposed method of operation for the AFI Plant in order to meet Best Available Retrofit Technology (BART) exemption criteria. Only natural gas fuel proposed for the AFI Plant dryer.			

EMISSIONS UNIT INFORMATION

Section [1]
AFI Plant

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): Industrial Processes; In-Process Fuel Use; Natural Gas; General		
2. Source Classification Code (SCC): 3-90-006-99		3. SCC Units: Million cubic feet burned
4. Maximum Hourly Rate: 0.135	5. Maximum Annual Rate: 1,182.6	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit: 1,000
10. Segment Comment: Maximum rate based on maximum heat input rate for the boiler of 135 MMBtu/hr.		

Segment Description and Rate: Segment ____ of ____

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):		3. SCC Units:
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

EMISSIONS UNIT INFORMATION

Section [1]

Multifos A and B Kilns, Dryer and Blending Operation

III. EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Application - For Title V air operation permitting only, emissions units are classified as regulated, unregulated, or insignificant. If this is an application for an initial, revised or renewal Title V air operation permit, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each regulated and unregulated emissions unit addressed in this application. Some of the subsections comprising the Emissions Unit Information Section of the form are optional for unregulated emissions units. Each such subsection is appropriately marked. Insignificant emissions units are required to be listed at Section II, Subsection C.

Air Construction Permit or FESOP Application - For air construction permitting or federally enforceable state air operation permitting, emissions units are classified as either subject to air permitting or exempt from air permitting. The concept of an "unregulated emissions unit" does not apply. If this is an application for an air construction permit or FESOP, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air permitting are required to be listed at Section II, Subsection C.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit Application - Where this application is used to apply for both an air construction permit and a revised or renewal Title V air operation permit, each emissions unit is classified as either subject to air permitting or exempt from air permitting for air construction permitting purposes, and as regulated, unregulated, or insignificant for Title V air operation permitting purposes. A separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit addressed in this application that is subject to air construction permitting and for each such emissions unit that is a regulated or unregulated unit for purposes of Title V permitting. (An emissions unit may be exempt from air construction permitting but still be classified as an unregulated unit for Title V purposes.) Emissions units classified as insignificant for Title V purposes are required to be listed at Section II, Subsection C.

If submitting the application form in hard copy, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application must be indicated in the space provided at the top of each page.

EMISSIONS UNIT INFORMATION

Section [1]

Multifos A and B Kilns, Dryer and Blending Operation

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.)

The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in this Section: (Check one)

This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Description of Emissions Unit Addressed in this Section:
Multifos A and B Kilns, Dryer and Blending Operation

3. Emissions Unit Identification Number: **036**

4. Emissions Unit Status Code: A	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code: 28
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8. Federal Program Applicability: (Check all that apply)

Acid Rain Unit

CAIR Unit

Hg Budget Unit

9. Package Unit:
Manufacturer: _____ Model Number: _____

10. Generator Nameplate Rating: _____

11. Emissions Unit Comment:
Proposed emissions limits for the Multifos A and B Kilns, Dryer and Blending Operation in order to meet Best Available Retrofit Technology (BART) exemption criteria.

Only natural gas fuel proposed for the Multifos A and B Kilns and Dryer.

EMISSIONS UNIT INFORMATION

Section [1]

Multifos A and B Kilns, Dryer and Blending Operation

Emissions Unit Control Equipment/Method: Control 1 of 1

1. Control Equipment/Method Description:
Wet scrubber for SO₂ control.

2. Control Device or Method Code: **013**

Emissions Unit Control Equipment/Method: Control ____ of ____

1. Control Equipment/Method Description:

2. Control Device or Method Code:

Emissions Unit Control Equipment/Method: Control ____ of ____

1. Control Equipment/Method Description:

2. Control Device or Method Code:

Emissions Unit Control Equipment/Method: Control ____ of ____

1. Control Equipment/Method Description:

2. Control Device or Method Code:

EMISSIONS UNIT INFORMATION

Section [1]

Multifos A and B Kilns, Dryer and Blending Operation

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): Industrial Processes; In-Process Fuel Use; Natural Gas; General		
2. Source Classification Code (SCC): 3-90-006-99		3. SCC Units: Million cubic feet burned
4. Maximum Hourly Rate: 0.125	5. Maximum Annual Rate: 1,090.6	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit: 1,000
10. Segment Comment: Maximum rate based on maximum heat input rates of 12.5 MMBtu/hr for the dryer and 56 MMBtu/hr for each of Kilns A and B, or a total of 124.5 MMBtu/hr.		

