NORTH CAROLINA DIVISION OF AIR QUALITY

Application Review

Issue Date: Month XX, 2023

Region: Raleigh Regional Office
County: Person
NC Facility ID: 7300082
Inspector's Name: Abdul Kadir
Date of Last Inspection: 03/09/2022
Compliance Code: 3 / Compliance - inspection

Facility Data

Applicant (Facility's Name): CertainTeed Roxboro Wallboard Facility

Facility Address:
CertainTeed Roxboro Wallboard Facility
921 Shore Road
Semora, NC 27343

SIC: 3275 / Gypsum Products
NAICS: 32742 / Gypsum Product Manufacturing

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

Permit Applicability (this application only)

SIP: 15A NCAC 02D .0515, .0516, and .0521
NSPS: 15A NCAC 02D .0524 – Subpart UUU
NESHAP: N/A
PSD: N/A
PSD Avoidance: 15A NCAC 02Q .0317
NC Toxics: 15A NCAC 02D .1100 and 02Q .0711
112(r): N/A
Other: N/A

Contact Data

Facility Contact	Authorized Contact	Technical Contact
D. Neil Gresham, Jr. Southeast Region EHS Manager (919) 691-2073 200 Certainteed Road Oxford, NC 27565	Satya Putta Plant Manager (366) 322-6341 921 Shore Rd Semora, NC 27343	D. Neil Gresham, Jr. Southeast Region EHS Manager (919) 691-2073 200 Certainteed Road Oxford, NC 27565

Application Data

Application Number: 7300082.22A
Date Received: 10/07/2022
Application Type: Modification
Application Schedule: TV-Significant

Existing Permit Data
Existing Permit Number: 10024/T05
Existing Permit Issue Date: 05/12/2021
Existing Permit Expiration Date: 04/30/2026

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2021	0.2900	31.07	20.80	51.08	31.62	1.42	0.7717 [Hexane, n-]
2020	0.3400	28.31	17.98	44.67	27.33	1.47	0.8635 [Hexane, n-]
2019	0.2300	17.34	14.37	27.80	21.09	0.5789	0.5519 [Hexane, n-]
2018	0.3300	28.60	22.55	47.23	36.53	0.9325	0.8888 [Hexane, n-]
2017	0.3800	36.67	3.52	59.25	44.76	1.22	1.16 [Hexane, n-]

Review Engineer: David B. Hughes

Review Engineer's Signature: **Date: Month XX, 2023**

Comments / Recommendations:
Issue 10024/T06
Permit Issue Date: Month XX, 2023
Permit Expiration Date: April 30, 2026

I. Purpose of Application

Application No. 7300082.22A

CertainTeed Roxboro Wallboard Facility (CertainTeed) operates a Gypsum Product Manufacturing in Semora, Person County, North Carolina. CertainTeed currently holds a Title V Operating Permit No. 10024T05 with an expiration date of April 30, 2026.

Air Permit Application No. **7300082.22A** was received on **October 7, 2022** for a significant modification pursuant to 15A NCAC 02Q .0501(b)(1) requesting to authorize the use of a silicone-based additive and to account for the additional formaldehyde emissions from wallboard production for the board dryer (Dryer End Seal Exhaust ID No. ES-39 and Wallboard Dryer Exhaust ID No. ES-40). In addition, CertainTeed is updating metal emissions data from the kettles (ID Nos. ES-09 and ES-10) and board dryer (ID Nos. ES-39 and ES-40) based on recent metals testing conducted at the facility. CertainTeed is also updating volatile organic compound (VOC) emissions from soap usage. The 2020 Title V Renewal Application included a lower VOC potential to emit (PTE) based on lower usage in recent years. However, to maintain operational flexibility, CertainTeed is requesting the PTE be returned to previous levels (See Section VIII).

II. Facility Description

The CertainTeed Roxboro facility manufactures wallboard from synthetic gypsum. Currently, the operations consist of receiving raw materials, drying, grinding, and calcining the gypsum to what is referred to as "landplaster." The landplaster is then mixed with wet and dry additives to form a slurry that is placed between two pieces of paper to form a continuous sheet of wallboard. The wallboard is allowed to set, cut into 24-foot lengths, and then cut into the correct size and shape prior to final drying. Waste and off-specification wallboard are recycled to the beginning of the process.

