NORTH CAROLINA DIVISION OF AIR QUALITY

Application Review

Issue Date: DRAFT

Region: Washington Regional Office
County: Beaufort
NC Facility ID: 0700071
Inspector's Name: Robert Bright
Date of Last Inspection: 04/28/2023
Compliance Code: 3 / Compliance - inspection

Facility Data

Applicant (Facility's Name): PCS Phosphate Company, Inc. - Aurora

Facility Address:
PCS Phosphate Company, Inc. - Aurora
1530 NC Highway 306 South
Aurora, NC 27806

SIC: 2874 / Phosphatic Fertilizers
NAICS: 325312 / Phosphatic Fertilizer Manufacturing

Facility Classification: Before: Title V **After:** Title V
Fee Classification: Before: Title V **After:** Title V

Permit Applicability (this application only)

SIP: N/A
NSPS: N/A
NESHAP: N/A
PSD: N/A
PSD Avoidance: N/A
NC Toxics: N/A
112(r): N/A
Other: N/A

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Khalid Alnahdy Env. & Tech. Services Manager (252) 322-8288 1530 NC Hwy 306 South Aurora, NC 27806	Jeremy Pierce Interim General Manager (252) 322-8201 1530 NC Highway 306 South Aurora, NC 27806	Chris Smith Env. Engineering Supervisor (252) 322-8263 1530 NC Highway 306 South Aurora, NC 27806

Application Data

Application Number: 0700071.24A
Date Received: 01/04/2024
Application Type: Modification
Application Schedule: TV-Sign-501(b)(2) Part II

Existing Permit Data
Existing Permit Number: 04176/T69
Existing Permit Issue Date: 07/24/2023
Existing Permit Expiration Date: 11/30/2027

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2022	2207.78	451.01	55.78	319.05	793.70	154.95	79.07 [Hydrogen fluoride (hydrofluori]
2021	2631.31	532.97	83.52	403.81	812.82	190.11	82.59 [MIBK (methyl isobutyl ketone)]
2020	2240.91	550.33	123.28	410.46	854.43	229.97	122.27 [MIBK (methyl isobutyl ketone)]
2019	2307.21	457.20	160.20	390.70	818.98	268.66	159.36 [MIBK (methyl isobutyl ketone)]
2018	3439.36	431.10	277.50	424.30	803.52	386.10	276.66 [MIBK (methyl isobutyl ketone)]

Review Engineer: Connie Horne

Review Engineer's Signature: **Date:** DRAFT

Comments / Recommendations:
Issue 04176/T70
Permit Issue Date: DRAFT
Permit Expiration Date: November 30, 2027

1. Purpose of Application

This permit action is for Part II of a two-step process allowed under 15A NCAC 02Q .0501(b)(2). The Rule states:

(c) With the exception in Paragraph (d) of this Rule, the owner or operator of an existing facility, new facility, or modification of an existing facility (except for minor modifications under Rule .0515 of this Section), including significant modifications that would not contravene or conflict with a condition in the existing permit, subject to the requirements of this Section shall not begin construction without first obtaining:

(1) a construction and operation permit following the procedures under this Section (except for Rule .0504), or
(2) a construction and operation permit following the procedures under Rule .0504 and filing a complete application within 12 months after commencing operation to modify the construction and operation permit to meet the requirements of this Section.

The Permittee submitted an application for a significant 501(b)(2) Part I permit (0700071.22B) on June 9, 2022. The Part I permit was issued on August 22, 2022 and included the following approved permit modifications.

- **I-SAL** - Construction of up to three (3) new sulfuric acid railcar loadout stations for off-site sales which receive feed from existing sulfuric acid storage and a storage tank. Only one station has been constructed as of this date.

- **I-SAUL** - Construction of up to three (3) new sulfuric acid unloading stations and a storage tank. These sources have not yet been constructed. This activity was, erroneously, not previously added to the Insignificant Activities list, but will be added with this modification.

On January 4, 2024, DAQ received this Part II application (0700071.24A) from PCS Phosphate Company, Inc. - Aurora to complete the process to include the above-listed changes as required in condition 2.2 D.1.a of Permit 04176T67. According to this application, one sulfuric acid railcar loadout station was constructed that began operation on June 29, 2023. Therefore, this application was received in the required 12-month timeframe after commencing operation. The technical review for the Part I application (0700071.22B) is attached to this document.

2. Facility Description

PCS Phosphate, Inc. is the world's largest fertilizer manufacturer and integrated phosphate mine and chemical facility. The facility operates many processes to produce fertilizer from the raw materials (e.g., phosphate rock from the mine) to intermediate products (e.g., sulfuric acid) to the finished products (e.g., diammonium phosphate). PCS employs approximately 865 persons (with approximately an additional 300 contractors).

3. Application Chronology

January 4, 2024	Part II application received.
January 4, 2024	Sent acknowledgment letter. Application complete.
January 15, 2024	Draft to applicant and regional office
January 15, 2024	Draft to public notice and EPA
February 14, 2024	Public comment period ends
February 29, 2024	EPA Comment period ends
DRAFT	Permit issued

4. Permit Modifications/Changes

The table below outlines the proposed changes to the current permit (04176T69):*

Page No.	Section	Description of Changes
Cover Letter	---	Modified to reflect current permit number, issue and effective dates
All	Headers	Amended permit revision number
1-195	Entire permit, where applicable	Modified to reflect current permit number, issue and effective dates
179	2.2 D	Removed "15A NCAC 02Q .0504: OPTION FOR OBTAINING CONSTRUCTION AND OPERATION PERMIT". This requirement was satisfied with the application (.24A) received January 4, 2024
187-194	Section 4	Updated the General Conditions to version 7.0 dated 08/21/2023

* This list is not intended to be a detailed record of every change made to the permit but a summary of those changes.

5. Other Requirements

- No application fee was required for this application.
- The appropriate number of application copies were received on 1/5/24.
- The application was signed by Mr. Jeremy Pierce, Interim General Manager, on 12/28/23 as the Responsible Official.
- Beaufort County has triggered increment tracking under PSD for PM_{10}, SO_2 and NOx. Any increment changes associated with this modification were addressed in the Part I permit (No. 04716T67).
- The associated dates are listed in the Application Chronology section above.

6. Public Notice

Public notice and EPA review is required for the completion of this two-step significant process. A notice of the DRAFT Title V Permit shall be made pursuant to 15A NCAC 02Q .0521. The notice will provide for a 30-day comment period, with an opportunity for a public hearing. Copies of the public notice shall be sent to persons on the Title V mailing list and EPA. Pursuant to 15A NCAC 02Q .0522, a copy of each permit application, each proposed permit and each final permit shall be provided to EPA. Also, pursuant to 15A NCAC 02Q .0522, a notice of the DRAFT Title V Permit shall be provided to each affected State at or before the time notice is provided to the public under 15A NCAC 02Q .0521, above.

