

Facility Name: **General Chemical LLC – Augusta Plant**

City: Augusta

County: Richmond

AIRS #: 04-13-245-00008

Application #: 17034

Date SIP Application Received: November 1, 2006

Date Title V Application Received: November 1, 2006

Permit No: 2819-245-0008-V-03-1

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## **Introduction**

This narrative is being provided to assist the reader in understanding the content of the referenced SIP permit to construct and draft operating permit amendment. Complex issues and unusual items are explained in simpler terms and/or greater detail than is sometimes possible in the actual permit. This permit is being issued pursuant to: (1) Sections 391-3-1-.03(1) and 391-3-1-.03(10) of the Georgia Rules for Air Quality Control, (2) Part 70 of Chapter I of Title 40 of the Code of Federal Regulations, and (3) Title V of the Clean Air Act Amendments of 1990. The following narrative is designed to accompany the draft permit and is presented in the same general order as the permit. This narrative is intended only as an adjunct for the reviewer and has no legal standing. Any revisions made to the permit in response to comments received during the public comment period and EPA review process will be described in an addendum to this narrative.

**I. Facility Description**

A. Existing Permits

Table 1 below lists the current Title V permit, and all administrative amendments, minor and significant modifications to that permit, and 502(b)(10) attachments. Comments are listed in Table 2 below.

Table 1: Current Title V Permit and Amendments

Permit/Amendment Number	Date of Issuance	Comments	
		Yes	No
2819-245-0008-V-03-0	June 6, 2006	X	

Table 2: Comments on Specific Permits

Permit Number	Comments
2819-245-0008-V-03-0	Renewal Title V Permit for operation of a 850 tons per day double absorption contact sulfuric acid plant and a 270 tons per day alum manufacturing facility.

B. Regulatory Status

1. PSD/NSR/RACT

The facility was potentially a “major” source under PSD/NSR regulations, but has previously taken limits to remain a “minor” source and avoid a PSD/NSR review. The facility accepted a limit of 0.08 lb acid mist per ton of acid produced (based on 850 ton/day maximum) to avoid PSD in 1996 when the plant capacity was more than doubled.

## 2. Title V Major Source Status by Pollutant

**Table 3: Title V Major Source Status**

Pollutant	Is the Pollutant Emitted?	If emitted, what is the facility's Title V status for the Pollutant?		
		Major Source Status	Major Source Requesting SM Status	Non-Major Source Status
PM	Yes			✓
PM <sub>10</sub>	Yes			✓
SO <sub>2</sub>	Yes	✓		
VOC	Yes			✓
NO <sub>x</sub>	Yes			✓
CO	N/A			
TRS	N/A			
H <sub>2</sub> S	N/A			
Individual HAP	Yes			✓
Total HAPs	Yes			✓
Sulfuric acid mist	Yes	✓		

## II. Proposed Modification

### A. Description of Modification

The facility proposes to modify the sulfuric acid manufacturing process at this plant and requests to increase the sulfuric acid production capacity from 850 to 1,200 tons per day. The facility plans to change the existing 3<sup>rd</sup> and 4<sup>th</sup> acid converter stages from series to parallel and any associated processing equipment. This facility will also install a new tail gas scrubber (Source Code: SC-2) to reduce overall SO<sub>2</sub> emissions from this plant and to produce 23,850 tons per year of sodium bisulfite solution for sale.

The facility is planning to convert the existing 4 catalyst bed double absorption sulfuric acid plant into a 3 catalyst bed single absorption arrangement, with the existing third catalyst bed and oleum interstage absorption system operating in parallel. The facility will install a soda ash scrubber to produce sodium bisulfite from SO<sub>2</sub> in offgas from sulfuric acid production.

The tail gas from the final tower, where the SO<sub>3</sub> reacts with water to form H<sub>2</sub>SO<sub>4</sub>, will now be scrubbed first with soda ash in a SO<sub>2</sub> Scrubber (Source Code: SC-2) to produce a concentrated sodium bisulfite solution. The discharge gas then exhausts via Stack S01 before being vented to the atmosphere. The facility is planning to modify this existing stack (Stack S01). The facility will also install a pad-type entrainment separator (Source Code: ES1) on this stack that will reduce particulate matter and sulfuric acid mist emissions. This stack currently has a Continuous Emissions Monitor for SO<sub>2</sub> emissions, which will be reinstalled on this stack after this modification. The facility expects to start construction on this project in October 2007.

