NORTH CAROLINA DIVISION OF AIR QUALITY

Application Review

Issue Date: DRAFT

Region: Raleigh Regional Office
County: Wake
NC Facility ID: 9200504
Inspector's Name: Sindy Huang
Date of Last Inspection: 09/01/2022
Compliance Code: 3 / Compliance - inspection

Facility Data

Applicant (Facility's Name): Austin Quality Foods, Inc.

Facility Address:
Austin Quality Foods, Inc.
One Quality Lane
Cary, NC 27513

SIC: 2052 / Cookies and Crackers
NAICS: 311821 / Cookie and Cracker 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
Mark Logue EHS Manager (919) 677-3292 One Quality Lane Cary, NC 28513	Sergio Bosch Plant Director (919) 677-3275 One Quality Lane Cary, NC 27513	Mark Logue EHS Manager (919) 677-3292 One Quality Lane Cary, NC 28513

Application Data

Application Number: 9200504.22B
Date Received: 11/07/2022
Application Type: Modification
Application Schedule: TV-Sign-501(b)(2) Part II

Existing Permit Data
Existing Permit Number: 06816/T20
Existing Permit Issue Date: 04/05/2023
Existing Permit Expiration Date: 10/31/2025

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2021	0.0700	12.18	355.09	10.19	0.9300	18.55	18.33 [Acetaldehyde]
2020	0.0700	12.30	384.91	10.28	0.9400	21.33	21.11 [Acetaldehyde]
2019	0.0700	11.97	159.43	10.04	0.9000	4.76	4.55 [Acetaldehyde]
2018	0.0800	10.57	141.27	8.78	0.8100	4.22	4.03 [Acetaldehyde]
2017	0.0700	10.83	136.66	9.04	0.8300	4.08	3.89 [Acetaldehyde]

Review Engineer: Connie Horne

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

Comments / Recommendations:
Issue 06816/T21
Permit Issue Date: DRAFT
Permit Expiration Date: October 31, 2025

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 (9200504.21A) on March 3, 2021. The Part I permit was issued on June 29, 2021 and included the following permit modifications.

- Increased the capacity of Line 200 (ES-2)
- Added a new catalytic oxidizer (CATOX-1) controlling Lines 200, 600, and 700 (ES-2, ES-7, and ES-8).
- Updated modeled emission rates under 15A NCAC 02D .1100 to reflect the recent emission test.

On November 7, 2022, DAQ received this Part II application (9200504.22B) from Austin Quality Foods, Inc. (AQF) to complete the process to include the above-listed changes as required in condition 2.1 B.4 of Permit 06816T19. According to this application, CATOX-1 began controlling emissions on Line 600 and 700 on November 5, 2021. Construction was completed on Line 200 in December 2021 and CATOX-1 began controlling emission from it on December 11, 2021. The technical review for the Part I application (9200504.21A) is attached to this document.

2. Facility Description

The existing facility is a bakery that produces crackers and other snack products. Baking activities take place in six ovens (also referred to as "lines"), and products can be broadly categorized based on how they are leavened. The facility can also add flavorings to any product as part of the baking process. Emissions from these processes come from proofing, leavening, baking, additives, and natural gas combustion.

"Leavening" refers to the process of generating carbon dioxide within dough, causing the dough to rise. Leavening can be accomplished with yeast or chemical leavening agents (e.g., bicarbonates). In addition to leavening, carbon dioxide production occurs during the "proofing" stage, although most of this reaction occurs in the ovens.

In yeast-leavened dough, yeast consumes sugars in the dough via biological processes to form carbon dioxide. In addition, the yeast will also produce ethanol (a volatile organic compound; "VOC") and acetaldehyde (a hazardous air pollutant; "HAP"). These materials will be emitted from the dough during the proofing and baking processes.

In non-yeast-leavened dough, a chemical reaction produces carbon dioxide. In most cases, any other materials produced in the chemical leavening reaction are not VOC or HAP. However, if the leavening agent is ammonium bicarbonate, ammonia will be emitted during the baking process.

3. Application Chronology

November 7, 2022	Part II application received (postmarked November 4, 2022)
November 8, 2022	Sent acknowledgment letter. Application complete except for ePayment of $1002
November 28, 2022	ePayment of $1002 received. Application deemed complete.
April 21, 2023	Draft to applicant and regional office
May XX, 2023	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 (06816T20):*

Page No.	Section	Description of Changes
Cover Letter	---	Modified to reflect current permit number, issue and effective dates
All	Headers	Amended permit revision number
1-23	Entire permit, where applicable	Modified to reflect current permit number, issue and effective dates
8	2.1 B.4	Removed "15A NCAC 02Q .0504: OPTION FOR OBTAINING CONSTRUCTION AND OPERATION PERMIT". This requirement was satisfied with the application (.22B) received November 7, 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

- An application fee of $1002 was required for this application and received on 11/28/22.
- The appropriate number of application copies was received on 11/07/22.
- The application was signed by Mr. Sergio Bosch, Plant Director, on 11/04/22 as the Responsible Official.
- Wake County has triggered increment tracking under PSD for SO_2. Any increment changes associated with this modification were addressed in the Part I permit (No. 06816T19).
- 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 September 1, 2022 by Sindy Huang of the Raleigh Regional Office. According to Ms. Huang's report, "Austin Quality Foods, Inc. appeared to be in compliance with all permitting requirements aside from 2Q .0317 Avoidance Conditions and 02D .1100 Control of Toxic Air Pollutants. However, these have already been addressed by the May 18, 2021 NOV/NRE and SOC".

8. Conclusions, Comments and Recommendations

The issuance of Air Quality Permit No. 06816T21 to Austin Quality Foods, Inc. is recommended.

NORTH CAROLINA DIVISION OF AIR QUALITY

Application Review

Issue Date: June 29, 2021

Region: Raleigh Regional Office
County: Wake
NC Facility ID: 9200504
Inspector's Name: Sindy Huang
Date of Last Inspection: 05/20/2020
Compliance Code: 3 / Compliance - inspection

Facility Data

Applicant (Facility's Name): Austin Quality Foods, Inc.

Facility Address:
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One Quality Lane
Cary, NC 27513

SIC: 2052 / Cookies and Crackers
NAICS: 311821 / Cookie and Cracker Manufacturing

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

Permit Applicability (this application only)

SIP: 02D .1100, 02Q .0317 (for 02D .1112 and 02D .0530), 02Q .0504, 02Q .0711
NSPS: n/a
NESHAP: n/a
PSD: n/a
PSD Avoidance: VOC
NC Toxics: acetic acid, ammonia
112(r): n/a
Other: n/a

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Mark Logue EHS Manager (919) 677-3292 One Quality Lane Cary, NC 28513	Sergio Bosch Plant Director (919) 677-3275 One Quality Lane Cary, NC 27513	Mark Logue EHS Manager (919) 677-3292 One Quality Lane Cary, NC 28513

Application Data

Application Number: 9200504.21A
Date Received: 03/03/2021
Application Type: Modification
Application Schedule: TV-Sign-501(b)(2) Part I

Existing Permit Data
Existing Permit Number: 06816/T18
Existing Permit Issue Date: 11/18/2020
Existing Permit Expiration Date: 10/31/2025

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2019	0.0700	11.97	159.43	10.04	0.9000	4.76	4.55 [Acetaldehyde]
2018	0.0800	10.57	141.27	8.78	0.8100	4.22	4.03 [Acetaldehyde]
2017	0.0700	10.83	136.66	9.04	0.8300	4.08	3.89 [Acetaldehyde]
2016	0.0700	10.75	120.79	8.95	0.8200	3.50	3.31 [Acetaldehyde]
2015	0.0600	9.63	99.42	8.08	0.7300	2.89	2.71 [Acetaldehyde]

Review Engineer: Russell Braswell

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

Comments / Recommendations:
Issue 06816/T19
Permit Issue Date: June 29, 2021
Permit Expiration Date: October 31, 2025 (no change)

1. Purpose of Application:

Austin Quality Foods, Inc. ("AQF", "the facility") currently operates a factory in Wake County under Title V permit 06816T18 ("the existing permit"). The existing permit includes annual emission limits for VOC and HAP. AQF currently complies with these limits without control devices. Based on recent emission test results, AQF has determined a control device for VOC and HAP emissions is necessary to continue production at desired levels.