Segment Description and Rate: Segment ____ of ____

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):		3. SCC Units:
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

EMISSIONS UNIT INFORMATION

POLLUTANT DETAIL INFORMATION

Section [1]
 Multifos A and B Kilns, Dryer and Blending Operation

Page [2] of [2]
 Sulfur Dioxide - SO₂

**F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION –
 POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS**

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: SO₂		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 25.0 lb/hour 109.5 tons/year		4. Synthetically Limited? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year			
6. Emission Factor: 25.0 lb/hr		7. Emissions Method Code: 0	
Reference: Requested Limit for Multifos A and B Kilns, Dryer and Blending Operation			
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:		
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: <input type="checkbox"/> 5 years <input type="checkbox"/> 10 years		
10. Calculation of Emissions: Annual Emissions = 25 lb/hr x 8,760 hrs/yr / 2,000 lb/ton = 109.5 TPY			
11. Potential, Fugitive, and Actual Emissions Comment:			

EMISSIONS UNIT INFORMATION

POLLUTANT DETAIL INFORMATION

Section [1] -
Multifos A and B Kilns, Dryer and Blending Operation

Page [2] of [2]
Sulfur Dioxide - SO₂

**F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION -
ALLOWABLE EMISSIONS**

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: 25.0 lb/hr	4. Equivalent Allowable Emissions: 25.0 lb/hour 109.5 tons/year
5. Method of Compliance: EPA Method 6	
6. Allowable Emissions Comment (Description of Operating Method): Allowable emissions in order to meet BART exemption criteria.	

Allowable Emissions Allowable Emissions ____ of ____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions ____ of ____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

**F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION -
ALLOWABLE EMISSIONS**

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: 25.0 lb/hr	4. Equivalent Allowable Emissions: 25.0 lb/hour 109.5 tons/year
5. Method of Compliance: EPA Method 5	
6. Allowable Emissions Comment (Description of Operating Method): Allowable emissions in order to meet BART exemption criteria.	

Allowable Emissions Allowable Emissions ____ of ____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions ____ of ____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

APPENDIX C

CATALYST SUPPLIER STUDY



HALDOR TOPSOE, INC.

Catalyst Division
17629 El Camino Real, Suite 300 • Houston, Texas 77058-3051
Phone: (281) 228-5000 • Fax: (281) 228-5109

e-mail

Date: May 2, 2008

To: Doug Thomas
Doug.Thomas@mosaicco.com

From: Patrick Polk
Phone No: (281) 228-5145
Fax No: (281) 228-5109
e-mail wpp@topsoe.com

Re: Modeling for Riverview and 3 New Wales plants

Doug,

I have investigated the expected performance of the Riverview plants and New Wales 01, 02 and 03 plants using all standard vanadium catalyst to reduce emissions to the 2.8 to 3.0 #/ton range. I used the same catalyst activities and temperature approach to equilibrium limitations for these calculations as I did for the larger cesium catalyst study. The catalyst activities used were:

1st bed - 65%
2nd bed - 85%
3rd bed - 85%
4th bed - 95%

The temperature approach to equilibrium was limited for each bed to 25, 20, 20 and 15°C, respectively.

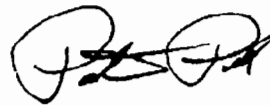
2.8 #/ton emissions require a conversion rate of 99.78%. For each plant I started with generic converter bed inlet temperatures of 420, 440, 440, and 415°C, respectively. If 99.78% conversion was achieved at these temperatures, I did not attempt to optimize the temperatures further. If 99.78% conversion was not initially obtained, I optimized the converter inlet temperatures until 99.78% conversion was obtained or the converter was optimized given the approach to equilibrium constraints.

It was possible to operate at maximum rate and an 11.5% SO₂ gas strength in all of the plants except New Wales 03 and Riverview #8. For the New Wales 03 plant it was necessary to reduce the gas strength to 11.3% in order to achieve the desired conversion. For the Riverview #8 plant it is not possible with the existing converter. However, since this converter will be replaced, it can be designed for a sufficient catalyst loading.

These calculations are based on the expected performance at the end of a 2 year turnaround cycle. The initial performance clean after a turnaround should be better than predicted. Please note that these are based on operating at an 11.5% gas strength. In order to operate at a higher gas strength, the catalyst loadings will need to be increased.

Sincerely,

HALDOR TOPSOE, INC.

A handwritten signature in black ink, appearing to read 'P. Polk', written over a horizontal line.

Patrick Polk
Account Manager
Sulfuric Acid Catalyst & WSA Technology

Job 82031

Mon, 28 Apr 2008

Mosaic - New Wales #1

Maximum vanadium catalyst loading

3400 STPD

11.5% SO₂

65% activity 1st bed

85% activity 2nd bed

85% activity 3rd bed

95% activity 4th bed

** Temperature approach to equilibrium limited to 25, 20, 20 & 15C **

Haldor Topsoe GIPS Calculation File :

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Made by : wpp

SUMMARY

Summary for Reactor Calculation

for Sulfur Dioxide Oxidation

Mosaic - New Wales #1

Maximum vanadium catalyst loading

3402
275Production (short TPD), as monohydrate.
SO2 in stack gas (ppm by moles).

Gas analysis (mole%)	Inlet first pass	Outlet last pass
Sulfur Dioxide	11.50	0.03
Sulfur Trioxide	0.00	0.85
Oxygen	9.45	4.44
Nitrogen	79.05	94.67
Temperature (deg.F)	788.00	826.70
Pressure (psia)	21.31	15.05
Flow (SCFM, 60deg.F)	159269.	132985.

