NORTH CAROLINA DIVISION OF AIR QUALITY

Application Review

Issue Date: DRAFT

Region: Wilmington Regional Office
County: New Hanover
NC Facility ID: 6500347
Inspector's Name: Linda Willis
Date of Last Inspection: 11/04/2021
Compliance Code: 3 / Compliance - inspection

Facility Data

Applicant (Facility's Name): Wilbara, LLC

Facility Address:
Wilbara, LLC
4620 Highway 421 North
Wilmington, NC 28401

SIC: 2819 / Industrial Inorganic Chemicals
NAICS: 325188 / All Other Basic Inorganic Chemical 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
Steve Suek Plant Manager (910) 508-0392 4620 Highway 421 North Wilmington, NC 28401	Steve Suek Plant Manager (910) 508-0392 4620 Highway 421 North Wilmington, NC 28401	Eric Cornwell Principal (678) 633-0631 3500 Lenox Road NE, Suite 1500 Atlanta, GA 30326

Application Data

Application Number: 6500347.22B
Date Received: 09/26/2022
Application Type: Modification
Application Schedule: TV-Sign-501(b)(2) Part II

Existing Permit Data
Existing Permit Number: 09904/T04
Existing Permit Issue Date: 07/07/2022
Existing Permit Expiration Date: 08/31/2026

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2021	166.55	8.83	0.0100	0.1000	---	---	--- [---]
2020	165.39	8.69	0.0100	0.0400	2.76	---	--- [---]
2019	117.05	7.66	0.0100	0.2000	17.07	---	--- [---]
2018	95.90	8.13	0.0100	0.2400	17.25	---	--- [---]
2017	103.35	8.78	0.0100	0.1400	18.14	---	--- [---]

Review Engineer: Connie Horne

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

Comments / Recommendations:
Issue 09904/T05
Permit Issue Date: DRAFT
Permit Expiration Date: August 31, 2026

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 (6500347.22A) on April 28, 2022. The Part I permit was issued on July 7, 2022 and included the following permit modifications.

- Addition of a long term limit for sulfur dioxide (SO_2) emissions under the Best Available Control Technology (BACT) that is applicable at all times, including periods of startup, shutdown, and malfunction (SSM).
- Addition of language to clarify that the existing short term limit for SO_2 emissions under BACT is applicable at all times, excluding periods of SSM.
- Addition of conditions for operations during startup events.

On September 26, 2022, DAQ received this Part II application (6500347.22B) from Wilbara to complete the process to include the above listed changes as required in condition 2.1 A.8 of Permit 09904T04. The technical review for the Part I application (6500347.22A) is attached to this document.

2. Facility Description

The Wilbara facility produces sulfuric acid with a limit of 575 tons per day utilizing dual-adsorption methodology.

3. Application Chronology

September 26, 2022	Part II application received
October 4, 2022	Sent acknowledgment letter indicating the application was complete
October 27, 2022	Draft to applicant and regional office
DRAFT	Draft to public notice and EPA
DRAFT	Public comment period ends
DRAFT	EPA Comment period ends
DRAFT	Permit issued

4. Permit Modifications/Changes

The table below outlines the proposed changes to the current permit:

Page No.	Section	Description of Changes
Cover Letter	---	Modified to reflect current permit number, issue and effective dates
All	Headers	Amended permit revision number
1-20	Entire permit, where applicable	Modified to reflect current permit number, issue and effective dates
10	2.1 A.8	Removed "15A NCAC 02Q .0504: OPTION FOR OBTAINING CONSTRUCTION AND OPERATION PERMIT". This requirement was satisfied with the application (.22B) received September 26, 2022.

* 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 was received on 9/26/22.
- The application was signed by Mr. Steve Suek, Plant Manager on 9/15/22 as the Responsible Official.
- New Hanover County has triggered increment tracking under PSD for PM-10, SO_2 and NO_x. Any increment changes associated with this modification were addressed in the Part I permit (No. 09904T04).
- 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 November 4, 2021 by Linda Willis of the Wilmington Regional Office. According to Ms. Willis' report, this facility appeared to be in compliance with all applicable requirements.