7. Facility Compliance Status

This facility was last inspected on April 28, 2023 by Robert Bright of the Washington Regional Office. According to Mr. Bright's report, "Based on review of records and visual observations, PCS Phosphate appeared to operate in compliance with the applicable air quality regulations and permit conditions at the time of this inspection."

8. Conclusions, Comments and Recommendations

The issuance of Air Quality Permit No. 04176T70 to PCS Phosphate Company, Inc. - Aurora is recommended.

NORTH CAROLINA DIVISION OF AIR QUALITY

Application Review

Issue Date:

Region: Washington Regional Office
County: Beaufort
NC Facility ID: 0700071
Inspector's Name: Robert Bright
Date of Last Inspection: 06/28/2022
Compliance Code: 3 / Compliance - inspection

Facility Data

Applicant (Facility's Name): PCS Phosphate Company, Inc. - Aurora

Facility Address:
PCS Phosphate Company, Inc. - Aurora
1530 NC Highway 306 South
Aurora, NC 27806

SIC: 2874 / Phosphatic Fertilizers
NAICS: 325312 / Phosphatic Fertilizer Manufacturing

Facility Classification: Before: Title V **After:** Title V
Fee Classification: Before: Title V **After:** Title V

Permit Applicability (this application only)

SIP: 02Q .0317 for PSD avoidance, 02Q .0504
NSPS: N/A
NESHAP: N/A
PSD: N/A
PSD Avoidance: Yes
NC Toxics: N/A
112(r): N/A
Other: N/A

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Khalid Alnahdy Env. & Tech Services Manager (252) 322-8288 1530 NC Hwy 306 South Aurora, NC 27806	William Ponton General Manager (252) 322-8195 1530 NC Highway 306 South Aurora, NC 27806	Chris Smith Senior Environmental Engineer (252) 322-8263 1530 NC Highway 306 South Aurora, NC 27806

Application Data

Application Number: 0700071.22B
Date Received: 06/09/2022
Application Type: Modification
Application Schedule: TV-Sign-501(b)(2) Part I

Existing Permit Data
Existing Permit Number: 04176/T66
Existing Permit Issue Date: 03/03/2022
Existing Permit Expiration Date: 12/31/2022

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2020	2240.91	550.33	123.28	410.46	854.43	229.97	122.27 [MIBK (methyl isobutyl ketone)]
2019	2307.21	457.20	160.20	390.70	818.98	268.66	159.36 [MIBK (methyl isobutyl ketone)]
2018	3439.36	431.10	277.50	424.30	803.52	386.10	276.66 [MIBK (methyl isobutyl ketone)]
2017	3139.72	407.90	155.90	527.70	900.13	251.19	154.84 [MIBK (methyl isobutyl ketone)]
2016	5193.68	468.70	175.97	620.80	900.83	267.26	174.59 [MIBK (methyl isobutyl ketone)]

Review Engineer: Betty Gatano

Review Engineer's Signature: **Date:**

Betty Gatano 08/22/2022

Comments / Recommendations:
Issue 04176/T67
Permit Issue Date: 08/22/2022
Permit Expiration Date:

1. Purpose of Application

PCS Phosphate Company, Inc. – Aurora (PCS) currently holds Title V Permit No. 04176T66 with an expiration date of December 31, 2022 for a phosphoric rock mining and phosphoric acid manufacturing facility located in Aurora, Beaufort County, North Carolina. Air Permit Application No. 0700071.22B was received on June 9, 2022 as the first step of a two-step significant modification pursuant to 15A NCAC 02Q .0501(b)(2) for a Sulfuric Acid Project that will allow the facility to either purchase or ship offsite sulfuric acid to increase profitability.

2. Application Chronology

May 23, 2022	PCS met with DAQ staff prior to submittal of the application to discuss the proposed project.
June 9, 2022	Received application for permit modification.
June 10, 2022	E-payment received.
June 10, 2022	Sent acknowledgment letter indicating the application was complete.
July 13, 2022	Betty Gatano and Joe Sullivan of PCS participated in a call to discuss proposed emission calculations. In a follow up call, PCS agreed with calculating emissions from the proposed project based on loading of sulfuric acid in the new loading process (ID No. I-SAL) rather than on the "net disbursement" of loading and unloading.
July 22, 2022	Draft permit and permit review forwarded internally for comments.
July 22, 2022	Robert Bright of the Washington Regional Office (WaRO) of the DAQ indicated he had no comments on the drafts.
July 26, 2022	Samir Parekh of the Stationary Source Compliance Branch (SSCB) of the DAQ responded and indicated the conditions specified in Section 2.5 of the permit were sufficient for the compliance emissions monitoring systems (CEMS) required for the Prevention of Significant Deterioration (PSD) avoidance condition.
July 29, 2022	Comments received from Joe Voelker of DAQ on the draft permit and permit review.
August 2, 2022	Betty Gatano e-mailed Joe Sullivan questions related to the comments received on the draft permit and permit review. Mr. Sullivan responded to the questions that same day.
August 5, 2022	Revised draft permit and permit review forwarded to Joe Voelker for final review.
August 12, 2022	Additional comments from Joe Voelker received, and the drafts updated.

August 12, 2022 Draft permit and review forwarded to facility for comments.

August 16, 2022 Received comments from Joe Sullivan of PCS. The facility requested to simplify the equation for the weighted SO_2 emission factor proposed in the permit application. The simplified equation is derived as shown in Attachment 1 to this document. The DAQ concurred with this request.