AQF has submitted this application for a 2-part significant modification under 15A NCAC 02Q .0501(b)(2). The application requests:

- Increase the capacity of Line 200 (ES-2)
- Add a new catalytic oxidizer controlling Lines 200, 600, and 700 (ES-2, ES-7, and ES-8).
- Update modeled emission rates under 15A NCAC 02D .1100 to reflect the recent emission test.

These changes will be discussed in this application review.

2. Facility description:

The existing facility is a bakery that produces crackers and other snack products. Baking activities take place in six ovens (also referred to as "lines"), and products can be broadly categorized based on how they are leavened. The facility can also add flavorings to any product as part of the baking process. Emissions from these processes come from proofing, leavening, baking, additives, and natural gas combustion.

"Leavening" refers to the process of generating carbon dioxide within dough, causing the dough to rise. Leavening can be accomplished with yeast or chemical leavening agents (e.g., bicarbonates). In addition to leavening, carbon dioxide production occurs during the "proofing" stage, although most of this reaction occurs in the ovens.

In yeast-leavened dough, yeast consumes sugars in the dough via biological processes to form carbon dioxide. In addition, the yeast will also produce ethanol (a volatile organic compound; "VOC") and acetaldehyde (a hazardous air pollutant; "HAP"). These materials will be emitted from the dough during the proofing and baking processes.

In non-yeast-leavened dough, a chemical reaction produces carbon dioxide. In most cases, any other materials produced in the chemical leavening reaction are not VOC or HAP. However, if the leavening agent is ammonium bicarbonate, ammonia will be emitted during the baking process.

3. Discussion:

1. Requirements in the existing Title V permit

   The existing facility is subject to annual emission limits on VOC and HAP. The existing facility does not use any control devices to comply with these limits. In order to demonstrate compliance with the emission limits, the facility calculates the monthly and 12-month rolling total VOC and HAP emissions based on production at the facility.

   This facility conducted an emission test on January 5, 2021 ("the recent emission test"; test reference number 2021-021ST) to determine VOC, HAP (as acetaldehyde), and acetic acid emission factors for

yeast-leavened production. The test results showed emission factors for these pollutants substantially higher than previously estimated. Based on the test results, the facility cannot continue production at desired levels and comply with the VOC and HAP emission limits in the existing Title V permit.

2. Proposed changes to the existing facility

In order to both continue production at desired levels and comply with the VOC and HAP emission limits, the facility has chosen to install a catalytic oxidizer ("CATOX-1") to control VOC and HAP emissions from Lines 200, 600, and 700.

In addition to installing CATOX-1, AQF plans to take this opportunity to increase the baking capacity of Line 200. The natural gas-fired burner associated with Line 200 will not increase in capacity.

Potential emissions from the facility that reflect the recent emission test, use of CATOX-1, and increased capacity of Line 200 are calculated in Section 4 below.

3. Catalytic oxidation

"Oxidation" means to control emissions of VOC and HAP compounds by combusting them to form carbon dioxide and water. In general, oxidizers work by raising the temperature of a VOC/HAP-laden gas stream such that the oxidation reaction (i.e., combustion) occurs. Catalytic oxidizers pass the gas stream through a catalyst that reduces the temperature needed to achieve the oxidation reaction. The oxidation reaction releases energy, helping to maintain the required operating temperature within the oxidizer. A natural gas-fired burner is used to supply additional heat as needed. Because a catalytic oxidizer can operate at a lower temperature, less supplemental fuel is needed to heat the oxidizer to maintain the operating temperature.

According to US EPA's fact sheet on catalytic oxidizers[1], a destruction efficiency of greater than 95% can be achieved depending on the specific VOC or HAP being oxidized. In this case, the VOC is primarily ethanol, and the HAP is primarily acetaldehyde, both of which are expected to oxidize readily. The fact sheet also notes that the temperature inside the catalytic oxidizer strongly influences the destruction efficiency. AQF will have to perform site-specific testing in order to determine the operating temperature and destruction efficiency of CATOX-1 as installed and operated at the facility.

US EPA's fact sheet also mentions that particulate matter ("PM") in the gas stream can coat the catalyst's surface, which will reduce the ability of the catalyst to influence the oxidization reaction. Although PM emitted by the ovens is relatively minor, AQF will still have to perform regular maintenance and inspection of CATOX-1 to ensure that the catalyst is operating properly.

In order to demonstrate that CATOX-1 is operating appropriately, the facility will be required to:

- Perform an initial compliance demonstration on CATOX-1.
- Perform a subsequent test once every five years.
- After completing a compliance demonstration, submit a permit application to incorporate the new results into the permit.
- Monitor and maintain the temperature in CATOX-1 above the temperature recorded during the compliance demonstration.

[1] See EPA-452/F-03-018 "Air Pollution Control Technology Fact Sheet – Name of Technology: Catalytic Incinerator". That document notes that a "catalytic incinerator" is also referred to as a "catalytic oxidizer".

- Perform monthly inspections of the ductwork associated with CATOX-1.
- Perform an annual internal inspection of CATOX-1.
- Perform maintenance as recommended by the manufacturer of CATOX-1.

4. Potential emissions

1. Ovens and baking lines (ES-1, ES-2, ES-3, ES-4, ES-5, ES-7, and ES-8)

Emissions from the ovens and baking lines come from the various reactions during baking and leavening and then the subsequent addition of flavorings.

1. Baking and leavening

Based on the results of the emission test, AQF has proposed the following emission factors for baking yeast-leavened products.[2]

- VOC: 10.59 pounds per ton of yeast-leavened product
- Acetaldehyde: 0.598 pounds per ton of yeast-leavened product
- Acetic acid: 1.50 pounds per ton of yeast-leavened product

Emissions from Lines 200, 700, and 600 (ES-2, ES-7, and ES-8, respectively) will be routed to the new CATOX-1. An initial estimate of 95% destruction efficiency and 100% capture efficiency can be used for calculating emissions; site-specific values will be established via emission testing.

When baking non-yeast-leavened products, the only pollutant expected is ammonia. The application estimates the ammonia emission rate as 0.215 pounds of ammonia emitted per pound of ammonium bicarbonate used.[3] Based on the air dispersion modeling demonstration (see Section 3.10), the facility is only permitted to use ammonium bicarbonate in Lines 300 and 400 (ES-3 and ES-4).