Kettles (ID Nos. ES-09 and ES-10)

Finely ground gypsum is uniformly fed to two conical kettles (ID Nos. ES-09 and ES-10) by a special screw type feeder. Burners installed above the kettles deliver hot gasses into the unit to calcine the raw gypsum. The heat is transferred to the gypsum through the hot gases by convection. The gasses then leave the kettles along with the steam from calcination at a temperature of approximately 325ºF. Gypsum is fed uniformly to the kettles. As the more dense raw gypsum particles sink in the material mass, they displace the lighter calcined material, which overflows into a hot material receiver. The material is discharged from the hot material receiver by air slide conveyors an then is transported through a screen to the stucco cooler.

Dust collectors following the kettles separate the steam and combustion gasses produced by calcination and transport the separated stucco back to the process. The steam and combustion gasses are discharged into the surrounding environment.

The Facility completes periodic testing of trace metals in gypsum. Utilizing newer analytical methods with lower detection limits has allowed the facility to more precisely estimate trace metals concentration. CertainTeed is updating PTE of various metals accordingly. Updated facility-wide PTE from four toxic air pollutants (TAPs) exceed the toxic permitted emission rates (TPER) under 15A NCAC 02Q .0711 limits. Thus, CertainTeed has submitted this permit modification application to account for these additional emissions.

Wallboard Dryer (ID Nos. ES-39 and ES-40

The Facility operates a natural gas-fired board dryer (ID Nos. ES-39 and ES-40) which has a total design capacity of 153.6 million Btu per hour (MMBtu/hr). The pre-heat dryer end seal exhaust primarily exhausts through the ES-39 stack. The pre-heat zone has no burner but instead utilizes pre-heated air from a heat exchanger which removes heat from the dryer exhaust prior to discharge. The additional three zones of the dryer, each containing combustion burners, exhaust to the board dryer exhaust through ES-40.

Emissions from the board dryer include both process and combustion emissions. The facility processes a variety of board types based on market demand and client specifications. One type of board that the facility processes is referred to as "mold and moisture resistant" board (MMR). MMR boards are manufactured using a chemical additive in the gypsum mix to provide a water-resistant characteristic to the wallboard. The two primary additives that are widely used in the industry are wax and silicone oil. Due to the nature of these chemicals and the overall manufacturing process, there are additional emissions generated in the drying process of the gypsum wallboard. While the PTE emissions for was MMR production were accounted for in the recent Title V renewal permit application, emissions associated with the use of silicone oil as an additive had not yet been considered. CertainTeed is submitting this permit modification application to account for these additional emissions. In addition, CertainTeed is updating the PTE for VOC emissions from soap additive. The 2020 Title V Renewal Application included a lower VOC PTE based on lower usage in recent years. However, to maintain operational flexibility, CertainTeed is requesting the PTE be returned to pervious levels established in the 2013 Title V Renewal Application. This change does not trigger any additional permitting.

III. Application Chronology

May 12, 2021 – Air Permit No. **10024T05** issued as a Title V renewal.

March 15, 2022 – Abdul Kadir of the Raleigh Regional Office (RRO) completed the annual compliance inspection of the facility.

October 7, 2022 – DAQ received Permit Application **7300082.22A**, which is a one-step Significant Modification. The application was deemed complete for processing on **October 18, 2022 upon receipt of the application fee**.

October 10, 2022 - Air Toxics Dispersion Modeling Analysis was received.

December 16, 2022 – Memorandum from Nancy Jones, Meteorologist, Air Quality Analysis Branch (AQAB) stating that the results from the Air Toxics Modeling Analysis are acceptable.

January 12, 2023 - DRAFT permit sent to Permittee, Supervisor, Raleigh Reginal Office and Samir Parekh for comment. Rachel Velthuisen (TRC Environmental Corporation) provided comments on draft permit and review via e-mail on **January 20, 2023**. Samir Parekh and Raleigh Regional Office had no comments.