August 21, 2022 Permit issued

3. Permit Modifications/Changes and TVEE Discussion

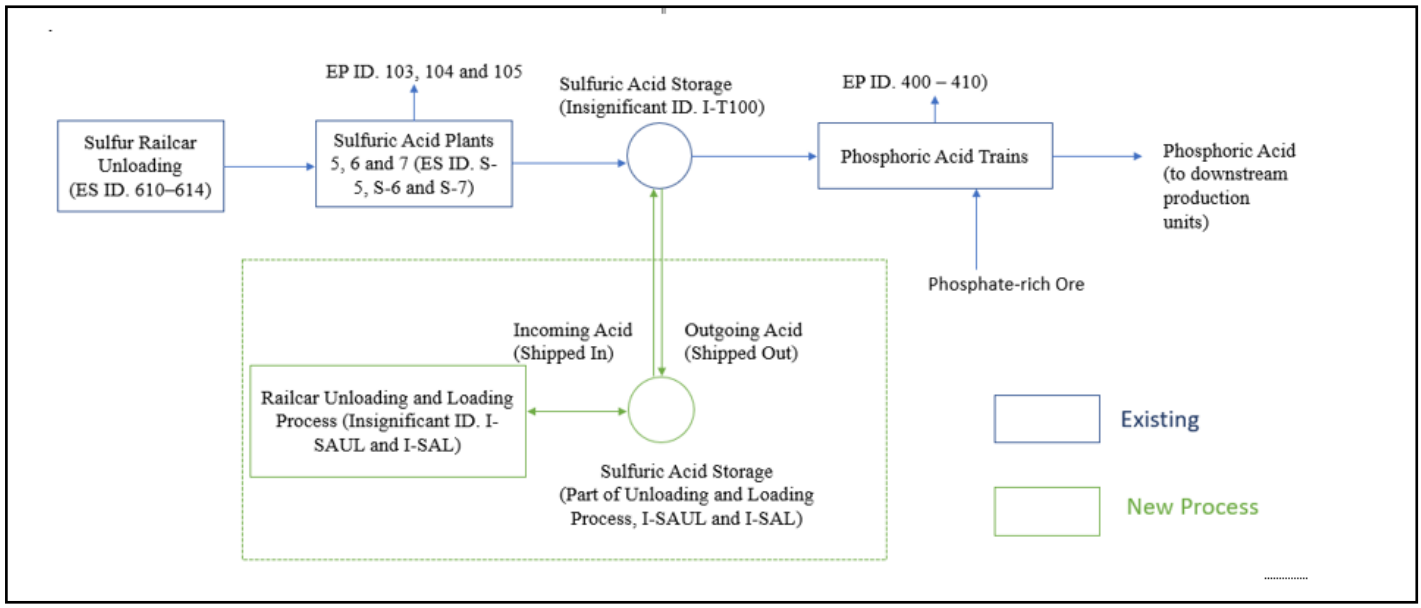
The table below list changes to the current permit under this modification.

Pages	Section	Description of Changes
Cover and throughout	--	Updated all dates and permit revision numbers.
2	--	Updated the Table of Contents.
4	Section 1.1	Added footnote indicating the emission sources (ID Nos. S-5, S-6, and S-7) are listed as a 15A NCAC 02Q .0501(b)(2) modification.
21	Section 1.8	Added footnote indicating the emission source (ID No. Sulfur Unloading) is listed as a 15A NCAC 02Q .0501(b)(2) modification.
25	2.1.1 A – Regulations Table	• Added reference to 15A NCAC 02Q .0317 for PSD avoidance for SO_2 and NO_X emissions. • Added reference to 15A NCAC 02Q .0504 for submittal of a TV permit application within one year from the date of beginning operation of applicable sources.
31 – 33	2.1.1 A.7	Added permit condition for 15A NCAC 02Q .0317 for PSD avoidance for SO_2 and NO_X emissions.
131	2.1.9 B	Added reference to 15A NCAC 02Q .0504 for submittal of a TV permit application within one year from the date of beginning operation of applicable sources.
140	2.2 G	Added requirement under 15A NCAC 02Q .0504 for submittal of a TV permit application within one year from the date of beginning operation of applicable sources.
141	2.3	Listed Section 2.3 as "RESERVED."
148 – 149	Section 3	• Moved "List of Insignificant Activities" to Section 3 in accordance with the updated formatting for TV permits. • Added sulfuric acid loading process (ID No. I-SAL) and unloading process (ID No. I-SAUL) to insignificant activities list.

The Title V Equipment Editor (TVEE) will be updated as part of the TV permit renewal application (0700071.17B), which is currently in house.

4. Sulfuric Acid Project Description

PCS manufacturers phosphoric acid that is used in downstream processes to make various liquid and solid fertilizer products, as well purified phosphoric acid used in the food and beverage industries. A simplified process diagram of the phosphoric acid process is provided in the figure below.



As shown in the figure, sulfuric acid is required for the production of phosphoric acid, and PCS produces sulfuric acid in its three sulfuric acid production process plants (ID Nos. S-5, S-6, and S-7). The sulfuric acid production process begins with elemental (molten) sulfur received in railcars and unloaded (ID No. Sulfur Unloading) to the process plants. The elemental sulfur is then combusted with air to form sulfur dioxide (SO_2). The SO_2 is converted to sulfur trioxide (SO_3) in the presence of a catalyst and excess oxygen. Finally, the SO_3 is absorbed in each plant's dual absorption system to produce a 96% sulfuric acid solution. The sulfuric acid is stored in five sulfuric acid tanks (ID No. I-T100).

Due to fluctuations in the price and availability of molten sulfur and sulfuric acid, PCS requests to undertake a project that will allow the facility to either purchase or ship offsite relatively small quantities of sulfuric acid to increase profitability. PCS estimates the sulfuric acid shipped from the facility will be a less than 1.5% of the overall sulfuric acid produced at the site. The Sulfuric Acid Project, as it is referred to in this document, requires the construction of new sulfuric acid unloading and loading processes, as outlined in green in the figure above. The sulfuric acid unloading process (ID No. I-SAUL) will consist of up to three railcar unloading stations and one associated storage tank. The sulfuric acid unloading process will be used for purchased sulfuric acid to be pumped into the existing storage tanks (ID No. I-T100). Similarly, the sulfuric acid loading process (ID No. I-SAL) will consist of up to three railcar loading stations and one associated storage tank and will be used for shipping sulfuric acid offsite. Intermediate storage may be needed and will be integrated into the existing insignificant activities (ID No. I-T100), if necessary.

The existing railcar sulfur unloading, sulfuric acid plants and phosphoric acid plants will not be modified as part of the Sulfuric Acid Project. The production capacity of the sulfuric acid plants exceeds the production capacity of the downstream phosphoric acid plants, which is the bottleneck for downstream production processes. Accordingly, phosphoric acid production volumes will be entirely unaffected by the new process, regardless of whether sulfuric acid is purchased or sold by the facility.

5. Emissions

Emissions associated with the Sulfuric Acid Project are sulfuric acid mist (SAM) from the new loading/unloading rail processes and associated tanks and emission increases in SO_2, nitrogen oxides (NO_X), SAM, and hydrogen sulfide (H_2S) from the existing sulfuric acid production process.

PCS is an existing major source under 15A NCAC 02D .0530, Prevention of Significant Deterioration (PSD). PCS has requested a PSD avoidance condition pursuant to 15A NCAC 02Q .0317 to limit emissions of SO_2 and NO_X to below the Significant Emission Rate (SER) of 40 tons per consecutive 12 month period for each pollutant. Emissions of SAM and H_2S from the Sulfuric Acid Project do not have the potential to exceed their SERs. Discussion of emission calculations from this project are provided below.

Emissions from the New Emission Sources (ID Nos. I-SAL and I-SAUL)
Minimal emissions of sulfuric acid are expected from the new sulfuric acid loading and unloading processes (ID No. I-SAL and I-SAUL) or the associated storage tanks due to the low vapor pressure of sulfuric acid. Specifically, the partial pressure of sulfur trioxide over a 96-weight percent solution of sulfuric acid product at a maximum temperature of approximately 30 ºC (86 ºF) (whether made offsite or onsite) is negligible at only 2.7×10^{-9} psia. Using this partial pressure, displacement emissions per 100-ton capacity railcar loaded or unloaded would yield a negligibly small emission rate of only 8×10^{-8} pounds of sulfuric acid.[1] This value equates to an emission factor of 8×10^{-10} lb/ton (8×10^{-8} pounds of sulfuric acid per 100-ton rail car).