On February 21, 2022, DAQ issued a NOV/NRE to Wilbara for 22 exceedances of the BACT emission limit for SO_2 during five startup events from October 5, 2021 through December 5, 2021. The issuance of this permit will resolve the NOV/NRE.

8. Conclusions, Comments and Recommendations

The issuance of Air Quality Permit No. 09904T05 to Wilbara, LLC is recommended.

NORTH CAROLINA DIVISION OF AIR QUALITY

Application Review

Issue Date: July 7, 2022

Region: Wilmington Regional Office
County: New Hanover
NC Facility ID: 6500347
Inspector's Name: Linda Willis
Date of Last Inspection: 11/04/2021
Compliance Code: B / Violation - emissions

Facility Data

Applicant (Facility's Name): Wilbara, LLC

Facility Address:
Wilbara, LLC
4620 Highway 421 North
Wilmington, NC 28401

SIC: 2819 / Industrial Inorganic Chemicals
NAICS: 325188 / All Other Basic Inorganic Chemical Manufacturing

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

Permit Applicability (this application only)

SIP: 02D .0517, 02D .0519, 02D .0524, 02D .0530, 02D .0614, 02D .1100
NSPS: Subpart H
NESHAP: No
PSD: Yes
PSD Avoidance: No
NC Toxics: Yes
112(r): No
Other: N/A

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Steve Suek Plant Manager (910) 508-0392 4620 Highway 421 North Wilmington, NC 28402	Steve Suek Plant Manager (910) 508-0392 4620 Highway 421 North Wilmington, NC 28402	Eric Cornwell Principal (678) 633-0631 3500 Lenox Road NE, Suite 1500 Atlanta, GA 30326

Application Data

Application Number: 6500347.22A
Date Received: 04/28/2022
Application Type: Modification
Application Schedule: TV-Sign-501(b)(2) Part I

Existing Permit Data
Existing Permit Number: 09904/T03
Existing Permit Issue Date: 09/27/2021
Existing Permit Expiration Date: 08/31/2026

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2020	165.39	8.69	0.0100	0.0400	2.76	---	--- [---]
2019	117.05	7.66	0.0100	0.2000	17.07	---	--- [---]
2018	95.90	8.13	0.0100	0.2400	17.25	---	--- [---]
2017	103.35	8.78	0.0100	0.1400	18.14	---	--- [---]
2016	149.64	8.68	0.0100	0.1800	16.36	---	--- [---]

Review Engineer: Betty Gatano

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

Betty Gatano 07/07/2022

Comments / Recommendations:
Issue 09904/T04
Permit Issue Date: 07/07/2022
Permit Expiration Date: 08/31/2026

1. Purpose of Application

Wilbara LLC (hereinafter referred to as Wilbara) is a commercial-grade sulfuric acid manufacturing plant located in Wilmington, New Hanover County, North Carolina. A permit application for the first step of a two-step significant modification pursuant to 15A NCAC 02Q .0501(b)(2) was received on April 28, 2022 for the following activities:

- Addition of a long term limit for sulfur dioxide (SO_2) emissions under the Best Available Control Technology (BACT) that is applicable at all times, including periods of startup, shutdown, and malfunction (SSM).
- Addition of language to clarify that the existing short term limit for SO_2 emissions under BACT is applicable at all times, excluding periods of SSM.
- Addition of conditions for operations during startup events.