March 7, 2023 – Jenny Sheppard (DAQ) updated TVEE.

Month XX, 2023 - Draft permit and review sent to 30-day public comment and 45-day EPA review periods.

Month XX, 2023 - 30-day public comment period ended; no comments received.

Month XX, 2023 - 45-day public comment period ended; no comments received.

Month XX, 2023 – Air Permit No. **10024T06** issued as a Title V Significant Modification.

IV. Permit Modifications/Changes and ESM Discussion

Page	Section	Description of Change
Global	Global	-Updated the application number and complete date. -Updated permit revision number to T06. -Updated the issuance/effective dates of the permit.
Cover Letter	Cover Letter	-Updated PSD increment tracking statement.
3	List of Acronyms	-Moved List of Acronyms from end of permit.
12	2.1 C.2.c	Deleted "The Permittee shall establish "normal" for the sources in the first 30 days following the effective date of the permit." Updated noncompliance wording.
27	2.1 I.3.c	-Updated shell language from Title V permit condition for 15A NCAC 02D .0521.
37	2.2 B.2.a Table	-Updated emission limits for Toxic Air Pollutants for Arsenic, Cadmium, Formaldehyde and Chromium per Nancy Jones's December 16, 2022 Memorandum.
38	2.2 B.3.c Table	-Cadmium and Chromium were removed from the table. The facililty already modeled to demonstrate compliance with the AALs for PTEs over the thresholds for cadmium and chromium VI.
39	Section 3 Insignificant Activities	-Moved Insignificant Activities list and removed footnote 3.
40-49	Section 4 General Conditions	-Updated General Conditions with most recent version (v6.0, 01/07/2022).

There were no modifications to the equipment descriptions needed in Title V Equipment Editor (TVEE).

V. Regulatory Review

The facility is currently subject to the following regulations:

15A NCAC 02D .0515, Particulates from Miscellaneous Industrial Process
15A NCAC 02D .0516, Sulfur Dioxide Emissions from Combustion Sources
15A NCAC 02D .0521, Control of Visible Emissions
15A NCAC 02D .0524, New Source Performance Standards – (40 CFR 60, Subpart UUU)
15A NCAC 02Q .0317, Avoidance Conditions for 15A NCAC 02D .0530: Prevention of Significant Deterioration (for PM_{10} and $PM_{2.5}$)
15A NCAC 02D .1100, Control of Toxic Air Pollutants *(State-Enforceable Only)*
15A NCAC 02Q .0711, Emission Rates Requiring a Permit *(State-Enforceable Only)*

A. K10 Conical Kettle (ID No. ES-09) and associated Bagfilter (ID No. DC-09) <u>K20 Conical Kettle (ID No. ES-10) and associated Bagfilter (ID No. DC-10)</u>

Source-specific applicable requirements are discussed below. In addition, applicable requirements for multiples sources are discussed in Section VI and VII below.

1. 15A NCAC 02D .0521 – Control of Visible Emissions

   Visible emissions from these sources **(ID Nos. ES-09 and ES-10)** are limited to 20 percent opacity. However, six-minute averaging periods may exceed 20 percent not more than once in any hour and not more than once in any hour and not more than four times in any 24-hour period. In no event shall the six-minute average exceed 87 percent opacity. VE observations must be performed once a month for all sources for emissions above normal, observations recorded in a logbook, and a semi-annual summary report submitted. Compliance is expected. This modification does not affect this status.

2. 15A NCAC 02D .0524 – New Source Performance Standards (40 CFR Part 60, Subpart UUU – Standards of Performance for Calciners and Dryers in Mineral Industries

   Kettles **(ID Nos. ES-09 and ES-10)** are subject to 40 CFR 60 Subpart UUU – Standards of Performance for Calciners and Dryers in Mineral Industries. The calciners and calciners in series with dryers that are subject to 40 CFR 60 Subpart UUU are limited to a particulate matter limit of 0.092 gm/dscm [0.04 gr/dscf] and 10 percent opacity.