PCS indicated a railcar can load/unload in approximately an hour, meaning the emission rate from the new loading/unloading processes is 8×10^{-8} pounds of sulfuric acid per hour. Emissions from the new storage tanks associated with these processes are estimated as the same rate as the railcar loading/unloading.

For the loading process (ID No. I-SAL), emissions were calculated with the emission factor noted above and a theoretical maximum loading throughput. PCS back calculated the theoretical maximum loading throughput using a conservatively low emission factor from the sulfuric acid production of process estimated as 1.2 pound of SO_2 per ton of 100% sulfuric acid produced, as shown in the calculation below:

Max H_2SO_4 loaded (tpy) = (<SER for SO_2 ton/yr) / [(1.2 lb SO_2/ton H_2SO_4)*(1 ton/2000 lb)]
Max H_2SO_4 loaded (tpy) = (<39.9 SO_2 ton/yr) / [(1.2 lb SO_2/ton H_2SO_4)*(1 ton/2000 lb)]
Max H_2SO_4 loaded = 66,500 tpy

Based on actual experience, PCS estimates the actual average emissions factor for SO_2 will be closer to 1.4 pound of SO_2 per ton of 100% sulfuric acid produced. Because the actual SO_2 emission factor is expected to be higher than the conservative emission factor used in the calculation above, the actual amount of sulfuric acid loaded in the new process (ID No. I-SAL) will remain lower than the theoretical maximum throughput.

For the unloading process (ID No. I-SAUL), emissions were estimated with the emission factor noted above and assuming the entire sulfuric acid production process was replaced with purchased sulfuric acid.

Emissions of sulfuric acid from the new loading and unloading processes and associated storage tanks are provided in the table below. About 0.005 pound per year of SAM is estimated from these sources, as shown in the table below.

[1] Perry's Chemical Engineering Handbook, Table 3-14a.

Emission Source	Maximum Sulfuric Acid Loaded/Unloaded (tpy)	Emission factor	Potential Emissions (lb/yr)	Potential Emissions (tpy)
I-SAL	66,500	8E-10 lb/ton	5.32E-05	2.66E-08
Associated loading tank	--	8E-8 lb/hr	7.01E-04	3.50E-07
I-SAUL	4,672,000	8E-10 lb/ton	3.74E-03	1.87E-06
Associated unloading tank	--	8E-8 lb/hr	7.01E-04	3.50E-07
		Total Emissions	5.19E-03	2.60E-06

Notes:
- Maximum throughput of sulfuric acid loaded was calculated as 66,500 tons annually.
- Maximum throughput of sulfuric acid unloaded is calculated as follows based on permit description:
  Production in Sulfuric Acid Plant No. 5 (ID No. S-5) = 3,600 tons per day
  Production in Sulfuric Acid Plant No. 6 (ID No. S-6) = 3,800 tons per day
  Production in Sulfuric Acid Plant No. 7 (ID No. S-7) = 5,400 tons per day
  Total daily production = 12,800 tons per day
  Annual production = 4,672,000 tpy
- Emissions from the tanks assume to occur for 8,760 hours per year.

Due to these minimal emissions, the proposed loading and unloading processes and associated storage tanks qualify as insignificant activities under 15A NCAC 02Q .0503(8).

Emissions of H_2S are not expected from the new rail processes (ID Nos. I-SAL or I-SAUL) or the associated storage tanks. H_2S is only present as a dilute gas in the headspace above the molten sulfur that arrives in railcars in the existing sulfur railcar unloading process (ID No. Sulfur Unloading).

Emissions from the Existing Emission Sources

The existing sulfuric acid plants (ID Nos. S-5, S-6, and S-7) and the existing sulfur railcar unloading (ID No. Sulfur Unloading) are upstream from the proposed loading and unloading processes (ID No. I-SAL and I-SAUL), and emissions from the upstream sources will be affected as a result of this project. Sulfuric acid loaded (i.e., shipped offsite) from the facility will result in emissions increases because more acid will be produced in the sulfuric acid plants. Conversely, sulfuric acid plant emissions will decrease when sulfuric acid is unloaded at the site (i.e., purchased) because the sulfuric acid plants will produce less sulfuric acid for downstream phosphoric acid production.

Pollutants emitted from the facility's three sulfuric acid plants include SO_2, NO_x and SAM. Sulfur dioxide emissions are monitored using CEMS. The sulfuric acid production rate is simultaneously monitored, allowing development of production-based emission factors (i.e., pounds of SO_2 emitted per ton of sulfuric acid production). Emission factors for SAM and NO_x have been developed from periodic stack tests and simultaneously measured production rates.

Small quantities of H_2S are also emitted from the existing railcar sulfur (molten) unloading process. H_2S is present in the headspace of incoming sulfur railcars and released during the unloading process.

SO_2 Emissions

In the permit application, PCS proposed using a production weighted emission factor to calculate emissions of SO_2 from the Sulfuric Acid Project. PCS indicated this approach was necessary because all three sulfuric acid plants feed to the sulfuric acid storage tanks (ID No. I-T100), and no tank is dedicated to an individual sulfuric acid plant such that a plant specific emission factor can be

calculated for loading acid in railcars.

The weighted emission factor equation proposed in the permit application can be simplified to the following equation, as shown in Attachment 1 to this document. This simplified equation will be used to determine an overall SO_2 emission factor for the sulfuric acid plants.

$$EF_{SO2,overall,i} = \frac{\left(E_{SO2,S-5,i} + E_{SO2,S-6,i} + E_{SO2,S-7,i}\right)}{\left(P_{S-5,i} + P_{S-6,i} + P_{S-7,i}\right)}$$

Where:

$EF_{SO2,overall,i}$ = overall SO_2 emission factor in calendar month i, (lb/ton)

$E_{SO2,S-5,i}$ = emissions of SO_2 as measured by the CEMS for Sulfuric Acid Plant No. 5 (ID No. S-5), in calendar month i, (lb)

$E_{SO2,S-6,i}$ = emissions of SO_2 as measured by the CEMS for Sulfuric Acid Plant No. 6 (ID No. S-6), in calendar month i, (lb)

$E_{SO2,S-7,i}$ = emissions of SO_2 as measured by then CEMS for Sulfuric Acid Plant No. 7 (ID No. S-7), in calendar month i, (lb)

$P_{S-5,i}$ = total amount of sulfuric acid produced in Sulfuric Acid Plant No. 5 (ID No. S-5) in calendar month i, (tons)

$P_{S-6,i}$ = total amount of sulfuric acid produced in Sulfuric Acid Plant No. 6 (ID No. S-6) in calendar month i, (tons)

$P_{S-7,i}$ = total amount of sulfuric acid produced in Sulfuric Acid Plant No. 7 (ID No. S-7) in calendar month i, (tons)

The emission factor will then be multiplied by the sulfuric acid loaded in the new sulfuric acid loading process (ID No. I-SAL) to determine the monthly and annual SO_2 emissions. PCS has requested to limit emissions of SO_2 to below the SER of 40 tons per consecutive 12 month period to avoid PSD.