CATOX-1 is heated with a natural gas-fired burner, and each of the six baking lines includes a natural gas-fired oven. Potential emissions from the combustion of natural gas will be calculated separately.

Using the above information, Table 1 calculates the potential emissions from baking in the ovens. These calculations include AQF's planned increase in baking capacity for Line 200.

[2] These values are higher than the reported results from 2021-021ST. According to the application, the proposed factors are "corrected to a 95% confidence interval using a 1-tailed analysis." See Application at page 2-3.
[3] This is based on "stoichiometry of thermal decomposition of ammonium bicarbonate (17g ammonia: 79g ammonium bicarbonate)." See Application at Appendix A, page 8.

Table 1: Emissions from baking activities

Source (Line)	Max. baking rate (lb/hr)*	Max. baking rate (ton/hr)	Max. ammonium bicarbonate rate (lb/hr)	Destruction Efficiency (% reduction)	Potential emissions: VOC (ton/yr)	HAP** (ton/yr)	Acetaldehyde (lb/hr)	Acetic acid*** (lb/hr)	Ammonia*** (lb/hr)
ES-1 (100)	6,100	3.05	0	0%	141.47	7.99	1.82	4.58	0.00
ES-2 (200)	7,100	3.55	0	95%	8.23	0.46	0.11	0.27	0.00
ES-3 (300)	6,100	3.05	84.5	0%	141.47	7.99	1.82	4.58	18.17
ES-4 (400)	7,100	3.55	103.4	0%	164.66	9.30	2.12	5.33	22.23
ES-7 (700)	8,600	4.30	0	95%	9.97	0.56	0.13	0.32	0.00
ES-8 (600)	7,100	3.55	0	95%	8.23	0.46	0.11	0.27	0.00

Constants and Factors†	
8,760	hours per year
2,000	pounds per ton
10.59	pounds of VOC emitted per ton of yeast-leavened production
0.598	pounds of acetaldehyde per ton of yeast-leavened production**
1.5	pounds of acetic acid per ton of yeast-leavened production
0.215	pounds of ammonia per pound of ammonium bicarbonate

Notes:

* See Application at Appendix A, page 3.

** Acetaldehyde is assumed to be 100% of the HAP emissions from yeast-leavened production

*** TAP only

† Emission factors for VOC, acetaldehyde, and acetic acid taken from site-specific test (test reference number 2021-021ST) and "corrected to a 95% confidence interval using a 1-tailed analysis." (See Application at page 2-3). Emission factor for ammonia taken from the molecular ratio of ammonia to ammonium bicarbonate (see Application at Appendix A, page 8).

Sample calculations for Table 1:

ES-1 (Line 100):

$$\frac{3.05 \text{ tons production}}{\text{hour}} \times \frac{10.59 \text{ pounds VOC}}{\text{ton production}} \times \frac{8{,}760 \text{ hours}}{\text{year}} \times \frac{1 \text{ ton}}{2{,}000 \text{ pounds}} = \frac{141.47 \text{ tons VOC}}{\text{year}}$$

ES-2 (Line 200)

$$\frac{3.55 \text{ tons production}}{\text{hour}} \times \frac{10.59 \text{ pounds VOC}}{\text{ton production}} \times \frac{8{,}760 \text{ hours}}{\text{year}} \times \frac{1 \text{ ton}}{2{,}000 \text{ pounds}} \times (1 - 95\% \text{ Dest. Eff.}) = \frac{8.23 \text{ tons VOC}}{\text{year}}$$

2. Flavoring

In addition to emissions from leavening, emissions are also expected from the various flavors applied to the products. Emissions from these activities are assumed to be 100% of the VOC contained in the products used. According to the application, the only emissions expected from these products are VOC and ethyl acetate (a TAP).

The application estimates the potential VOC emissions from flavorings as 62.12 tons per year and ethyl acetate as 0.26 pounds per hour.[4]

2. Proofing (ES-11)

"Proofing" refers to periods of time when yeast-leavened products are leavening outside of the baking lines. Additional VOC and HAP are emitted from the yeast-leavened products during proofing. There are no emissions associated with non-yeast-leavened products.[5]

The facility estimates the VOC emission factor to be 10% of the emission factor for the ovens. In addition, the facility estimates that 3% of the VOC emitted during proofing is acetaldehyde.[6]

Using the above information, Table 2 calculates potential emissions from proofing activities.

Table 2: Emissions from proofing activities

Source	Process rate (ton/hr)	Potential Emissions		
		VOC (ton/yr)	HAP (ton/yr)	Acetaldehyde (lb/hr)
All yeast-leavened production	21.05	97.64	2.93	0.67

Constants and Factors
8,760 hours per year
2,000 pounds per ton
1.059 pounds of VOC emitted per ton of yeast-leavened material proofing*
0.032 pounds of acetaldehyde per ton of yeast-leavened material proofing**

Notes:
* 10% of the VOC emission factor for yeast-leavened baking.
** 3% of the VOC emission factor for proofing.

Sample calculation for Table 2:

All yeast-leavened production:

$$\frac{21.05 \text{ tons production}}{\text{hour}} \times \frac{1.059 \text{ pounds VOC}}{\text{ton production}} \times \frac{8{,}760 \text{ hours}}{\text{year}} \times \frac{1 \text{ ton}}{2{,}000 \text{ pounds}} = \frac{97.64 \text{ tons VOC}}{\text{year}}$$

[4] See Application at Appendix A, pages 9 and 10.
[5] Because 100% of the available ammonia in ammonium bicarbonate is assumed to be emitted during baking (see Note 3), there can be no additional ammonia emissions from proofing of non-yeast-leavened products.
[6] The proofing VOC emission factor is based on information in "American Bakers Association's 'State Air Permitting Manual' ". The acetaldehyde emission factor is based on information in "San Diego Air Pollution Control District, 'Baking Process Description', March 12, 1998". See Application at Appendix A, page 14. In addition, DAQ has previously accepted this estimation method; see application review for Title V permit 06816R13, issued July 30, 2014 (pages 4 and 5).

4. Natural gas combustion (ES-1, ES-2, ES-3, ES-4, ES-5, ES-7, ES-8, CATOX-1, IS-7, and IS-11)

The facility operates six natural gas-fired ovens. The new CATOX-1 will also include a natural gas burner. In addition, the facility operates several insignificant activities that burn natural gas. The total heat input capacity of natural gas combustion at the facility is approximately 101.38 million Btu per hour. Using this information and the published emission factors in AP-42, Table 3 calculates potential emissions from natural gas combustion at the facility.

Table 3: Emissions from facility-wide natural gas combustion

Pollutant	Emission Factor*** ($lb/10^6 scf$)	Potential Emissions (ton/yr)
NOx	100	43.53
CO	84	36.57
VOC	5.5	2.39
SO_2	0.6	0.26
PM*	7.6	3.31
Acetaldehyde**	1.52E-05	0.00
Total HAP	1.89	0.82

Constants and Factors
101.38 million Btu per hour, total heat input
2,000 pounds per ton
8,760 hours per year
1,020 Btu per standard cubic foot

Notes
* PM=PM10=PM2.5
** Facility-wide highest HAP is acetaldehyde
*** Emission factors from AP-42, Tables 1.4-1, 2, and 3, except for acetaldehyde and total HAP, which come from NC DAQ's emission estimation spreadsheet

5. Cleaning and Sanitizing (ES-9)

The facility uses various cleaning and sanitizing products in operations throughout the facility. Emissions from these activities are assumed to be 100% of the VOC contained in the products used. According to the application, these materials do not contain any HAP, so VOC is the only pollutant expected from these activities.