   PM emissions from the kettles **(ID Nos. ES-09 and ES-10)** are controlled by bagfilters **(DC-09 and DC-10)** respectively. Routine inspections and maintenance are required for each bagfitler. Continued compliance is expected. This modification does not affect this status.

3. 15A NCAC 02Q .0317: Avoidance Conditions for 15A NCAC 02D .0530: Prevention of Significant Deterioration

   The County of Person is in attainment or unclassifiable/attainment for all promulgated National Air Quality Standards (NAAQS) in accordance with 40 CFR 81.334. The PSD program applies to each major stationary source and each major modification in this County. Based on the emissions calculations, this facility is a minor source for PSD. However, because several of the sources **(ID Nos. ES-09 through ES-12)** have the potential to emit uncontrolled emissions greater than the PSD thresholds, CertainTeed previously requested federally enforceable PSD avoidance conditions for facility-wide PM_{10} and $PM_{2.5}$ emissions **(excluding ES-43, IES-46, ES-47, ES-49, ES-G1 and IES-G2)**, limiting each to less than 250 tons per consecutive 12-month period. Continued compliance is expected. This modification does not affect this status.

B. Dry End Seal Exhaust (ID No. ES-39)
Wallboard Dryer Exhaust (ID No. ES-40)

Source-specific applicable requirements are discussed below. In addition, applicable requirements for multiples sources are discussed in Section VI and VII below.

4. 15A NCAC 02D .0515, "Particulates from Miscellaneous Industrial Processes"

   The Dry End Seal Exhaust **(ID No. ES-39)** and Wallboard Dryer Exhaust **(ID No. ES-40)** are subject to 02D .0515. Emissions of particulate matter shall not exceed an allowable emission rate as calculated by one of the following equations:

   $E = 4.10 \times P^{0.67}$ (for process rates less than or equal to 30 tons per hour), or

$E = 55.0 \times P^{0.11} - 40$ (for process rates greater than 30 tons per hour)

Where: E = allowable emission rates in pounds per hour
P = process weight in tons per hour

Liquid and gaseous fuels and combustion air are not considered as part of the process rate.

To ensure PM emissions meet this standard, monitoring, recordkeeping, and reporting requirements apply to these sources. Continued compliance is expected. This modification does not affect this status.

5. 15A NCAC 02D .0516– Sulfur Dioxide Emissions From Combustion Sources

Sulfur dioxide emissions from the wallboard dryer exhaust **(ID Nos. ES-40)** is limited to 2.3 pounds per million Btu heat input.

Using AP-42 emission factors, SO_2 emissions from natural gas are estimated to be less than 2.3 lb/MM/Btu, as follows:

AP-42 emission factor for natural gas = 0.6 lbs /million standard cubic feet
AP-42 heat value for natural gas = 1,020 million Btu

$$\frac{0.6\ lbs}{1\ x\ 10^6\ scf} \times \frac{1\ x\ 10^6\ scf}{1{,}020\ mmBtu} = \frac{0.0006\ lb\ SO_2}{mmBtu}$$

Because worst case SO_2 emission rates are estimated to be less than the allowable SO_2 emission rate (2.3 lb SO_2/mmBtu), no monitoring recordkeeping, or reporting shall be required to demonstrate compliance with this limitation. Compliance is indicated, as natural gas combustion results in negligible sulfur dioxide emissions. This modification does not affect this status.

6. 15A NCAC 02D .0521 – Control of Visible Emissions

Visible emissions from these sources **(ID Nos. ES-39 and ES-40)** are limited to 20 percent opacity. However, six-minute averaging periods may exceed 20 percent not more than once in any hour and not more than once in any hour and not more than four times in any 24-hour period. In no event shall the six-minute average exceed 87 percent opacity. VE observations must be performed once a month for all sources for emissions above normal, observations recorded in a logbook, and a semi-annual summary report submitted. Compliance is expected. This modification does not affect this status.