NOx Emissions

Emissions of NO_X from the Sulfuric Acid Project will be calculated using a production weighted emission factor. However, NO_X emissions are not measured with CEMS. Instead, PCS conducts performance tests on either Sulfuric Acid Plant Nos. 5 or 6 once every five-year permit cycle to demonstrate compliance with 15A NCAC 02D .0519. PCS conducts performance tests on Sulfuric Acid Plant No. 7 annually to determine compliance with 15A NCAC 02D .0519 and with an existing Best Available Control Technology (BACT) emission limit for NO_X under 15A NCAC 02D .0530. The most recent test results are provided in the table below.

Results of NO_X Emission Testing at the Sulfuric Acid Plants

Sulfuric Acid Plant	Test Date	Test Results	Emissions Limit	Standard	Compliance
Plant No. 5 (ID No. S-5)	03/03/2021	0.07 lb/ton H_2SO_4	5.8 lb/ton H_2SO_4	02D .0519	Yes
Plant No. 6 (ID No. S-6)	04/16/2016	0.13 lb/ton H_2SO_4	5.8 lb/ton H_2SO_4	02D .0519	Yes
Plant No. 7 (ID No. S-7)	04/21/2021	0.15 lb/ton H_2SO_4	0.6 lb/ton H_2SO_4	02D .0530	Yes
			5.8 lb/ton H_2SO_4	02D .0519	Yes

Sulfuric Acid Plant	Test Date	Test Results	Emissions Limit	Standard	Compliance
Notes: • The test results for Plant No. 5 were approved by Taylor Fort of the DAQ SSCB in a memorandum on July 6, 2021. • The test results for Plant No. 6 were approved by Shannon Vogel of the DAQ SSCB in a memorandum on August 2, 2016. • The test results for Plant No. 7 were approved by Brent Hall of the DAQ SSCB in a memorandum on June 17, 2021.					

The production weighted emission factor for NO_X will be calculated using monthly sulfuric acid production and the DAQ SSCB approved test results for NO_X, as shown in the following equation.

$$EF_{NOx,weighted,i} = \frac{\left[\left(EF_{NOx,S-5,i} * P_{S-5,i}\right) + \left(EF_{NOx,S-6,i} * P_{S-6,i}\right) + \left(EF_{NOx,S-7,i} * P_{S-7,i}\right)\right]}{\left(P_{S-5,i} + P_{S-6,i} + P_{S-7,i}\right)}$$

Where:

$EF_{NOx,weighted,i}$ = weighted NO_X emission factor in calendar month i, in pounds of NO_X emissions per ton sulfuric acid produced

$EF_{NOx,S-5,i}$ = NO_X emission factor for Sulfuric Acid Plant No. 5 (ID No. S-5) developed from testing conducted in accordance with Section 2.1.1 A.3.b in the permit in calendar month i, in pounds of NO_X emissions per ton sulfuric acid produced

$EF_{NOx,S-6,i}$ = NO_X emission factor for Sulfuric Acid Plant No. 6 (ID No. S-6) developed from testing conducted in accordance with Section 2.1.1 A.3.b in the permit in calendar month i, in pounds of NO_X emissions per ton sulfuric acid produced

$EF_{NOx,S-7,i}$ = NO_X emission factor for Sulfuric Acid Plant No. 7 (ID No. S-7) developed from testing conducted in accordance with Section 2.1.1 A.5.c in the permit in calendar month i, in pounds of NO_X emissions per ton sulfuric acid produced

$P_{S-5,i}$ = total amount of sulfuric acid produced in Sulfuric Acid Plant No. 5 (ID No. S-5) in calendar month i, in tons

$P_{S-6,i}$ = total amount of sulfuric acid produced in Sulfuric Acid Plant No. 6 (ID No. S-6) in calendar month i, in tons

$P_{S-7,i}$ = total amount of sulfuric acid produced in Sulfuric Acid Plant No. 7 (ID No. S-7) in calendar month i, in tons

The weighted emission factor will then be multiplied by the sulfuric acid loaded in the new sulfuric acid loading process (ID No. I-SAL) to determine the monthly and annual NO_X emissions. PCS has requested to limit emissions of NO_X to below the SER of 40 tons per consecutive 12 month period to avoid PSD.

Emissions of SAM and H_2S

Emissions of SAM and H_2S from the existing sulfuric acid plants (ID Nos. S-5, S-6, and S-7) and existing the sulfur railcar unloading (ID No. Sulfur Unloading) will increase as a result of this modification. The expected increase from the existing emission sources was calculated using the theoretical maximum loading throughput of the loading process (ID No. I-SAL) as determined based on SO_2 emissions of less than 40 tpy (see above). The emission increase of these pollutants from the existing sources are provided in the table below:

The table below also compares the emission increases in SAM and H_2S to the SERs for these pollutants. Although the addition of the new rail processes (ID Nos. I-SAL and I-SAUL) and associated storage tanks will result in a small amount of SAM emissions (2.60E-06 tpy of SAM),

most of the emissions of SAM result from the existing sulfur acid plants (ID Nos. S-5, S-6, and S-7). As shown in the table, emission increases of SAM and H_2S remain below their SERs. Therefore, a PSD avoidance condition is not required for emissions of SAM and H_2S.

Pollutant	Maximum Sulfuric Acid Loaded (ton/yr)	Emission factor (lb/ton)	Potential Emission Increase (ton/yr)	SER (ton/yr)	SER exceeded
SAM	66,500	0.15 lb/ton sulfuric acid	4.99	7	No
H_2S	66,500	0.0048 lb/ton sulfur	0.16	10	No

Notes:

- Potential emissions were based on 66,500 tons of sulfuric acid loaded annually.
- The emission factor for SAM was based on the limit in 40 CFR Part 60, Subpart H, "Standards of Performance for Sulfuric Acid Plants." This rule limits SAM emissions from the sulfuric acid plants (ID Nos. S-5, S-6, and S-7) to no more than 0.15 pounds per ton of 100% sulfuric acid produced.
- The emission factor for H_2S emissions from each 100-ton railcar unloaded at the site from the existing sulfur unloading process (ID No. Sulfur Unloading) was determined to be 0.482 pounds or 0.00482 lb/ton.
- As noted above, the addition of the new rail processes (ID Nos. I-SAL and I-SAUL) and associated storage tanks will result in an additional 2.60E-06 tpy of SAM. The potential emissions of SAM resulting from this modification will remain below the SER when this value is added to the values in above.