2. Application Chronology

April 28, 2022	Received application for permit modification.
May 4, 2022	Sent acknowledgment letter indicating the application for permit modification was complete, provided the e-payment was received within 10 days.
May 5, 2022	E-payment received.
May 17, 2022	Betty Gatano received an e-mail from Eric Cornwell, consultant for the facility, discussing proposed gap filling language in the permit.
June 15 and 16, 2022	Betty Gatano discussed the proposed gap filling language with Samir Parekh of the Stationary Source Compliance Branch. Based on the discussion, Betty Gatano provide revised language to Eric Cornwell, who agreed on the changes.
June 20, 2022	Nancy Jones of the Air Quality Analysis Branch of the DAQ indicated the revisited National Ambient Air Quality Standards (NAAQS) analysis provided in the Wilbara permit application was valid.
June 20, 2022	Eric Cornwell provided clarification of SO_2 emission calculations.
June 20, 2022	Draft permit and permit review forwarded internally for comments.
June 21, 2022	Comments received from Linda Willis of the Wilmington Regional Office (WiRO).
June 22, 2022	Comments received from Booker Pullen, Permitting Supervisor.
June 27, 2022	Samir Parekh of the Stationary Source Compliance Branch indicated he had no comments.
June 29, 2022	Draft permit and permit review forward to Wilbara for review.
July 5, 2022	Comments from Wilbara received. Wilbara requested to clarify reporting requirements for excess emissions in Section 2.1 A.4.g.ii of the draft permit. Betty

Gatano discussed proposal with Samir Parekh, and Mr. Parekh provided alternate language. Wilbara reviewed the alternate language and agreed to the changes.

July 7, 2022 Permit issued.

3. Permit Modifications/Changes and TVEE Discussion

The following table describes the changes to the current permit as part of this modification.

Page No.	Section	Description of Changes
Cover letter and throughout permit	--	• Updated all dates and permit revision numbers. • Reformatted permit in accordance with current TV permitting shell. • Corrected cross references.
3	--	"List of Acronyms" moved to Page 3 of the permit.
4	Section 1	Added footnote indicating the emission source and control device (ID Nos. ES-01 and ME-01) are listed as a 15A NCAC 02Q .0501(b)(2) modification.
4	2.1 A – Regulations Table	• Added reference to long term and short term BACT emission limits for SO_2. • Added reference to 15A NCAC 02Q .0504 for submittal of a TV permit application within 12 months of issuance of Air Permit No. 09904T04.
6	2.1 A.4.b	• Added the long term BACT emission limit for SO_2. • Revised the short term BACT emission limit for SO_2.
8	2.1 A.4.g.i(B)	Clarified procedures for missing data substitution.
8	2.1 A.4.g.iii	Revised language for reporting excess emissions.
8	2.1 A.4.h	Added startup procedures for the sulfuric acid plant (ID No. ES-01).
11	2.1 A.8	Added requirement for submittal of a TV permit application within 12 months of issuance of Air Permit No. 09904T04.
12	Section 3	Moved "List of Insignificant Activities" to Section 3 in accordance with the updated formatting for TV permits.
13 – 21	Section 4	Updated General Permit Conditions with most current version (version 6.0, 01/07/2022).

No changes were made to the TVEE for this modification.

4. Permit Modification

This section discusses the facility background and the necessity for the proposed modification, as well as the modification itself, including associated emissions and applicable regulations.

Background

The Wilbara facility consists of a double-adsorption sulfuric acid manufacturing plant (ID NO. ES-01), producing up to 575 tons per day (tpd) of sulfuric acid (H_2SO_4) with a final concentration of approximately 98.5%. The H_2SO_4 production process begins when elemental sulfur is injected into a sulfur burner (or sulfur furnace) to form SO_2. The SO_2 is cooled using a waste heat boiler to produce steam. The SO_2 gas enters in multi-state converter to produce sulfur trioxide (SO_3) in the presence of a catalyst and excess oxygen. Finally, the SO_3 is contacted with 99% H_2SO_4 in adsorption towers where SO_3 combines with water in the acid to produce H_2SO_4. The sulfuric acid plant is controlled by a vertical tube mist-eliminator system (ID No. ME-01) installed on the plant's final adsorbing tower. Emissions from the sulfuric acid plant include SO_2 and sulfuric acid mist (SAM).