This application is being processed as a significant modification with construction because the proposed project constitutes a modification under provisions of New Source Performance Standards. This acid plant (Source Code: K01) is subject to the requirements of 40 CFR 60 Subpart H, "Standards of Performance for Sulfuric Acid Plants". The facility also has proposed a lower emissions limit for SO<sub>2</sub> emissions (2.6 pounds SO<sub>2</sub> emitted per ton acid produced) from this plant to avoid classification under PSD regulations. The current emissions limit is 4.0 pounds of SO<sub>2</sub> emitted per ton acid produced based on a maximum sulfuric acid production of 850 tons per day. This facility will also be required to take a lower limit of 0.07 pounds sulfuric acid mist emitted per ton acid produced in order to avoid a PSD review for sulfuric acid mist emissions. The current emissions limit is 0.08 pounds of sulfuric acid mist emitted per ton acid produced based on a maximum sulfuric acid production of 850 tons per day.

## B. Emissions Change

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**Table 4: Emissions Change Due to Modification**

<b>Pollutant</b>	<b>Is the Pollutant Emitted?</b>	<b>Net Actual Emissions Increase (Decrease) (tpy)</b>	<b>Net Potential Emissions Increase (Decrease) (tpy)</b>
PM	✓	~ 6	~ 6
PM <sub>10</sub>			
SO <sub>2</sub>	✓	34.4	34.4
VOC			
NO <sub>x</sub>			
CO			
TRS			
H <sub>2</sub> S			
Individual HAP			
Total HAPs			
Sulfuric acid mist	✓	6.0	6.0

In this permit application, General Chemicals has calculated baseline actual emissions for K01 Sulfuric Acid Plant, based on the time period starting January 1, 2002 and ending December 31, 2003, for criteria pollutant SO<sub>2</sub>, using actual operating data from the SO<sub>2</sub> CEMS on this stack. The actual SO<sub>2</sub> emissions are determined as 535 tons per year for this time period. The projected SO<sub>2</sub> emissions are calculated as follows using the maximum daily production rate and the new 2.6 pounds SO<sub>2</sub> emitted per acid produced emission limit:

$$(1200 \text{ tons acid/day})(2.6 \text{ lbs SO}_2/\text{ton})(365 \text{ days/yr})(1 \text{ ton}/2000 \text{ lbs}) = 569.4 \text{ tpy SO}_2 \text{ emissions}$$

Therefore, this proposed project will result in an increase of 34.4 tpy of SO<sub>2</sub>. As expected, the installation of the soda ash scrubber will ensure that the facility's overall SO<sub>2</sub> emissions will not increase significantly even though daily sulfuric acid production capacity is increased by 350 tons per day, and that the facility can comply with the new 2.6 pounds per ton limit. Since the major modification threshold for SO<sub>2</sub> is 40 tons per year, this proposed project does not trigger a PSD review for this pollutant.

This facility is a minor source for criteria pollutant, particulate matter (PM). The PM potential emissions from this modification are estimated about 6 tons per year, which is significantly lower than the 15 tons per year major modification threshold for this pollutant. Therefore, this proposed project does not trigger a PSD review for PM.

The other pollutant that has a potential to emit from this modification is sulfuric acid mist. The facility has used a different time period to determine baseline actual emissions for sulfuric acid mist. General Chemicals has calculated baseline actual emissions for K01 Sulfuric Acid Plant, based on the time period starting January 1, 2004 and ending December 31, 2005, for sulfuric acid mist, using actual operating data and stack test emission factors at this plant. Calculations are as follows:

Baseline Actual Emissions:  $(850 \text{ tpd})(365 \text{ day/yr})(0.06 \text{ lbs/ton})(1 \text{ ton}/2000 \text{ lbs}) = 9.3 \text{ tpy H}_2\text{SO}_4 \text{ mist}$   
Projected Emissions:  $(1200 \text{ tpd})(365 \text{ day/yr})(0.07 \text{ lbs/ton})(1 \text{ ton}/2000 \text{ lbs}) = 15.3 \text{ tpy H}_2\text{SO}_4 \text{ mist}$

The projected emissions are calculated using the actual emission factor (0.07 pounds emitted per ton acid) from the facility's 2006 performance test data. Thus, this proposed project will result in an increase of 6.0 tons per year of sulfuric acid mist. Since the major modification threshold for sulfuric acid mist is 7 tons per year, this proposed project does not trigger a PSD review for this pollutant.

### C. PSD/NSR Applicability

The facility is major with respect to PSD because actual SO<sub>2</sub> emissions are greater than 100 tpy.

This proposed project is not a major modification for PSD (attainment areas) or Nonattainment NSR (nonattainment areas). Please refer to Section B above.

**IV. Regulated Equipment Requirements**

A. Brief Process Description

A brief process description can be referenced in the narrative for the Renewal Title V Permit No. 2819-245-0008-V-03-0 and in Section II.A of this narrative.