6. Regulatory Review

The following regulations apply to the sulfuric acid plants (ID Nos. S-5, S-6, and S-7).

- 15A NCAC 02D .0517, Emissions from Plants Producing Sulfuric Acid – PCS complies with this regulation by meeting the testing, monitoring, recordkeeping, and reporting (MRR) requirements under "Standards of Performance for Sulfuric Acid Plants," 40 CFR Part 60 Subpart H. No changes to the permit are required, and continued compliance is anticipated.

- 15A NCAC 02D .0519, Nitrogen Oxide Emissions from Sulfuric Acid Manufacturing Plants – PCS demonstrates compliance with this regulation by conducting a performance test on either Sulfuric Acid Plant No. 5 or 6 once every five-year permit cycle and on Sulfuric Acid Plant No. 7 annually. No changes to the permit are required, and continued compliance is anticipated.

- 15A NCAC 02D .0524, New Source Performance Standards (NSPS) – All three plants were constructed after August 17, 1971 and are subject to "Standards of Performance for Sulfuric Acid Plants," 40 CFR Part 60 Subpart H (NSPS Subpart H), per 40 CFR 60.80(b). The facility must meet emission limits for SO_2, SAM, and visible emissions (VE) under NSPS Subpart H. In addition to MRR requirements, compliance is demonstrated by annual testing of sulfuric acid and installation and operation of CEMS for SO_2 emissions. PCS must also follow procedures for hot or cold startups under NSPS Subpart H. No changes to the permit are required, and continued compliance with NSPS Subpart H is anticipated.

- 15A NCAC 02D .0530, Prevention of Significant Deterioration (PSD) – Sulfuric Acid Plant No. 7 (ID No. S-7) was added to Air Permit No. 04176T37 issued on January 4, 2008. The modification was a PSD major modification, for significant emissions of SAM and NO_X, and BACT emission limits were established for these pollutants. PCS must conduct inspection and maintenance of the vertical mist vertical tube mist eliminator on Plant No. 7 to ensure compliance and must also conduct source testing annually to demonstrate compliance. The results of the most recent testing are shown below. No changes to the permit are required, and continued compliance is anticipated.

Pollutant	Test Date	Test Results	Emissions Limit	Regulation	Compliance
NO_X	04/21/2021	0.146 lb/ton 100% H_2SO_4	0.6 lb/ton 100% H_2SO_4	02D .0530	Yes
H_2SO_4 mist	04/28/2021	0.043 lb/ton 100% H_2SO_4	0.075 lb/ton 100% H_2SO_4		Yes

Notes:

- The test results for NO_X emissions were approved by Brent Hall of the SSCB in a memorandum on July 17, 2021.
- The test results for emissions of H_2SO_4 mist were approved by Taylor Fort of the SSCB in a memorandum on August 25, 2021.

- 15A NCAC 02D .0614, Compliance Assurance Monitoring - Emissions of SAM from sulfuric acid plants Nos. 5, 6, and 7 (ID Nos. S-5, S-6, and S-7) are controlled by vertical tube mist eliminators (ID Nos. 415-934, 406-129, and 407-258, respectively) installed on the plants' final absorbing towers. These emission sources are subject to CAM. PCS conducts monthly VE observations from these sources for CAM. No changes to the permit are required, and continued compliance is anticipated.

- 15A NCAC 02D .1100, Control of Toxic Air Pollutants – Emissions of SAM and H_2S, which are both toxic air pollutants (TAPs) under the NC Air Toxics Program, will increase as a result of this modification. PCS did not conduct additional air dispersion modeling for the Sulfuric Acid Project because the minimal emissions from the new loading/unloading processes (ID Nos. I-SAL and I-SAUL) and associated storage tanks and the maximum permitted emission rates from existing permitted sources (ID Nos. S-5, S-6, S-7, and Sulfur Unloading) are not impacted by the project.

  DAQ evaluated emissions from this modification to ensure no additional air dispersion modeling was required to demonstrate compliance with NC Air Toxics.

  The previous facility-wide air dispersion modeling was conducted at maximum permitted emission rates optimized to 98% of the acceptable ambient levels (AAL). Therefore, any emission increases from the existing emission sources (ID Nos. S-5, S-6, S-7, and Sulfur Unloading) are accounted for in the previous air dispersion modeling, and no additional air dispersion modeling is needed for existing emission sources. It should be noted that the existing sulfuric acid storage tanks (ID Nos. I-T100), which are insignificant activities, have never been modeled because there are no measurable emissions from these tanks.

  Emissions of H_2S are not expected from the new rail processes (ID Nos. I-SAL or I-SAUL) or the associated storage tanks. Hydrogen sulfide is only present as a dilute gas in the headspace above the molten sulfur that arrives in railcars prior to use in sulfuric acid production. Therefore, this TAP was not evaluated from the new rail processes or associated storage tanks.

  As noted previously, the emission factor of SAM from loading/unloading railcars is 8×10^{-8} pounds of sulfuric acid per 100-ton railcar. PCS indicated a railcar can load/unload in approximately an hour, meaning the emission rate from the new rail processes is 8×10^{-8} pounds of sulfuric acid per hour. Emissions from the new storage tanks are estimated as the same rate as the railcar loading/unloading. The increase in SAM resulting from the new rail processes and associated tanks were compared with the permitted emission rates used for the facility-wide air dispersion modeling for SAM, optimized to 98% of the AAL. The results of the comparison are provided in the table below.

Permitted limits of SAM	Increase of SAM from New Rail Processes	Increase of SAM from New Tanks	Total Increase	% of permitted limit
55.01 lb/hr	4.8E-07 lb/hr	1.6E-07 lb/hr	6.4E-07 lb/hr	1.2E-06
1306.9 lb/day	1.2E-05 lb/day	3.8E-06 lb/day	1.5E-05 lb/day	1.2E-06

Notes:

- The sulfuric acid unloading process (ID No. I-SAUL) will consist of up to three railcar unloading stations, and the sulfuric acid loading process (ID No. I-SAL) will consist of up to three railcar loading. The emission rate of 8 x 10^{-8} pounds of sulfuric acid per hour was multiplied by six to simulate all six stations loading and unloading simultaneously.
- The new unloading and loading processes may include associated storage tanks. The emission rate of 8 x 10^{-8} pounds of sulfuric acid per hour was multiplied by two to represent hourly emissions from these two tanks.
- The permitted values listed above represent emissions used in the air dispersion modeling and include emission source subject to the Maximum Achievable Control Technology (MACT) standards. These emission sources were removed from the NC Air Toxics table in the permit under Air Permit No. 04176T58 issued on May 8, 2019. Therefore, the permitted values listed above differ from those listed in Attachment 1 of the permit.