The application estimates the potential VOC emissions from cleaning and sanitizing as 19.5 tons per year.[7]

[7] See Application at Appendix A, page 12.

6. Seasoning room (IS-10)

   The facility estimates emissions from the seasoning room based on an emission test at a similar facility in Kansas City. Based on that test, the application estimates potential emissions of VOC to be 0.99 tons per year and acetic acid to be 0.23 pounds per hour.[8]

7. Emergency generator (IS-EG1)

   The facility operates a 150 kW diesel-fired emergency generator. Potential emissions for this generator have previously been calculated by DAQ. Table 4 shows the emissions calculated as part of the T15 permit revision.[9]

Table 4: Emissions from emergency generator

Pollutant	Potential Emissions (ton/yr)
NOx	1.71
CO	0.37
VOC	0.14
SO_2	0.11
PM	0.12
Acetaldehyde	0.0003
Total HAP	0.0015

8. Other activities (IS-2, IS-6, and IS-8)

   Emissions from these sources are expected to be negligible.

9. Facility-wide potential emissions (after control)

   Table 5 summarizes the calculations above.

[8] See Application at Appendix A, page 16.
[9] See application review for Title V permit 06816T15, issued February 1, 2016 (page 10).

Table 5: Facility-wide potential uncontrolled emissions

Pollutant	Ovens (ES-1, ES-2, ES-3, ES-4, ES-7, ES-8)		Proofing (ES-11)	Facility-wide NG combustion (ES-1, ES-2, ES-3, ES-4, ES-7, ES-8, CATOX-1, IS-7, IS-11)	Cleaning (ES-9)	Seasoning (IS-10)	Em. Gen. (IS-EG1)	Total
	Proofing (ton/yr)	Flavoring (ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)
NOx				43.53			1.71	45.24
CO				36.57			0.37	36.94
VOC	474.05	62.12	97.64	2.39	19.50	0.99	0.14	656.83**
SO2				0.26			0.11	0.37
PM*				3.31			0.12	3.43
High HAP (Acetaldehyde)	26.77		2.93	0			0.0003	29.70***
Total HAP	26.77		2.93	0.82			0.0015	30.52†

Notes
* PM=PM10=PM2.5
** Facility is limited to 250 ton/yr VOC to avoid PSD applicability
*** Facility is limited to 10 ton/yr of any individual HAP to avoid classification as a major source of HAP
† Facility is limited to 25 ton/yr of total HAP to avoid classification as a major source of HAP

5. Rules Review

Activities at this facility are subject to the following rules:

- 15A NCAC 02D .0515 "Particulates from Miscellaneous Industrial Processes"
- 15A NCAC 02D .0516 "Sulfur Dioxide from Combustion Sources"
- 15A NCAC 02D .0521 "Control of Visible Emissions"
- 15A NCAC 02D .1100 "Control of Toxic Air Pollutants" [state-enforceable only]
- 15A NCAC 02D .1806 "Control and Prohibition of Odorous Emissions" [state-enforceable only]
- 15A NCAC 02Q .0317 "Avoidance Conditions" (PSD Avoidance, MACT Avoidance)
- 15A NCAC 02Q .0504 "Option for Obtaining Construction and Operation Permit"
- 15A NCAC 02Q .0711 "Emission Rates Requiring a Permit" [state-enforceable only]

AQF's requirements under these rules are discussed below:

1. 02D .0515 "Particulates from Miscellaneous Industrial Processes"

   This rule limits particulate matter ("PM") emissions from emission sources that exhaust through a stack, vent, or outlet, and with no other specific PM emission limits. The emission limit is a function of the process rate of the subject emission source. At this facility, each permitted emission source is subject to this rule.

DAQ has previously determined that activities at this facility will comply with 02D .0515 without any control devices.[10] Neither installation of CATOX-1 nor the increase in baking capacity of Line 200 will substantially increase PM emissions, so AQF's ability to comply with this rule will not be impacted.

2. 02D 0516 "Sulfur Dioxide Emissions from Combustion Sources"

This rule limits sulfur dioxide ("SO_2") emissions from combustion sources for which there are no other SO_2 emission standards. In all cases, the limit is 2.3 pounds of SO_2 per million Btu of heat input. Each oven line is subject to this rule. In addition, the new CATOX-1 will be subject to this rule.

Ovens: Natural gas is the only fuel burned in the ovens. Based on the emission factors found in chapters 3.4 of AP-42, this fuel is expected to comply with 02D .0516 by default. Therefore, no monitoring, recordkeeping, or reporting is required for the ovens to demonstrate compliance with this rule. Increasing the capacity of Line 200 will not impact AQF's ability to comply with this rule.

CATOX-1: The new oxidizer will burn natural gas as a supplementary fuel to maintain a specified minimum temperature within the oxidizer. As stated above, natural gas combustion is expected to comply with 02D .0516 by default. In addition, CATOX-1 will be heated by oxidizing the VOC and HAP that pass through it. None of the VOC or HAP that will be controlled by CATOX-1 contain sulfur, so they will not contribute to any SO_2 emissions. Therefore, the operation of CATOX-1 is expected to comply with this rule without any additional monitoring, recordkeeping, or reporting requirements.

3. 02D .0521 "Control of Visible Emissions"

This rule limits the opacity of non-fugitive visible emissions ("VE") from emission sources that do not have a specific VE limit under other 02D .0500 rules. For sources constructed after 1971 (i.e., each source at this facility), the rule limits opacity in most cases to 20%. At this facility, each permitted emission source is subject to this rule.

No visible emissions are expected from the combustion of natural gas or from operating CATOX-1. AQF is expected to comply with this rule without any additional monitoring, recordkeeping, or reporting requirements.

4. 02D .1100 "Control of Toxic Air Pollutants" [state-enforceable only]

This rule requires facilities to emit toxic air pollutants ("TAP") at rates less than what would cause an exceedance of the acceptable ambient limits ("AAL") listed in 02D .1104. In the past, AQF has submitted air dispersion modeling to demonstrate that the AAL for ammonia would not be exceeded. Because this application changes TAP emission rates, compliance with this rule must be reexamined.

Facilities that emit TAPs at rates greater than the TAP permitting emission rates ("TPER") listed in 02Q .0711 must perform air dispersion modeling to demonstrate compliance with 02D .1100. In the application, AQF demonstrated that the only TAPs to exceed their respective TPERs are ammonia and acetic acid. Because these TPERs are exceeded, AQF must demonstrate that the AALs for ammonia and acetic acid are not exceeded.

In order to demonstrate compliance with the AALs, AQF performed air dispersion modeling using EPA's AERMOD tool. DAQ has reviewed AQF's modeling demonstration and determined that it is adequate to demonstrate compliance with the AALs. Table 6 shows the conclusions of DAQ's review of

[10] See application review for Title V permit 06816T15, issued February 1, 2016 (page 6).