Sulfuric acid manufacturing plants, such as Wilbara, are considered chemical process plants. As such, the facility falls under one of the "List of 28" industrial categories for which "major stationary source" is defined as a facility with the potential to emit 100 tpy or more of a regulated pollutant under Prevention of Significant Deterioration (PSD) permitting program.[1]

Wilbara is considered a major stationary source with the potential to emit 241.4 tpy of SO_2, which is above the 100 tpy threshold for listed categories. The facility underwent a BACT analysis for SO_2 when the facility was initially permitted with the issuance of Air Permit No. 09904R00 on September 18, 2008.[2] The BACT for SO_2 is a dual adsorption process with a combination of vanadium and cesium catalysts with a maximum allowable SO_2 emission rate of 2.3 pounds per ton (lb/ton) of acid produced.

The SO_2 BACT emission limit was not established with consideration of higher than normal short term startup emissions, and neither the PSD emissions standard nor the recordkeeping and monitoring provisions indicated that the BACT emissions limitation would apply during SSM events. In the original permit application for the greenfield facility where BACT was established, the permit application specifically provided that compliance with the SO_2 BACT emission limit would be demonstrated using a continuous emission monitoring systems (CEMS), excluding SSM events.

Air Permit No. 09904RT03 was issued on September 27, 2021 to renew the TV permit. The Title V permit renewal extended the SO_2 BACT emission limitations to startup events at the facility for the first time by revising the monitoring, recordkeeping, and reporting requirements under the BACT. Specifically, Section 2.1 A.4.f.iii in the renewed permit states the following in regard to emissions of SO_2 as measured with the CEMS:

iii. The Permittee shall report excess emissions for all periods of operation, including start-up, shutdown, and malfunction**.**

As required by the updated permit language, Wilbara indicated 22 exceedances of the SO_2 emission limit of 2.3 lb/ton of sulfuric acid produced (3-hour rolling average) in its fourth quarter 2021 report. These exceedances occurred during five startup events from October 5, 2021 through December 5, 2021. The facility received a Notice of Violation/Notice of Recommendation for Enforcement (NOV/NRE) on February 21, 2022 from DAQ for these exceedances.

Wilbara's attorney responded to the NOV/NRE in a letter dated March 23, 2022. The response letter explained that exceedances of the SO_2 BACT emission limit during startup are unavoidable. The BACT for SO_2 is a dual adsorption process, using cesium-promoted catalyst in the facility's final passes of the catalytic converter and vanadium catalyst on all other passes. The activity of the catalyst is temperature dependent, and it generally takes 2 to 4 hours for three of the four catalysts beds/passes for the catalytic converter to reach activity temperatures of 700 to 800^{o}F. During this period, SO_2 emissions from the plant can be considerably higher than normal operations and are, thus, unavoidable.

<u>Modification</u>

This application for permit modification is intended to resolve the compliance issue of excess emissions of SO_2 during startup. The modification proposes to add a long term SO_2 emission limit under BACT, to revise the existing short term emission limit, and to add procedures for startup events. With this modification,

[1] 40 CFR 52.166(b)(1)(i)(a)

[2] Wilbara also has the potential to emit 8.1 tpy of sulfuric acid mist (SAM) emissions, which is greater than the significant emission rate of 7 tpy. The facility also underwent a BACT analysis for SAM when the facility was initially permitted with the issuance of Air Permit No. 09904R00 on September 18, 2008.

neither the numerical value of the BACT emission limit nor the operating method will change. Further, the requested modification is not a relaxation of an existing BACT emission limit nor a relaxation of a PSD avoidance limit per 40 CFR 52.21(r)(4). Therefore, an additional BACT analysis is not required.