Additionally, the location of railcar loading and unloading processes under consideration is several hundred feet from the facility's closest ambient boundary occurring at the barge loadout station. Given the small emissions from the new rail processes and the anticipated location at the facility, these new emissions are not expected to impact the air dispersion modeling results, and DAQ concurs no additional air dispersion modeling is required for this modification.

- 15A NCAC 02Q .0317, Avoidance Condition, – PCS has requested avoidance conditions limiting emissions of SO_2 and NO_X from the Sulfuric Acid Project to less than 40 tpy, each. As noted above emissions will be determined based on weighted emission factors and the throughput of sulfuric acid loaded in the new loading process (ID No. I-SAL). PCS must calculate emissions monthly and report emissions semiannually to ensure compliance. Compliance is anticipated.

- 15A NCAC 02Q .0504, Option for Obtaining Construction and Operating Permit – PCS will be required to submit a Title V permit application pursuant to 15A NCAC 02Q .0504 (aka the "Part II" permit application) within 12 months of beginning operation of the new loading process (ID No. I-SAL).

- Consent Decree Civil Action No. 14-707-BAJ-SCR (aka the Consent Decree or CD) – In February 2015, PCS entered into a consent decree jointly with PCS Nitrogen Fertilizer, L.P. and the US EPA to comply with certain permitting and compliance requirements. As part of the consent decree, PCS is required to meet long term and short emission limits for SO_2, emission limits for SAM, and other compliance objectives under specified timetables. Requirements under the CD were added to Air Permit No. 04176T54 issued on December 15, 2017. The requirements are contained in Section 2.5 of the permit. No changes to the permit are required, and continued compliance is anticipated.

The new loading and unloading processes (ID Nos. I-SAL and I-SAUL) and associated tanks and the existing sulfuric acid storage tanks (ID No. I-T100) have no applicable regulations. The existing sulfur unloading process (ID No. Sulfur unloading) is only subject to 15A NCAC 02D .1100.

7. NSPS, NESHAPS/MACT, NSR/PSD, 112(r), CAM

NSPS

PCS has numerous emission sources subject to various New Source Performance Standards (NSPS). All three sulfuric acid plants are subject to "Standards of Performance for Sulfuric Acid Plants," 40 CFR Part 60 Subpart H (NSPS Subpart H), per 40 CFR 60.80(b). No changes to the permit are required, and continued compliance with NSPS Subpart H is anticipated.

NESHAPS/MACT

PCS is a major source of hazardous air pollutants (HAPs) and has numerous emission sources subject to various Maximum Achievable Control Technology (MACT) standards. No new MACTS are triggered by the Sulfuric Acid Project, as neither SAM nor H_2S are HAPs.

PSD

PCS is located in Beaufort County, which is either in attainment or unclassifiable/attainment of National Ambient Air Quality Standards (NAAQS) for all criteria pollutants. The PSD minor baseline dates have been triggered for Beaufort County for NO_X, SO_2, and PM_{10} emissions. Emissions of NO_X and SO_2 will increase, and the emission increases for increment tracking is based on the 40 tpy for this project. PM_{10} emissions are not expected.

Type of Emissions	**SO_2**	**NO_X**
Potential Emissions (SER)	<40 tpy	<40 tpy
Hourly Emission increases from Project	< 9.13 lb/hr	< 9.13 lb/hr

112(r)

PCS is subject to Section 112(r) of the Clean Air Act requirements because it stores regulated substances in quantities above the thresholds in 112(r). This permit modification does not affect the 112(r) status of the facility, and continued compliance is anticipated.

Compliance Assurance Monitoring (CAM)

Pursuant to 40 CFR Part 64 and 15A NCAC 02D .0614, Compliance Assurance Monitoring (CAM), is applicable to any pollutant-specific emission unit (PSEU), if the following three conditions are met:

- the unit is subject to any (non-exempt: e.g., pre-November 15, 1990, Section 111 or Section 112 standard) emission limitation or standard for the applicable regulated pollutant.
- the unit uses any control device to achieve compliance with any such emission limitation or standard.
- unit's precontrol potential emission rate exceeds either 100 tons/yr (for criteria pollutants) or 10/25 tons/yr (for HAPs).

The sulfuric acid plants are subject to CAM for SAM emissions. This modification will not change the CAM status of the sulfuric acid plants. Continued compliance is anticipated.

8. NC Air Toxics

As discussed above, the small emission increases of TAPs associated with the Sulfuric Acid Project are not expected to impact the previous air dispersion modeling results, and therefore, no additional air dispersion modeling is required as part of this modification.

PCS has previously conducted facility-wide air modeling for numerous TAPs, and modeled emission limits for these TAPs are incorporated in Attachment 1 to the permit. The TAPs table in the permit does

not include NESHAP/MACT emission sources, which were removed as part of Air Permit No. 04176T58 issued on May 5, 2019. Continued compliance is anticipated.

9. Facility Emissions Review

Facility-wide potential emissions are provided in the table below. Actual emissions from PCS from 2016 to 2020 are reported in the header of this permit review.

Pollutant	TV Potential Emissions (tpy)
PM (TSP)	3,509
PM10	2,060
PM2.5	1,432
CO	1,271
NO_x	10,146
SO_2	8,760
VOC	289
GHG	791,670
Notes: Facility-wide emissions as reported in Form D-1 in application no. 0700071.22B	

10. Compliance Status

Robert Bright of the WaRO completed the most recent full compliance evaluation (FCE) for PCS on April 9, 2021. The facility appeared to operate in compliance during the FCE.

The five-year compliance history for PCS is provided below:

- A Notice of Violation/Notice of Recommendation for Enforcement (NOV/NRE) was issued on June 24, 2019. On April 4, 5, and 15, 2019, PCS conducted emissions testing on Calciner No. 4 to demonstrate compliance with the fluoride emission limitations in MACT Subpart AA. The results of the tests indicated PCS exceeded the emission limitation of 0.0009 pounds of fluoride per ton P_2O_5 wet feed. A civil penalty in the amount of $4,218, including costs, was assessed on October 9, 2019 for this violation. The penalty was paid in full on October 28, 2019.
- PCS and DAQ entered into a SOC (SOC 2019-002) for resolution of all noncompliance issues associated with mercury emissions from the calciners. SOC 2019-002 was finalized on September 5, 2019. On March 25, 2021, the DAQ issued a letter to PCS indicating the facility had met all the requirement of SOC 2019-002. The letter closed the SOC.
- A Notice of Deficiency was issued on August 16, 2017 for failure to conduct a cylinder gas audit on sulfuric acid plant No. 5 during the second quarter of 2017.

11. Public Notice/EPA and Affected State(s) Review

No public notice is required for the first step application of a two-step significant modification pursuant to 15A NCAC 02Q .0501(b)(2).