AQF's modeling demonstration. These conclusions are based on the emission calculations performed above.[11]

Table 6: Maximum modeled impacts for Austin Quality Foods

Pollutant	Averaging Period	Max. Conc. (µg/m^3)	AAL (µg/m^3)	% of AAL
Acetic acid	1-hr	817.2	3,700	22.1%
Ammonia	1-hr	2,217.5	2,700	82.1%

The emission rates used in AQF's modeling demonstration will be included in the new Title V permit in Specific Condition 2.2 A.2.

In order to ensure that the modeled emission rates for ammonia are not exceeded, AQF must limit the use of ammonium bicarbonate in the baking lines. The usage rates used in the modeling demonstration are shown in Table 7. These limits will be included in the new Title V permit.

Table 7: Ammonium bicarbonate limits[12]

Emission Source	Maximum allowable ammonium bicarbonate rate (lb/hr)
ES-3 (Line 300)	84.5
ES-4 (Line 400)	103.4
All others	none

In order to ensure that the modeled emission rates for acetic acid are not exceeded, AQF must control Lines 200, 700, and 800 with CATOX-1. Because AQF modeled acetic acid at the maximum potential post-control emission rates, there are no additional requirements.

5. 02D .1806 "Control and Prohibition of Odorous Emissions" [state-enforceable only]

This rule requires that facilities not cause objectionable odors outside of the facility's boundary. In general, DAQ requires facilities that have caused substantiated odor complaints to implement some kind of control for odorous emissions.

AQF has not received any recent odor complaints. Neither the installation of CATOX-1 nor the increase in baking capacity of Line 200 are expected to negatively impact odors around the facility. AQF is expected to comply with this rule without any additional monitoring, recordkeeping, or reporting requirements.

[11] See Attachment 1 for DAQ's analysis of the air dispersion modeling.
[12] These rates are the same as the basis for the previous modeling demonstration. The existing permit contains a typo for the ammonium bicarbonate limit for ES-4 (existing permit shows 201.6, should have been 103.4). The new permit will include the correct limit for ES-4. See Attachment 2 for AQF's request to correct the existing permit and confirmation that the ammonia emission limit has not been exceeded.

6. 02Q .0317 "Avoidance Conditions" (Avoidance of 02D .0530 "Prevention of Significant Deterioration") ("PSD")

This rule allows a facility to accept enforceable emission limits to avoid applicability of other rules. In order to avoid applicability of PSD, AQF has accepted a limit of less than 250 tons of VOC emitted per year.

The existing facility is a minor source for PSD. In order to maintain this designation, the facility must emit less than the major source threshold for each pollutant. For facilities not included in the list of source categories in 40 CFR 51.166(b)(1)(i)(a), the threshold is 250 tons per year of any criteria pollutant (a.k.a. "the PSD limit"). Based on the emission summary in Table 5, the only pollutant with potential emissions greater than the PSD limit is VOC.

In order to comply with the PSD limit, AQF has chosen to install CATOX-1 to reduce VOC emissions from Lines 200, 600, and 700. However, even when operating CATOX-1, the facility will still have potential VOC emissions greater than the PSD limit. Therefore, in addition to installing and operating CATOX-1, AQF must calculate and monitor actual VOC emissions from the facility on a monthly basis in order to demonstrate compliance with the PSD limit.

AQF will use the following method to calculate VOC emissions on a monthly basis:

Equation 1:

$$VOC_t = VOC_{uncontrolled} + VOC_{CATOX} + VOC_{proof} + VOC_{flavor} + VOC_{clean} + VOC_{Misc}$$

Where:

$VOC_{uncontrolled}$	is calculated by Equation 2.
VOC_{CATOX}	is calculated by Equation 3.
VOC_{proof}	is calculated by Equation 4.
VOC_{flavor}	is the sum of the flavor usage (tons per month) multiplied by the VOC content (%) for each flavor used in that month.
VOC_{clean}	is the sum of the cleaning products used (tons per month) multiplied by the VOC content (%) for each cleaning product used in that month.
VOC_{Misc}	is the sum of VOC emissions from sources and processes not otherwise specified (tons per month). When calculating emissions, the Permittee shall use the relevant AP-42 emission factors or another method approved by DAQ.

Equation 2:

$$VOC_{uncontrolled} = (P \times EF_{uncontrolled}) / (2{,}000)$$

Where:

P	is the sum of yeast-leavened production in ES-1, ES-3, and ES-4 (tons per month).
$EF_{uncontrolled}$	is 10.59 pounds of VOC per ton of yeast-leavened production.

Equation 3:

$$VOC_{CATOX} = (P \times EF_{uncontrolled}) \times (1 - [\%Op \times \%DE \times \%CE]) / (2{,}000)$$

Where:

P	is the sum of yeast-leavened production in ES-2, ES-7, and ES-8 (tons per month).
$EF_{uncontrolled}$	is 10.59 pounds of VOC per ton of yeasted production.
%Op	is the number of hours in a month where the oxidizer (**ID No. CATOX-1**) was operating divided by the number of hours in a month where any of the controlled emission sources (ES-2, ES-7, and ES-8) were operating. Hours where the oxidizer is operating and none of the controlled emission sources were operating are not counted.

%DE	is the tested destruction efficiency of the oxidizer. %DE is initially estimated to by 95%. The Permittee will determine %DE during the initial performance test.
%CE	is the tested capture efficiency of the oxidizer. %CE is initially estimated to be 100%. The Permittee will determine %CE during the initial performance test.

Equation 4:

$$VOC_{proof} = (P \times EF_{proof}) / (2{,}000)$$

Where:

P	is the sum of yeast-leavened production in all emission sources (tons per month)
EF_{proof}	is 1.059 pounds of VOC per ton of yeast-leavened production (i.e., 10% of the tested emission factor for yeast leavening)

By operating CATOX-1, performing regular maintenance on CATOX-1 (see Section 3.3), keeping monthly records of VOC emissions, and submitting semiannual reports, AQF is expected to comply with the PSD limit.

The above requirements will be incorporated into the permit under Specific Condition 2.2 B.1 and 15A NCAC 02Q .0317 "Avoidance Conditions".

7. 02Q .0317 "Avoidance Conditions" (Avoidance of 15A NCAC 02D .1111 "Maximum Achievable Control Technology") ("MACT"; 40 CFR Part 63)

In general, 15A NCAC 02D .1111 requires facilities that are designated as a "major source" of HAP to comply with the applicable emission standards under Section 112(d) of the Clean Air Act (the "MACT" rules). However, there are no MACT rules that apply to bakeries. Therefore, 15A NCAC 02D .1111 does not apply to this facility. Furthermore, no avoidance condition is needed to avoid applicability of this rule because there are no MACT rules that would otherwise apply.

The existing permit includes a MACT avoidance limit in Specific Condition 2.2 B.2. As shown above, this avoidance limit is not required and will be removed from the permit.

8. 02Q .0317 "Avoidance Conditions" (Avoidance of 15A NCAC 02D .1112 "112(g) Case by Case Maximum Achievable Control Technology" ("112(g)")

In general, 15A NCAC 02D .1112 requires facilities to develop a case-by-case MACT if they are constructing a major source of HAP *and* if that source has no applicable MACT rule under 40 CFR Part 63. As an alternative, a facility can accept an enforceable emission limit under 02Q .0317 to avoid applicability of the rule. The potential applicability of 15A NCAC 02D .1112 and potential need of an avoidance limit are examined below.