Long term BACT Emission Limit
Wilbara is proposing a long term BACT emission limit of 2.3 pounds per ton of sulfuric acid produced on a rolling 365 day average as measured with the CEMS, applicable at all times including periods of SSM.

The proposed averaging time (i.e., rolling 365 day average) is consistent with the averaging time associated with the long term emission limit for SO_2 specified in the 2015 Consent Decree (CD)[3] between PCS Nitrogen Fertilizer, L.P. (PCS) and the US EPA. Requirements under the CD were first added to Air Permit No. 04176T54 issued to PCS on December 15, 2017 and remain in the permit in perpetuity.

DAQ concurs with the proposal, and the proposed long term BACT emission limit will be added to the permit as part of this modification.

Short term BACT limit
Wilbara is proposing a short term BACT emission limit of 2.3 pounds per ton of sulfuric acid produced on a rolling 3-hour average as measured with the CEMS, applicable at all times excluding periods of SSM.

A BACT emission limit must be at least as stringent as any applicable New Source Performance Standard (NSPS). Wilbara is subject to 15A NCAC 02D .0524, "New Source Performance Standards," as promulgated in 40 CFR 60, Subpart H, "Standards of Performance for Sulfuric Acid Plants," (NSPS Subpart H), including Subpart A, "General Provisions." Under NSPS Subpart H, SO_2 emissions shall not exceed 4 lb/ton of sulfuric acid produced. Thus, the BACT emission limit of 2.3 lb/ton of acid produced is more stringent than the NSPS Subpart H emission limit, as required.

NSPS Subpart H requires the use of CEMS for SO_2 emissions but does not specify that the SO_2 emission standard applies during SSM. As such, excess emissions during start up events are not violations of the emissions limit. As specified in 40 CFR 60.8(c), "Operations during periods of startup, shutdown, and malfunction shall not constitute representative conditions for the purpose of a performance test nor shall emissions in excess of the level of the applicable emission limit during periods of startup, shutdown, and malfunction be considered a violation of the applicable emission limit unless otherwise specified in the applicable standard." Thus, the proposed modification to exclude SSM emissions from the short term BACT emission limit is consistent with the NSPS.

DAQ concurs with the proposal, and the revised short term emission limit will be added to the permit as part of this modification.

Startup Events
Although excess emissions during startup are unavoidable, Wilbara will follow the proposed startup procedures to minimize emission during startup. Wilbara has identified two types of startup, and both types will be subject to the startup procedures as discussed below,

Warm Startup – These events typically occur once per month and are restarts after a brief plant shutdown to make adjustments and smaller repairs to the system to maximize performance. A

[3] Consent Decree Civil Action No. 14-707-BAJ-SCR. February 26, 2015.

shutdown leading to a warm startup generally lasts from 1 to 10 hours, during which time the plant systems (sulfur furnace, piping, catalyst, etc.) are still near operating temperature. Warm restarts typically take 2 to 3 hours before the SO_2 emissions are less than the BACT emission limits. While the shutdowns can be planned to some extent, the exact downtime duration and restart time is unknown because of maintenance, process adjustments, etc. required during downtime. Warm startups are intermittent, akin to the readiness and period runtime occurring for an emergency generator. Warm startup account for less than 0.4% of the annual operating time.

Cold Startups – These events occur once per year or less frequently and are restarts after prolonged shutdowns. To conduct a cold restart, a natural gas burner reheats the system components but cannot achieve the temperature associated with warm startups. The duration of a cold start is 2 to 4 hours upon firing sulfur. Emissions during cold startup are higher than warm startups. Cold startups account for less than 0.1% of the annual operating time, but during this brief time, emissions in excess of short term BACT limit cannot be avoided.