Temperature and Conversion Profile

Pass no.	1	2	3	4	Total
Cat. volume (liters) VK, 12 mm Daisy	125655.	154000.	173200.	207777.	660632.
Cat. pass area (sq.ft)	1665.48	1665.48	1665.48	1665.48	
SO3/H2SO4 removed after each pass (SCFM)	0.	0.	17145.	0.	
Inlet temp. (deg.F)	788.00	824.00	824.00	779.00	
Outlet temp. (deg.F)	1150.17	974.53	871.37	826.70	
Temp. rise (deg.F)	362.17	150.53	47.37	47.70	607.76
Outlet temperature approach (deg.F)	44.99	44.73	53.76	27.00	
Total conversion (%)	60.73	85.84	93.70	99.80	
SO2 Bed Conversion(%)	60.73	63.95	55.50	96.86	
Catalyst bed pressure drop (in WG)	3.0	3.9	4.4	4.6	15.9

Job 82031

Mon, 28 Apr 2008

Mosaic - New Wales #2

Maximum vanadium catalyst loading

3400 STPD

11.5% SO2

65% activity 1st bed

85% activity 2nd bed

85% activity 3rd bed

95% activity 4th bed

** Temperature approach to equilibrium limited to 25, 20, 20 & 15C **

Haldor Topsoe GIPS Calculation File :

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Made by : wpp

SUMMARY

Summary for Reactor Calculation

for Sulfur Dioxide Oxidation

Mosaic - New Wales #2

Maximum vanadium catalyst loading

3401	Production (short TPD), as monohydrate.
288	SO2 in stack gas (ppm by moles).

Gas analysis (mole%)	Inlet first pass	Outlet last pass
Sulfur Dioxide	11.50	0.03
Sulfur Trioxide	0.00	0.88
Oxygen	9.45	4.44
Nitrogen	79.05	94.65
Temperature (deg.F)	788.00	828.09
Pressure (psia)	21.31	15.06
Flow (SCFM, 60deg.F)	159269.	133020.

Temperature and Conversion Profile

Pass no.	1	2	3	4	Total
Cat. volume (liters)					
VK, 12 mm Daisy	118900.	125600.	191800.	207460.	643760.
Cat. pass area (sq.ft)	1665.48	1665.48	1665.48	1665.48	
SO3/H2SO4 removed after each pass (SCFM)	0.	0.	17110.	0.	
Inlet temp. (deg.F)	788.00	824.00	824.00	779.00	
Outlet temp. (deg.F)	1126.86	983.61	885.15	828.09	
Temp. rise (deg.F)	338.86	159.61	61.15	49.09	608.71
Outlet temperature approach (deg.F)	92.32	57.22	43.00	27.00	
Total conversion (%)	56.72	83.36	93.51	99.79	
SO2 Bed Conversion(%)	56.72	61.54	61.00	96.81	
Catalyst bed pressure drop (in WG)	2.9	3.2	4.9	4.6	15.5

Job 82031

Mon, 28 Apr 2008

Mosaic - New Wales #3

Maximum vanadium catalyst loadings

3400 STPD

11.3% SO2

65% activity 1st bed

85% activity 2nd bed

85% activity 3rd bed

95% activity 4th bed

** Temperature approach to equilibrium limited to 25, 20, 20 & 15C **

Haldor Topsoe GIPS Calculation File :

C:/Ginp/535790x.out

Made by : wpp

SUMMARY

Summary for Reactor Calculation

for Sulfur Dioxide Oxidation

Mosaic - New Wales #3

Maximum vanadium catalyst loadings

3401
296Production (short TPD), as monohydrate.
SO2 in stack gas (ppm by moles).

Gas analysis (mole%)	Inlet first pass	Outlet last pass
Sulfur Dioxide	11.30	0.03
Sulfur Trioxide	0.00	0.83
Oxygen	9.65	4.79
Nitrogen	79.05	94.35
Temperature (deg.F)	790.00	836.60
Pressure (psia)	21.31	14.88
Flow (SCFM, 60deg.F)	162108.	135825.

Temperature and Conversion Profile

Pass no.	1	2	3	4	Total
Cat. volume (liters) VK, 12 mm Daisy	124300.	139600.	157000.	189000.	609900.
Cat. pass area (sq.ft)	1491.31	1491.31	1491.31	1491.31	
SO3/H2SO4 removed after each pass (SCFM)	0.	0.	17144.	0.	
Inlet temp. (deg.F)	790.00	835.00	840.00	790.00	
Outlet temp. (deg.F)	1147.47	980.42	887.72	836.60	
Temp. rise (deg.F)	357.47	145.42	47.72	46.60	597.21
Outlet temperature approach (deg.F)	49.08	43.74	40.41	27.39	
Total conversion (%)	60.93	85.62	93.69	99.78	
SO2 Bed Conversion(%)	60.93	63.20	56.09	96.56	
Catalyst bed pressure drop (in WG)	4.2	4.9	5.6	5.9	20.6