1. AQF as a greenfield facility:

This facility has been in operation since before July 1, 1998. Per 15A NCAC 02D .1112(a)(2), this rule does not apply to an existing major source if it was operating prior to July 1, 1998. Therefore, this rule did not apply to the greenfield facility, regardless of major source status. However, subsequent modifications may still trigger applicability of this rule.

2. New emission sources after July 1, 1998:

Since July 1, 1998, AQF has installed two baking lines (specifically, ES-7 and ES-8).[13] The addition of either of these lines could potentially be an affected source. This rule specifically defines an "affected source" at 15A NCAC 02D .1112(c)(1):

> "Affected source" means the stationary source or group of stationary sources that, when fabricated on site, erected, or installed meets the definition of "construct a major source" or the definition of "reconstruct a major source" contained in this Paragraph.

Based on this definition, in order to be considered an affected source, a source must be constructed or reconstructed as defined in the rule. The rule specifically defines "construct a major source" at 15A NCAC 02D .1112(c)(4):

> "Construct a major source" means:
>
> (A) To fabricate, erect, or install at any greenfield site a stationary source or group of stationary sources that is located within a contiguous area and under common control and that emits or has the potential to emit 10 tons per year of any HAPs or 25 tons per year of any combination of HAP; or
>
> (B) To fabricate, erect, or install at any developed site a new process or production unit that ***in and of itself*** emits or has the potential to emit 10 tons per year of any HAP or 25 tons per year of any combination of HAP, unless the process or production unit satisfies Subparts (i) through (vi) of this Paragraph… [emphasis added]

Paragraph (A) does not apply because it could only have applied to this facility when it was initially constructed (i.e., a greenfield facility). Paragraph (B) does not apply because, based on the emission calculations in Table 1, neither ES-7 nor ES-8 have potential emissions of HAP greater than the thresholds. The rule's definition of "reconstruct a major source" also requires HAP emissions greater than the 10/25 ton threshold from an individual unit. Therefore, no source at this facility has met the definition of "construct a major source".

3. Applicability and/or avoidance of 15A NCAC 02D .1112

As discussed above, neither AQF as a whole nor any individual emission source at AQF meets the applicability requirements of 15A NCAC 02D .1112. Therefore, this rule does not apply to the facility and no avoidance condition is required.

9. 02Q .0504 "Option for Obtaining Construction and Operation Permit"

When applying for a significant modification via the 2-part process under 15A NCAC 02Q .0501(b)(2), applicants are required to submit an additional application within 12 months of commencing operation of the modified facility. The new Title V permit will include an application submittal requirement under Specific Condition 2.1 B.4. AQF will also be required to report when the facility commences operation of the upgrade Line 200 and CATOX-1 in order to verify that the 12-month deadline was not exceeded.

[13] See Application at page 3-2.

10. 02Q .0711 "Emission Rates Requiring a Permit" [State-enforceable Only]

This rule includes a list of TAP permitting emission rates ("TPER"). Facilities that emit a TAP at a rate greater than its respective TPER must demonstrate that those emission rates comply with 02D .1100 "Control of Toxic Air Pollutants" (see Section 5.4 above).

In the application, AQF provided an air dispersion modeling demonstration for ammonia and acetic acid. In addition, the application also demonstrated that the facility does not have the potential to emit any other TAP greater than its respective TPER. Therefore, no additional modeling demonstration will be required for any other TAP. Table 8 is a copy of the TAP emission summary from the application[14]:

Table 8: Facility-wide TAP emission rates versus TPERs

TAP	Facility wide Totals			2Q .0711(a) Limits (TPERs) [1]			Above Limit?		
	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr
Acetaldehyde	6.78E+00	1.63E+02	5.94E+04	6.8E+00			N		
Acrolein	2.81E-06	6.73E-05	2.46E-02	2.0E-02			N		
Ammonia	4.09E+01	9.81E+02	3.58E+05	6.8E-01			Y		
Benzene	2.28E-04	5.47E-03	1.99E+00			8.1E+00			N
Benzo(a)pyrene	1.27E-07	3.04E-06	1.11E-03			2.2E+00			N
Ethyl Acetate	2.59E-01	6.23E+00	2.27E+03	3.6E+01			N		
Formaldehyde	7.81E-03	1.87E-01	6.84E+01	4.0E-02			N		
Hexane	1.87E-01	4.49E+00	1.64E+03		2.3E+01			N	
Toluene	3.58E-04	8.58E-03	3.13E+00	1.4E+01	9.8E+01		N	N	
Arsenic	4.04E-08	9.70E-07	3.54E-04			5.3E-02			N
Beryllium	3.03E-08	7.27E-07	2.65E-04			2.8E-01			N
Cadmium	3.03E-08	7.27E-07	2.65E-04			3.7E-01			N
Chromium VI	3.03E-08	7.27E-07	2.65E-04		1.3E-02			N	
Manganese	6.06E-08	1.45E-06	5.31E-04		6.3E-01			N	
Mercury	3.03E-08	7.27E-07	2.65E-04		1.3E-02			N	
Nickel	3.03E-08	7.27E-07	2.65E-04		1.3E-02			N	
Acetic Acid	3.18E+01	7.63E+02	2.79E+05	3.9E+00			Y		
1,3-Butadiene	3.95E-07	9.48E-06	3.46E-03			1.1E+01			N
Xylene	2.88E-06	6.91E-05	2.52E-02	1.6E+01	5.7E+01		N	N	

[1]- Horizontal TPERs were used here for conservatism.

AQF will be required to maintain records of production and emissions such that compliance with each TPER can be verified. No reporting will be required to demonstrate compliance.

6. Application Chronology:

- March 3, 2021 — Application received in Raleigh Central Office.
- April 13, 2021 — Email to Aimee Andrews (managing consultant for Trinity Consultants, a firm representing AQF) requesting additional information regarding operation of the proposed oxidizer and emissions from previous years in light of the new emission factor.
- April 14, 2021 — Email response received to above request.
- April 14, 2021 — Email to Aimee Andrews requesting additional information regarding the ammonium bicarbonate rate for ES-4.

[14] See Application at Appendix A, page 2.

- April 16, 2021 — Email response received to above request. This response corrected the ammonium bicarbonate rate for ES-4 (was 201.6, should have been 103.4). See Attachment 2 for this correspondence.
- April 21, 2021 — DAQ AQAB approved AQF's modeling demonstration.
- May 19, 2021 — DAQ SSCB approved emission test 2021-021ST.
- May 20, 2021 — Initial draft of the permit and application review were sent to Raleigh Central Office staff (Mark Cuilla, Booker Pullen) for review. Comments were resolved on June 1, 2021.
- June 1, 2021 — A draft of the permit was sent to DAQ staff (Dena Pittman, Sindy Huang, Samir Parekh, and Taylor Hartsfield) and AQF staff (Aimee Andrews, Sergio Bosch, and Mark Logue). See Attachment 3 for a summary of comments on this draft.
- June 17, 2021 — A new draft of the permit was sent to Aimee Andrews that addressed comments receive on the previous draft.
- June 28, 2021 — Aimee Andrews responded to the June 17 draft and indicated that AQF had no further comments.
- June 29, 2021 — Permit issued.