B. Equipment List for the Process

Emission Units		Specific Limitations/Requirements		Air Pollution Control Devices	
ID No.	Description	Applicable Requirements/Standards	Corresponding Permit Conditions	ID No.	Description
K01	Sulfuric Acid Plant – <u>1200 tons/day</u>	391-3-1-.02(2)(a)1 391-3-1-.02(2)(b) 391-3-1-.02(2)(j) 40 CFR 60 Subpart H <u>40 CFR 52.21 Avoidance</u>	3.2.1, 3.3.1, 3.3.2, 4.2.1, <u>4.2.2</u> , 5.2.1, 5.2.2, <u>5.2.3</u> , 6.1.7, 6.2.1, 6.2.3, 6.2.4	<u>SC-1</u> V04 <u>SC-2</u> <u>ES1</u>	<u>Oleum Tank Scrubber</u> , Mist Eliminators, <u>Soda Ash SO<sub>2</sub> Scrubber</u> , <u>Entrainment Separator</u>

\* Generally applicable requirements contained in this permit may also apply to emission units listed above.

C. Equipment & Rule Applicability

The Sulfuric Acid Plant (Source Code: K01) has taken a new maximum production rate of 438,000 tons per year (1,200 tons per day) of 100% sulfuric acid. The installations of a Soda Ash SO<sub>2</sub> Scrubber (Source Code: SC-2) and an Entrainment Separator (Source Code: ES1) will reduce sulfur dioxide, particulate matter and sulfuric acid mist emissions from this facility. Currently, emissions from this plant are controlled by mist eliminators (Source Code: V04) and a packed bed scrubber (Source Code: SC-1) on the oleum storage tank.

The sulfuric acid plant is subject to the following rules and regulations:

- 40 CFR 60 Subpart H – “*Standards of Performance for Sulfuric Acid Plants*”

The sulfuric acid production facility was modified after August 17, 1971. The rule limits the facility to sulfur dioxide emissions to less than 4 pounds per ton of sulfuric acid produced and 0.15 pounds sulfuric acid mist (H<sub>2</sub>SO<sub>4</sub>) per ton of sulfuric acid produced. The rule also limits opacity from the process to 10% or less. To avoid PSD applicability and reduce SO<sub>2</sub> emissions, the facility has decided to take a more stringent limit of 2.6 pounds per ton of sulfuric acid produced.

- Georgia Rule 391-3-1-.02(2)(j) – “*Sulfuric Acid Plants*”

This plant was extensively modified after January 1, 1972, which requires the facility to comply with 40 CFR 60 Subpart H. The facility is also required to operate a continuous sulfur dioxide monitor and recorder.

No other equipment is classified as a significant emission unit. The storage tanks and all alum process equipment are listed as insignificant activities.

D. Compliance Status

The facility did not indicate that they are out of compliance with any applicable rules and regulations in the application for this modification.

E. Operational Flexibility

There are no requests for operational flexibility for this modification.

F. Permit Conditions

Condition 3.2.1 is a modified condition that requires the facility to limit maximum production of 100% sulfuric acid to 1,200 tons per day from the Sulfuric Acid Plant.

Permit Condition 3.3.2 outlines the 40 CFR 60 Subpart H limits and PSD Avoidance limits for the Sulfuric Acid Plant. Condition 3.3.2.a requires the facility to comply the new 2.6 pounds per ton of sulfuric acid produced PSD avoidance limit for SO<sub>2</sub> emissions. Condition 3.3.2.b requires the facility to comply the new 0.07 pounds per ton of sulfuric acid produced PSD avoidance limit for sulfuric acid mist emissions. No change is made to Condition 3.3.2.c.

**V. Testing Requirements (with Associated Record Keeping and Reporting)**

Condition 4.2.2 is a new condition that requires the facility to conduct a performance test for SO<sub>2</sub> and sulfuric acid mist emissions on the stack (Stack S01) for the Sulfuric Acid Plant. This performance test will be used to verify applicable PSD avoidance and Subpart H limits in Condition 3.3.2. This performance test will also be used to develop and verify appropriate excursion values for the pressure drop, scrubbing flow rate, and pH in the Soda Ash SO<sub>2</sub> Scrubber (Source Code SC-2) and pressure drop in the Entrainment Separator (Source Code: ES1).

**VI. Monitoring Requirements (with Associated Record Keeping and Reporting)**

Existing Condition 4.2.1 in Permit No. 2819-245-0008-V-03-0 requires the facility conduct annual performance tests for sulfur dioxide and sulfuric acid mist emissions from the sulfuric acid plant. These annual performance tests for sulfur dioxide and sulfuric acid mist emissions from the sulfuric acid plant will provide reasonable assurance that the facility will comply with the PSD Avoidance limits in Condition 3.3.2.