Procedure during Startup – In the permit application for this modification, Wilbara proposed procedures to follow during startup (both cold and warm startup) to minimize emissions of SO_2. The startup procedures will be incorporated in the permit as part of this modification. The procedures are outlined below:

- A plant start-up must not exceed 70% of the designed operating rate, until the CEMS indicates SO_2 emissions are below 2.3 lb/ton of acid produced on a 3-hour rolling average.
- Wilbara can use a more appropriate indicator for operating rate (e.g., sulfur flow rate, blower pressure, furnace temperature, gas strength, blower speed, number of sulfur guns operating, etc.) because operating rate can be difficult to determine at startup. These alternate indicators must be verified and documented.
- The sulfuric acid plant can exceed the SO_2 emission limit for up to four hours after initiating startup, provided best operational practices to minimize emissions are followed.
- Wilbara must shutdown the sulfuric acid plant (ID No. ES-01) (i.e. cease burning sulfur) if the plant has not achieved an emission rate of equal to or less than 2.3 lb/ton of acid produced on a 3-hour rolling average, within four hours of initiating startup.
- If the only reason for high emissions is low catalyst temperatures, the plant need not be shut down provided emissions of SO_2 have been decreasing.
- Wilbara may restart the plant as soon as practicable following any needed repairs or adjustments, provided the corrective action is taken and properly documented.

Emissions

This modification does not change the actual or potential emissions from the facility because neither the numerical value of the limits nor the operating method is changing. The potential emissions of SO_2 are calculated with the BACT emission limit of 2.3 lb/ton of acid produced and the production limit of 575 ton/day of acid, as shown in the equation below:

SO_2 emissions = 2.3 lbs/ton * 575 tons/day * 365 days/yr * ton/2000 lb = 241.4 ton SO_2/yr

Actual emissions are estimated using CEMS averages of the last five years of operating data.

Pollutant	Actual Emissions (tpy)	Potential Emissions (tpy)
SO_2	136.9	241.4

Regulation Review
This modification does not result in any new regulations. The sulfuric acid plant is subject to the following regulations. No changes to the permit are required other than the update to the BACT permit condition as discussed above. Compliance is anticipated.

- 15 NCAC 02D .0517, Emissions from Plants Producing Sulfuric Acid
- 15 NCAC 02D .0519, Control of Nitrogen Dioxide and Nitrogen Oxides Emissions
- 15 NCAC 02D .0524, New Source Performance Standards
- 15 NCAC 02D .0530, Prevention of Significant Deterioration
- 15 NCAC 02D .0614, Compliance Assurance Monitoring (CAM) Plan
- 15 NCAC 02D .1100, Control of Toxic Air Pollutants

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

NSPS
As noted previously, the sulfuric acid plant (ID No. ES-01) is subject to NSPS Subpart H. No changes to the permit are required with this modification, and continued compliance is anticipated.

NESHAP/MACT
The Wilbara plant is a minor source of hazardous air pollutant (HAP) emissions. The Wilbara plant is not subject to any National Emission Standards for Hazardous Air Pollutants (NESHAP) under 40 CFR Part 63. This permit modification does not affect the facility's status with respect to HAPs.

PSD
As noted previously, sulfuric acid manufacturing plants are considered chemical process plants that fall under one of the "List of 28" industrial categories for which "major stationary source" is defined as a facility with the potential to emit 100 tpy or more of a regulated pollutant.

Because potential emissions of SO_2 from Wilbara exceeded 100 tpy, the facility underwent a BACT analysis for SO_2 when the facility was initially permitted with the issuance of Air Permit No. 09904R00 on September 18, 2008. The BACT for SO_2 is a dual adsorption process with a combination of vanadium and cesium catalyst with a maximum allowable SO_2 emission rate of 2.3 lb/ton of acid produced. The BACT condition will be updated to address SSM events as part of this permit modification. Compliance is anticipated upon issuance of the permit.

Wilbara also has the potential to emit 8.1 tpy of SAM emissions, which is greater than the significant emission rate of 7 tpy. The facility also underwent a BACT analysis for SAM when the facility was initially permitted. No changes to the BACT emission limit for SAM is required as part of this permit modification, and continued compliance is anticipated.