7. Other Regulatory Concerns

- This facility was most recently inspected June 7, 2020 by Sindy Huang. AQF appeared to be in compliance with the existing Title V permit at that time.
- Based on the recent emission test, AQF has exceeded the annual VOC and HAP emission limits starting with CY2017. As of the issuance of this permit, AQF is negotiating a Special Order by Consent ("SOC") with NC DAQ to address previous and ongoing emission exceedances. The SOC is a separate process from the Title V permit and will not be included in the Title V permit at this time. The SOC is not indicative of AQF's ability to comply with the new permit in the future.
- Applications for significant modification require an application fee. The appropriate fee was included with the application.
- Applications for significant modification require a Professional Engineer's seal in some circumstances. AQF submitted Form D5 "Technical Analysis to Support Permit Application" (which includes a Professional Engineer's seal) on March 11, 2021.
- Applications for significant modification require a zoning consistency determination in some circumstances. AQF included a request for a zoning consistency determination to the Town of Cary with the application.
- Applications for significant modification require a public notice and EPA review period. However, because this application is the first part of a 2-part significant modification, no such

period is required. When AQF submits the required second application, there will be a 30-day public notice period and 45-day EPA review period.

8. Summary of Changes to Title V Permit

The following changes were made to the Austin Quality Foods, Inc. Air Permit No. 06816T18:

Page No.*	Section*	Description of Changes
Throughout	Throughout	• Updated dates/permit numbers. • Fixed formatting.
3	1	• Added CATOX-1 controlling ES-2, 7, and 8, as requested by Permittee. • Added note regarding 2-step significant modifications.
4	2.1 A.	• Removed references to ES-2, 7, and 8 from this section.
6	2.1 B (new)	• Added this section for ES-2, 7, and 8 and CATOX-1. • Added Specific Conditions for 02D .0515, 02D .0516, 02D .0521, and 02Q .0504.
8	2.1 C and D (formerly 2.1 B and C)	• Renumbered these sections to reflect addition of new Section 2.1 B.
9	2.2 A.2	• Updated emission limits to reflect most recent modeling demonstration. • Noted that ammonium bicarbonate is not allowed on lines other than ES-3 and ES-4. • Noted that ES07, 7, and 8 must be controlled by CATOX-1.
12	2.2 B.1	• Added initial testing requirement for CATOX-1. • Added subsequent testing requirement for CATOX-1. • Added maintenance and monitoring requirements for CATOX-1. • Updated emission calculation formulas to reflect the use of CATOX-1 and the new emission factors. • Updated recordkeeping requirements to include maintenance and monitoring of CATOX-1.
n/a	2.2 B.2 (former)	• Removed this condition because there are no rules under 40 CFR Part 63 that would apply to this facility, and therefore 15A NCAC 02D .1111 cannot apply to this facility regardless of HAP emissions.

* This refers to the current permit unless otherwise stated.

9. Recommendations

Issue permit 06816T19.

Attachment 1 to Review of Application 9200504.21A: Air Dispersion Modeling Memo

DIVISION OF AIR QUALITY
April 21, 2021

MEMORANDUM

TO: Russell Braswell, Permit Engineer, RCO
Dena Pittman, Permit Coordinator, RRO

FROM: Nancy Jones, Meteorologist, Air Quality Analysis Branch (AQAB)

THROUGH: Tom Anderson, AQAB Supervisor

SUBJECT: Review of Toxics Dispersion Modeling Analysis for Austin Quality Foods, Inc.
Cary Facility, Wake County, North Carolina Facility ID: 9200504

I have reviewed the dispersion modeling analysis, received March 3, 2021 for Austin Quality Foods Cary Facility, in Wake County, North Carolina. The modeling was submitted because stack testing showed that emissions factors for VOCs were underestimated and that actual emissions would exceed the permit limits. The purpose for modeling was to demonstrate compliance with guidelines specified in 15A NCAC 2D .1104 for Toxic Air Pollutants (TAPs) emitted in excess of the Toxic Permitting Emission Rates (TPERs) listed in 15A NCAC 2Q .0711. The modeling adequately demonstrates compliance, on a source-by-source basis, for all toxics modeled.

Two air toxics, acetic acid and ammonia, were evaluated using AERMOD (v19191) using the 2014-2018 surface data for Raleigh Durham and upper air data for Greensboro and the adjust u* option. Direction-specific building dimensions, determined using EPA's BPIP-Prime program (04274), were used as input to the model for building wake effect determination. Receptors were placed at 25 meter intervals along the fenceline and at 100 meter intervals out to 2000 meters. Emission rates modeled are three times the expected emissions to allow greater operational flexibility. Release parameters and emission rates are attached.

Maximum Modeled Toxics Impacts for Austin Quality Foods
Cary, Wake County, NC

Pollutant	Averaging Period	Max. Conc. (mg/m^3)	AAL (mg/m^3)	% of AAL
Acetic acid	1-hr	817.2	3,700	22.1%
Ammonia	1-hr	2,217.5	2,700	82.1%

This compliance demonstration assumes the source parameters and pollutant emission rates used in the dispersion modeling analysis are correct.

cc: Tom Anderson
Nancy Jones

Model Inputs Austin Quality Foods
Cary, Wake County, NC

	Source ID	Stack Release Type	Easting (X)	Northing (Y)	Base Elevation	Stack Height	Temp.	Exit Velocity	Stack Diameter	ACETIC ACID	AMMONIA
			(m)	(m)	(m)	(ft)	(°F)	(fps)	(ft)	(lb/hr)	(lb/hr)
1	OV1_1U	DEFAULT	697912.5	3966016	110	30	422	20	1.18	0.763	0.006
2	OV1_2U	DEFAULT	697913.2	3966001	110	30	395	20	1.18	0.763	0.006
3	OV1_3U	DEFAULT	697913.7	3965986	110	30	469	19	1.18	0.763	0.006
4	OV1_4U	DEFAULT	697914.4	3965972	110	30	519	19	1.18	0.763	0.006
5	OV1_5U	DEFAULT	697914.8	3965957	110	30	450	22	1.18	0.763	0.006
6	OV1_6U	DEFAULT	697915.6	3965942	110	30	324	23	1.18	0.763	0.006
7	OV3_1U	DEFAULT	697922.2	3966016	110	38	345	16	0.98	0.763	3.060
8	OV3_2U	DEFAULT	697922.7	3966002	110	38	476	31	0.98	0.763	3.060
9	OV3_3U	DEFAULT	697923.4	3965986	110	38	580	31	0.98	0.763	3.060
10	OV3_4U	DEFAULT	697924	3965972	110	38	595	27	0.98	0.763	3.060
11	OV3_5U	DEFAULT	697924.5	3965957	110	38	360	31	0.98	0.763	3.060
12	OV3_6U	DEFAULT	697925.1	3965942	110	38	295	32	0.98	0.763	3.060
13	OV4_1U	DEFAULT	697929.4	3966017	110	38	530	24	0.98	0.887	3.714
14	OV4_2U	DEFAULT	697929.9	3966001	110	38	515	26	0.98	0.887	3.714
15	OV4_3U	DEFAULT	697930.4	3965991	110	38	630	25	0.98	0.887	3.714
16	OV4_4U	DEFAULT	697930.9	3965976	110	38	605	24	0.98	0.887	3.714
17	OV4_5U	DEFAULT	697931.3	3965964	110	38	475	28	0.98	0.887	3.714
18	OV4_6U	DEFAULT	697932.4	3965942	110	38	440	31	0.98	0.887	3.714
19	CATOX1	DEFAULT	697935	3965941	110	53	600	56	3.51	0.855	0.204
20	IS10	HORIZONTAL	697965.1	3965891	110	12	ambient	4	0.56	0.226	0.000

Attachment 2 to Review of Application 9200504.21A: Correction/Amendment to Application

From: Braswell, Russell <russell.braswell@ncdenr.gov>
Sent: Wednesday, April 14, 2021 4:13 PM
To: Aimee Andrews <AAndrews@trinityconsultants.com>
Subject: RE: [External] RE: Air Quality Permit Application for Austin Quality Foods
I'm looking at the ammonia emission calculations in Appendix A page 8. I'm confused about the calculation for ES-4.