7. 15A NCAC 02Q .0317 Avoidance Conditions for 15A NCAC 02D .0530 PSD

The County of Person is in attainment or unclassifiable/attainment for all promulgated National Air Quality Standards (NAAQS) in accordance with 40 CFR 81.334. The PSD program applies to each major stationary source and each major modification in this County. Based on the emissions calculations, this facility is a minor source for PSD. However, because several of the sources **(ID Nos. ES-39 and ES-40)** have the potential to emit uncontrolled emissions greater than the PSD thresholds, CertainTeed previously requested federally enforceable PSD avoidance conditions for facility-wide PM_{10} and $PM_{2.5}$ emissions

(excluding ES-43, IES-46, ES-47, ES-49, ES-G1 and IES-G2), limiting each to less than 250 tons per consecutive 12-month period. Continued compliance is expected. This modification does not affect this status.

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

NSPS

New Source Performance Standards (NSPS): 40 CFR 60, Subpart OOO, *Standards of Performance for Nonmetallic Mineral Processing Plants* regulates particulate emissions from each crusher, grinding mill, screening operation, bucket elevator, belt conveyor, bagging operation, storage bin, and enclosed truck or railcar loading operation at a nonmetallic mineral processing plant. Neither the kettles **(ID Nos. ES-09 and ES-10)** nor the wallboard dryer **(ID Nos. ES-39 and ES-40)** are subject to this subpart.

New Source Performance Standards (NSPS): 40 CFR 60, Subpart UUU, *Standards of Performance for Calciners and Dryers in Mineral Industries* regulates particulate emissions from calciners and dryers at mineral processing plants. applies to asphalt processing and asphalt roofing manufacturing sources at the plant. Calciners are defined by the regulation as equipment used to remove chemically bound water from the mineral material through direct or indirect heating. A dryer is a device used to remove free water through direct or indirect heating. Kettles **(ID Nos. ES-09 and ES-10)** are subject to this subpart.

New Source Performance Standards (NSPS): 40 CFR 60, Subpart IIII, *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines* standards specify requirements for manufacturers and owners / operators of Stationary Compression Ignition Internal Combustion Engines (CI ICE). This standard applies to the two diesel emergency engines at the facility. Neither the kettles **(ID Nos. ES-09 and ES-10)** nor the wallboard dryer **(ID Nos. ES-39 and ES-40)** are subject to this subpart.

This modification does not affect this status.

NESHAPS/MACT

The Permittee is subject to 15A NCAC 02D .1111: Maximum Achievable Control Technology (MACT), 40 CFR Part 63, Subpart ZZZZ, *National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*. The facility maintains two emergency use generators. Neither the kettles **(ID Nos. ES-09 and ES-10)** nor the wallboard dryer **(ID Nos. ES-39 and ES-40)** are subject to this Subpart. This permit modification does not affect this status.

PSD

The CertainTeed facility is located in Person County, which is currently in attainment with all National Ambient Air Quality Standards (NAAQS) for all pollutants. The facility is currently classified as a "minor source" with regard to 250 tons/yr industrial category (i.e, non-listed source category) major source. Because several of the sources have the potential to emit uncontrolled emissions greater than the PSD thresholds, CertainTeed previously requested and obtained federally enforceable PSD avoidance conditions for PM_{10} and $PM_{2.5}$ for the facility operations under 15A NCAC 02Q .0317. Refer to Section 2.2 B.1 of the current permit. In brief, the facility is not a "major stationary source" for PSD.

Any physical change that would occur at a "minor" stationary source that would amount to major source by itself would require a PSD review. As discussed in this document, the facility is not making any physical changes. It is simply accurately accounting all emissions for regulated NSR pollutants due to use of additives in wallboard manufacturing process in the form of silicon oil and soap/dispersants. As per the applicant, the previously processed Title V renewal application did not accurately account for the increase in emissions due to above additives. It appears that the requested changes are not "physical changes" to the stationary source. Regardless, the change in emissions are expected to be much less than 250 tons/yr. Specifically, the application includes change in emissions of approximately 49 tons/yr of VOC (pollutant with the largest increase), based on the non-sanctioned potential to potential concept. Using the sanctioned applicability test (actual-to-projected actual or the actual to potential test), the change in emissions are expected to be higher, but still much below the major source level. In brief, this permit modification will not cause the facility to become PSD major. PSD avoidance conditions for PM and PM2.5 will continue to be met. Therefore, no PSD applicability analysis will be required. This permit modification does not affect this status.