As required as part of the 2008 PSD application for the greenfield facility, Wilbara conducted an ambient impact analysis to ensure the proposed facility was protective of the NAAQS[4] for SO_2. Wilbara revisited the results of this analysis to ensure the intermittent emissions during startup in excess of 2.3 lb/ton of SO_2, which were not considered in the 2008 analysis, remain protective of the NAAQS.

Annual and 24-hour Averaging Periods
The 2008 analysis included annual, 24-hour, and 3-hour averaging periods for SO_2 emissions. Actual SO_2 emissions on both a 24-hour and annual average are below the BACT emission limit of 2.3 lb/ton even including a typical 3-hour cold startup. Therefore, the previous assessment for the annual and

[4] See the permit review in support of Air Permit No. 09904R00 issued on September 16, 2008.

24-hour NAAQS are unaffected by anticipated startup emissions, and no additional analysis is required for these averaging periods.

Three hour Averaging Period
Wilbara was required to conduct a full Class II Area NAAQS for its 2008 ambient impact analysis. Emissions of SO_2 used in the 2008 analysis were calculated with the BACT emission limit of 2.3 lb/ton of acid produced and the production limit of 575 ton/day, as shown in the equation below:

SO_2 emissions = 2.3 lb/ton * 575 tons/day / 24 hours/day = 55.1 lb/hr of SO_2

To estimate the impact of emission exceedances during startup for this permit modification, Wilbara assumed a peak 3-hour average SO_2 emission rate during cold startup based on 10 lb/ton per acid produced. This value is 4.35 times the value used in the 2008 air dispersion modeling. The 2008 "Maximum Modeled Impact" was then multiplied by 4.35, assuming concentration is linear with emissions, to arrive at an adjusted concentration. The 2008 modeling impact and the adjusted value for SO_2 are provided in the table below. Even with the concentration adjusted to account for exceedances during startup, the total impact is only 46% of the NAAQS for SO_2.

Class II Area NAAQS Modeling Results

Pollutant	Analysis	Averaging Period	Maximum Modeled Impacts (µg/m^3)			Background Concentration (µg/m^3)	Total Impact (µg/m^3)	NAAQS (µg/m^3)	% of NAAQS
			Impact from Wilbara	Offsite	Total				
SO_2	2008	3-hour	20.8[1]	332.7	353.5[2]	170	523.5	1300	40%
	Adjusted	3-hour	90.5[3]	332.7	423.2	170	593.2	1300	46%
	Worst-Case	3-hour	797.3	332.7	1130.0	170	1300	1300	100%

Notes:

1. High First-High (H1H) modeled impact.
2. Includes both on-site and off-site sources.
3. The concentration was adjusted by assuming emissions of 10 lb/ton of SO2, which is 4.35 times the value used in the 2008 air dispersion modeling. The adjusted concentration is calculated as follows:
   SO_2 adjusted impact = (20.8 2 µg/m^3)* 4.35 = 90.5 µg/m^3
4. The worst-case emissions are 38.3 the value used in the 2008 air dispersion modeling.

As noted above, Wilbara assumed a peak 3-hour average SO_2 emission rate during cold startup of 10 lb/ton per acid produced for the adjusted analysis. The highest 3-hour average production based emission rate observed during the five, warm startup events in the fourth quarter of 2021 was 7.52 lb/ton of acid produced or 3.27 times the emission rate used in the 2008 analysis. The adjusted value is 4.35 times the emission rate used in the 2008 analysis, meaning the adjusted value is an appropriate assumption for ensuring the intermittent excess emissions during startup remain protective of the NAAQS and increments.