The table shows:

Ammonium bicarb usage: 201.6 lb/hr
Ammonia emission factor: 0.215 lb/lb

Shouldn't this result in a potential ammonia emission rate of 43.34 lb/hr? I understand that 22.14 lb/hr was used for the modeling demonstration. Does this mean that a different ammonium bicarb limit is needed?

Thanks,
-Russell

- - - - -

From: Aimee Andrews <AAndrews@trinityconsultants.com>
Sent: Friday, April 16, 2021 11:36 AM
To: Braswell, Russell <russell.braswell@ncdenr.gov>
Subject: RE: [External] RE: Air Quality Permit Application for Austin Quality Foods

Hi Russell,

You're correct the conversion is supposed to be ammonia (lb/hr) / 0.215 lb/lb = ammonium bicarbonate (lb/hr)

So 22.24 lb/hr / 0.215 = 103.4 lb/hr instead of 201.6 lb/hr.

I went back to the permit application, draft permit, and draft permit review document. The permit application and draft review document both have the ~103.4 lb/hr ammonium bicarbonate limit listed. However, the permit was issued with a higher 201.6 lb/hr limit and I can't find any rationale for that change. Therefore I think it was a typo. I'm attaching the draft review document that shows the lower number and the draft permit which shows the higher number.

I went through old emails and there was discussion with Kevin Godwin and Dena Pittman about the rounding differences in the ammonia values. But that's the only thing I could find that discussed any changes to the limits.

Since the permit was issued, the permit's limits have been incorporated into our spreadsheets, but the correct calculation should be 103.4 lb/hr ammonium bicarbonate limit on ES-4. Can we fix that limit since the permit is open now? I would also then update our references to the 201.6 in our spreadsheets.

Excerpt from our permit application (Submitted February 2019):

Potential Ammonia Emissions

Line	Emission Unit ID	Maximum Allowable Ammonium Bicarbonate Usage[1] (lb/hr)	Ammonia Emission Factor[2] (lb/lb)	Potential Ammonia Emissions[3] (lb/hr)	Potential Ammonia Emissions[4] (tpy)
100	ES-1	-		-	-
200	ES-2	-		-	-
300	ES-3	85.1	0.215	18.32	80.2
400	ES-4	103.4	0.215	22.24	97.4
600	ES-8	-		-	-
		Total Ammonia Emissions		**40.6**	**177.7**

Notes
1 Maximum allowable ammonium bicarbonate usage rates calculated based on revised ammonia limits:
Ammonium Bicarbonate Usage Limit (lb/hr) = Ammonia Emission Limit (lb/hr) / (0.215 lb/lb)
2 Emission factor per reaction stoichiometry of thermal decomposition of ammonium bicarbonate (17 g ammonia:79 g ammonium bicarbonate).
Emission factor (lb ammonia/ lb ammonium bicarbonate) = 0.215 lb/lb
3 Maximum Allowable Ammonia based on revised air dispersion modeling analysis
4 Based on Potential Ammonia Emissions (lb/hr) * (8760 hrs/yr) / (2000 lb/ton)

Thank you and please let me know if you'd like to discuss over a call.

Aimee

Aimee Andrews, PE
Managing Consultant

From: Braswell, Russell <russell.braswell@ncdenr.gov>
Sent: Friday, April 16, 2021 1:39 PM
To: Aimee Andrews <AAndrews@trinityconsultants.com>
Subject: RE: [External] RE: Air Quality Permit Application for Austin Quality Foods

Aimee,

1. We can make this correction now. I'll note this correction in your application and I'll make the following correction to the permit:

   b. To ensure compliance with the above limits, the following restrictions shall apply:
      i. The amount of ammonium bicarbonate used per oven shall not exceed the following:

Emission Source(s)	Allowable Amount of Ammonium Bicarbonate Usage (lb/hr)
ES-3	84.5
ES-4	~~201.6~~103.4

2. With this in mind, based on the facility's records of ammonium bicarb usage, has the facility exceeded 103.4 lb/hr in ES-4?

Thanks for your help,
-Russell

- - - - -

From: Aimee Andrews <AAndrews@trinityconsultants.com>
Sent: Friday, April 16, 2021 1:44 PM
To: Braswell, Russell <russell.braswell@ncdenr.gov>
Subject: RE: [External] RE: Air Quality Permit Application for Austin Quality Foods

Russell,

That sounds good. The max they use with their recipes is 83.7 lb/hr on that line. Any changes to their recipes and products have to go through their Environmental Manager first.

Thank you,
Aimee

Aimee Andrews, PE
Managing Consultant

Attachment 3 to Review of Application 9200504.21A: Comments on June 1 Draft

- One response to the June 1, 2021 draft was received. The response was an email from Aimee Andrews (managing consultant for Trinity Consultants, a firm representing AQF) that included a Microsoft Word document with comments in the margins and specific changes indicated with the "track changes" feature. Below is a summary of the comments and proposed changes and DAQ's responses.

    1. Request a three-hour block average temperature instead of rolling three-hour average.

        Response: DAQ prefers to use rolling average in cases where a rule does not specifically dictate a block average.

    2. Allow facility to "confirm" existing parameters without any additional permit action. The proposed threshold for "confirmation" was a %DE greater than 95% of the previous value and an operating temperature within 10% of the previous value.

        Response: I disagree with this proposal. DAQ policy requires a permit application in the event that any test result is less stringent than the previous test. As proposed, this provision would allow the Permittee to test at a higher oxidizer temperature and demonstrate a lower destruction efficiency, and then subsequently operate at a lower temperature and claim the previous, higher destruction efficiency.

    3. Once the %CE is established, there would be no reason for additional CE testing unless the containment structure/ductwork is modified.

        Response: I generally agree with this. I will update the draft permit with the following: "The Permittee may choose not to re-establish %CE provided that no substantial modifications have been made to the enclosures, ductwork, and ventilation that are associated with CATOX-1 since the previous test."

    4. References to 112(g) are incorrect. Either replace with facility-wide HAP-minor limit, rewrite to limit only Line 700 to 10/25tpy or remove entirely because there are no applicable MACTs.

        Response: After reconsidering the applicability of 112(g), I believe the best solution is to remove the facility-wide HAP limit from the permit entirely.

    5. In addition to the above, the response pointed out typos and inconsistent requirements.

        Response: I have corrected the indicated issues.

- A new draft of the permit that incorporated the above responses was provided to Aimee Andrews on June 17, 2021. On June 28, 2021, Aimee Andrews confirmed that AQF had no additional comments or responses to this draft.