12. Other Regulatory Considerations

- A P.E. seal is not required for this permit application.
- A zoning consistency determination is required for this permit modification. However, the area in which PCS is located does not have zoning. As such, a notice was placed in the local paper, and a sign has been placed in front of the facility as required pursuant to 15A NCAC 02Q .0113. The facility provided an affidavit and proof of publication of the legal notice as part of the permit application.
- A permit fee of $7,210 was submitted as an e-payment on June 10, 2022.

13. Recommendations

The permit application for PCS Phosphate Company, Inc. – Aurora in Aurora, Beaufort County, NC has been reviewed by DAQ to determine compliance with all procedures and requirements. DAQ has determined that this facility is complying or will achieve compliance, as specified in the permit, with all requirements that are applicable to the affected sources. The DAQ recommends the issuance of Air Permit No. 04176T67.

In the permit application, PCS proposed using a production weighted emission factor for SO_2 to calculate emissions of SO_2 from the sulfuric acid plants (ID Nos. S-5, S-6, and S-7). The production weighted emission factor for SO_2 is calculated using monthly sulfuric acid production and emissions measured by the SO_2 CEMS for each plant, as shown in the following equation.

$$EF_{SO2,weighted,i} = \frac{\left[\left(EF_{SO2,S-5,i} * P_{S-5,i}\right) + \left(EF_{SO2,S-6,i} * P_{S-6,i}\right) + \left(EF_{SO2,S-7,i} * P_{S-7,i}\right)\right]}{\left(P_{S-5,i} + P_{S-6,i} + P_{S-7,i}\right)}$$

Where:

$EF_{SO2,weighted,i}$ = weighted SO_2 emission factor in calendar month i, (lb/ton)

$EF_{SO2,S-5,i}$ = emission factor for SO_2 as determined by CEMS for Sulfuric Acid Plant No. 5 (ID No. S-5), in calendar month i, (lb/ton)

$EF_{SO2,S-6,i}$ = emission factor for SO_2 as determined by CEMS for Sulfuric Acid Plant No. 6 (ID No. S-6), in calendar month i, (lb/ton)

$EF_{SO2,S-7,i}$ = emission factor for SO_2 as determined by CEMS for Sulfuric Acid Plant No. 7 (ID No. S-7), in calendar month i, (lb/ton)

$P_{S-5,i}$ = total amount of sulfuric acid produced in Sulfuric Acid Plant No. 5 (ID No. S-5) in calendar month i, (tons)

$P_{S-6,i}$ = total amount of sulfuric acid produced in Sulfuric Acid Plant No. 6 (ID No. S-6) in calendar month i, (tons)

$P_{S-7,i}$ = total amount of sulfuric acid produced in Sulfuric Acid Plant No. 7 (ID No. S-7) in calendar month i, (tons)

The SO_2 emission factor for each sulfuric acid plant can be calculated as the pounds of SO_2 emissions measured by the SO_2 CEMS each month divided by the monthly production rate for each sulfuric plant, as shown in the following equation.

$$EF_{SO2,SA\ plant} = \frac{E_{SO2,SA\ plant}}{P_{SA\ plant}}$$

Where:

$EF_{SO2,\ SA\ plant}$ = monthly emission factor for SO_2 for a given sulfuric acid plant (lb/ton)

$E_{SO2,\ SA\ plant}$ = monthly emissions of SO_2 as determined by the CEMS for a given sulfuric acid plant (lb)

$P_{SA\ plant}$ = monthly amount of sulfuric acid produced in a given sulfuric acid plant (tons)

The emission factor equation above can then be substituted into the weighted emission factor equation as shown below:

$$EF_{SO2,weighted,i} = \frac{\left[\left(\frac{E_{SO2,S-5,i}}{P_{S-5,i}} * P_{S-5,i}\right) + \left(\frac{E_{SO2,S-6,i}}{P_{S-6,i}} * P_{S-6,i}\right) + \left(\frac{E_{SO2,S-7,i}}{P_{S-7,i}} * P_{S-7,i}\right)\right]}{\left(P_{S-5,i} + P_{S-6,i} + P_{S-7,i}\right)}$$

Where:

$EF_{SO2,weighted,i}$ = weighted SO_2 emission factor in calendar month i, (lb/ton)

$E_{SO2,S-5,i}$ = emissions of SO_2 as measured by the CEMS for Sulfuric Acid Plant No. 5 (ID No. S-5), in calendar month i, (lb)

$E_{SO2,S-6,i}$ = emissions of SO_2 as measured by the CEMS for Sulfuric Acid Plant No. 6 (ID No. S-6), in calendar month i, (lb)

$E_{SO2,S-7,i}$ = emissions of SO_2 as measured by the CEMS for Sulfuric Acid Plant No. 7 (ID No. S-7), in calendar month i, (lb)

$P_{S-5,i}$ = total amount of sulfuric acid produced in Sulfuric Acid Plant No. 5 (ID No. S-5) in calendar month i, (tons)

$P_{S-6,i}$ = total amount of sulfuric acid produced in Sulfuric Acid Plant No. 6 (ID No. S-6) in calendar month i, (tons)

$P_{S-7,i}$ = total amount of sulfuric acid produced in Sulfuric Acid Plant No. 7 (ID No. S-7) in calendar month i, (tons)

The production rates of the sulfuric acid plants cancel out in the numerator of the above equation. The resulting equation for an SO_2 overall emission factor reduces to the sum of SO_2 emissions as measured by the CEMS from each sulfuric acid plant divided by the production rate of each sulfuric acid plant. The simplified equation below will be used to determine an overall SO_2 emission factor for the sulfuric acid plants.

$$EF_{SO2,i} = \frac{\left(E_{SO2,S-5,i} + E_{SO2,S-6,i} + E_{SO2,S-7,i}\right)}{\left(P_{S-5,i} + P_{S-6,i} + P_{S-7,i}\right)}$$

$EF_{SO2,i}$ = overall SO_2 emission factor in calendar month i, (lb/ton)

$E_{SO2,S-5,i}$ = emissions of SO_2 as measured by the CEMS for Sulfuric Acid Plant No. 5 (ID No. S-5), in calendar month i, (lb)

$E_{SO2,S-6,i}$ = emissions of SO_2 as measured by the CEMS for Sulfuric Acid Plant No. 6 (ID No. S-6), in calendar month i, (lb)

$E_{SO2,S-7,i}$ = emissions of SO_2 as measured by the CEMS for Sulfuric Acid Plant No. 7 (ID No. S-7), in calendar month i, (lb)

$P_{S-5,i}$ = total amount of sulfuric acid produced in Sulfuric Acid Plant No. 5 (ID No. S-5) in calendar month i, (tons)

$P_{S-6,i}$ = total amount of sulfuric acid produced in Sulfuric Acid Plant No. 6 (ID No. S-6) in calendar month i, (tons)

$P_{S-7,i}$ = total amount of sulfuric acid produced in Sulfuric Acid Plant No. 7 (ID No. S-7) in calendar month i, (tons)