This facility currently has a SO<sub>2</sub> Continuous Emissions Monitor on the stack for the Sulfuric Acid Plant. The facility is planning to reinstall the SO<sub>2</sub> monitor after the proposed modification. This should also provide reasonable assurance that the facility will comply with the SO<sub>2</sub> PSD Avoidance limit in Condition 3.3.2.a upon startup after the proposed project.

Condition 5.2.3 is a new condition in this permit that requires the facility to monitor the pressure drop, scrubbant flow rate and pH on the Soda Ash Scrubber (Source Code SC-2) and pressure drop on the Entrainment Separator (Source Code ES1). This monitoring condition will provide reasonable assurance that these newly installed control devices are operating properly so that sulfur dioxide, particulate matter and sulfuric acid mist emissions are minimized. Excursion values for the operating parameters for the Soda Ash Scrubber (Source Code SC-2) and the Entrainment Separator (Source Code ES1) are defined in Conditions 6.1.7.c.iv and 6.1.7.c.v.

**VII. Other Record Keeping and Reporting Requirements**

Excess emissions value (2.6 pounds per ton of 100% sulfuric acid) for sulfur dioxide emissions is updated for the Sulfuric Acid Plant (Source Code K01).

Excursion value for the maximum daily acid production in Condition 6.1.7.c.i is also updated.

**Addendum to Narrative**

The 30-day public review started on March 22, 2007 and ended on April 23, 2007. The only comments that were received during the public comment period were from General Chemical LLC. There comments, along with the Division's responses are as follows:

Company Comment 1 (Conditions 4.2.2, 5.2.3 and 6.1.7.c.iv)

The facility has requested to modify Condition 4.2.2 and delete Conditions 5.2.3 and 6.1.7.c.iv that pertains to the new monitoring and record keeping requirements for the operating parameters for the soda ash scrubber and the entrainment separator.

The facility has requested to delete the language related to system performance in Condition 4.2.2. The facility states that the primary purpose of the soda ash scrubber is sodium bisulfite production. As such, the soda ash scrubber is inherent process equipment. General Chemical does not operate the scrubber at an efficiency higher than that achieved during normal process operations in order to comply with the applicable limitations or standards. The facility claims that the actual performance of this system while in operation is confidential. Making this information public provides General Chemical's and their process designer's competitors with a commercial advantage. Furthermore, the operating ranges of these parameters are not indicators of meeting the required emission limitations. This data is not necessary for demonstrating compliance with the permit.

The exhaust stack is already, and will be equipped with a CEMS for SO<sub>2</sub> emissions in accordance with Condition 5.2.1. Therefore, monitoring the performance of the soda ash scrubber differential pressure, scrubbant flow and pH is unnecessary for demonstrating compliance with the SO<sub>2</sub> emissions limitation imposed under Condition 3.2.2.a of the final and draft permits.

As with the current process, the visible emissions from the modified process will be proportional to and a surrogate for sulfuric acid mist emissions. The permit already requires, and General Chemical already practices, daily visible emissions checks pursuant to Condition 5.2.2, as well as annual reference method stack testing for sulfuric acid mist pursuant to Condition 4.2.1. Therefore, facility contends monitoring the entrainment separator ES1 differential pressure is not necessary to comply with the sulfuric acid mist limit in Condition 3.3.2.b.

**Response**

*The Division partially agrees. The Division will remove the requirement in Condition 5.2.3 to monitor the scrubbant flow rate, the pressure differential and the pH in the soda ash scrubber. The SO<sub>2</sub> CEMS requirement under Condition 5.2.1 and daily visible emissions under Condition 5.2.2 will provide reasonable assurance of compliance with the SO<sub>2</sub> limit in Condition 3.2.2.a. Therefore, Condition 5.2.3(a to c) will be deleted, and Condition 4.2.2 will be updated.*

*However, the Division disagrees with the facility regarding the monitoring requirement for the pressure differential on the entrainment separator. In this modification project, this facility has taken a lower emission limit for sulfuric acid emissions to avoid a PSD review. In order to provide reasonable assurance of compliance with sulfuric acid mist emissions limit in Condition 3.3.2.b, the facility will need to conduct an annual performance test for sulfuric acid mist emissions in accordance with existing Condition 4.2.1 and maintain proper operation of the entrainment separator. The SO<sub>2</sub> CEMS does not always provide an accurate measurement for sulfur acid mist emissions. The daily visible emissions check are also needed to provide reasonable assurance of compliance with the 10% opacity limit in Condition 3.3.2.c. Therefore, the monitoring*

*requirement for the pressure differential on the entrainment separator will remain in Conditions 5.2.3 and 6.1.7.c.iv.*

Company Comment 2 (Section 1.3)

In this section, the facility requests to change the start construction date on this project from October 2007 to March 2007.

Response

*The Division agrees, and the change has been made. The issuance of the draft permit allows the facility to commence construction on this project on March 7, 2007.*