Wilbara noted in the response to the NOV/NRE that emissions from cold startups were greater than warm startup. In consideration of the cold startups, the DAQ back calculated a "worst-case" concentration that would result in the NAAQS being exceeded. As shown in the table above, this value corresponds to an emission rate 38.3 times the value used in the 2008 air dispersion modeling and is more than 10 times the emissions rates observed during the fourth quarter 2021 during the warm startup events. This "worst-case" concentration is further indication that the NAAQS will be protected during startup.

112(r)

Wilbara is not subject to Section 112(r) of the Clean Air Act requirements because it does not store any regulated substances in quantities above the thresholds in the rule. This permit modification does not affect the 112(r) status of the facility.

CAM

Continuous assurance monitoring (CAM) is required only for SAM emissions from the sulfuric acid plant. CAM requirements for SAM were added to the permit with issuance of Air Permit No. 09904T02 (first TV renewal) on March 27, 2017. This permit modification does not affect the CAM requirement and continued compliance is anticipated.

A CEMS for SO_2 emissions is required to ensure compliance with the BACT and NSPS Subpart H emissions limits. Pursuant to 40 CFR 64.2(b)(1)(vi), emission limits that require a continuous compliance determination method (such as a CEMS) are exempted from CAM. Therefore, emissions of SO_2 are exempted from CAM, and this modification does not affect the CAM status for the SO_2 emissions.

6. Facility Wide Air Toxics

North Carolina has state-enforceable toxic air pollutant (TAP) standards that limit ambient impacts of regulated TAPs. Pursuant to the rule, if facility-wide emissions of a regulated TAP exceed the associated Toxic Permitting Emissions Rate (TPER) provided in 15A NCAC 02Q .0711, the facility must demonstrate through air dispersion modeling that the ambient impact of the affected pollutant does not exceed the Acceptable Ambient Level (AAL) pursuant to 15A NCAC 02D .1100.

Because emissions of H_2SO_4 exceeded its TPER, Wilbara submitted an air dispersion modeling analysis on March 26, 2008 to demonstrate that ambient impacts of H_2SO_4 resulting from the proposed sulfuric acid plant would not exceed the AAL. DAQ's Air Quality Analysis Branch reviewed and approved the modeling analysis on May 5, 2008, which established H_2SO_4 emission limits of 2.4 lb/hr and 57.5 lb/day. No changes are required to the permit as part of the modification, and continued compliance with NC Air Toxics is anticipated.

7. Facility Emissions Review

Facility-wide potential emissions are provided in the table below. Actual emissions from 2016 to 2020 are provided on the first page of this permit review.

Pollutant	Expected Actual Emissions (tpy)	Potential Emissions (tpy)
CO	2.2	2.2
NO_x	12.9	12.9
SO_2	156	241.4

Notes:

- $PM/PM_{10}/PM_{2.5}$ emissions reported in the emission inventory are from the roads.
- Emissions of NO_X are formed from the combustion of N_2 in the air and emissions of CO are formed from incomplete fuel combustion when burning elemental sulfur in the furnace.
- Facility wide emissions provided in D1 form in permit application no. 6500347.22A.
- Expected actual emissions represent "future projected actual" and are based on the average CEMs data over the past five years, plus a 5% margin.

8. Compliance Status

During the most recent inspection, conducted on November 4, 2021 by Linda Willis of the Wilmington Regional Office, the facility appeared to be in compliance with all applicable requirements.

On February 21, 2022, DAQ issued a NOV/NRE to Wilbara for 22 exceedance of the BACT emission limit for SO_2 during five startup events from October 5, 2021 through December 5, 2021. The issuance of this permit will resolve the NOV/NRE.

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

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

10. Other Regulatory Considerations

- A P.E. seal is not required for this application.
- A zoning consistency determination is not required for this permit application.
- A permit fee of $7,210 was submitted via e-payment on May 5, 2022.

11. Recommendations

DAQ has reviewed the permit application for Wilbara, LLC located in Wilmington, New Hanover County 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. DAQ recommends the issuance of Air Permit No. 09904T04.