112(r)

The facility is not subject to Section 112(r) of the Clean Air Act requirements because it does not store one or more of the regulated substances in quantities above the thresholds in the Rule. This permit modification does not affect this status.

CAM

40 CFR Part 64.2 is applicable to any pollutant-specific emission unit, located at a facility, required to hold a Title V permit, if the following three conditions are met:

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

The Facility utilizes bagfilters **(ID Nos. DC-09 and DC-10)** on the kettles **(ID Nos. ES-09 and ES-10)** to meet PM emission limits associated with 40 CFR Part 60, Subpart UUU. It is noted that this is the only applicable requirement for PM emissions from the kettles. Subpart UUU was promulgated on September 28, 1992 (57 FR 44503), which is after the CAM exemption date. Thus, the kettles are exempt from the CAM rule requirements. The wallboard dryer **(ID Nos. ES-39 and ES-40)** does not utilize a control device, therefore, is not subject to CAM. This permit modification does not affect this status.

VII. Facility Wide Air Toxics

15A NCAC 02D .1100 – Control of Toxic Air Pollutants (State-Enforceable Only)

This regulation establishes rules for emissions of toxic air pollutants (TAPs) to protect human health. According to this rule a facility must not emit any of the listed toxic air pollutants in such quantities that may cause or contribute beyond the facility's premises to any significant ambient air concentration that may adversely affect human health, except as allowed pursuant to 15A NCAC 02Q .0700. The facility emits listed TAPs and is subject to this rule.

15A NCAC 02Q .0711 – Toxic Air Pollutant Emission Rates Requiring a Permit (State-Enforceable Only)

This regulation requires that a facility, for each of the listed TAPs, make a demonstration that facility-wide actual emissions, do not exceed the TPERs listed in 15A NCAC 02Q .0711(a). The facility must be operated and maintained in such a manner that emissions of any listed TAPs from the facility, including fugitive emissions, will not exceed TPERs listed in 15A NCAC 02Q .0711(a). A permit to emit any of the listed TAPs shall be required for a facility if emissions from all sources, except the exempt sources are greater than the corresponding TPERs.

Prior to exceeding any of the listed TPERs (for unobstructed stacks), the facility must be responsible for obtaining a permit to emit TAPs and for demonstrating compliance with the requirements of 15A NCAC 02D .1100 "Control of Toxic Air Pollutants".

CertainTeed has requested an increase to TAPs based on updated metals testing from the kettles and board dryer. An assessment of emissions has identified that only emissions of arsenic, cadmium, chromium, and formaldehyde exceed their corresponding TPERs.

The TPER Comparison Table in Table 1 below provides a summary of the proposed facility-wide emissions of TAPs following the changes from this project. As shown in the table, arsenic, cadmium, chromium, and formaldehyde are the only TAPs above the limits requiring a permitted emission rate. Other process and combustion emissions from the kettles are not changing as a result of this permit modification.

Table 1: Facility-Wide TPER Review

Pollutant	Facility-Wide PTE			TPER Limit			Exceed TPER Limit?
	lb/yr	lb/day	lb/hr	lb/yr	lb/day	lb/hr	
Acetaldehyde	0.85	2.34E-03	9.74E-05	-	-	28.43	No
Acrolein	0.16	4.42E-04	1.84E-05	-	-	0.08	No
Ammonia	7751.67	21.24	0.88	-	-	2.84	No
Arsenic	0.78	2.14E-03	8.91E-05	0.194	-	-	Yes
Benzene	9.06	2.48E-02	1.03E-03	11.069	-	-	No
Benzo-(a)pyrene	0.004	1.13E-05	4.69E-07	3.044	-	-	No
Beryllium	0.04	1.22E-04	5.08E-06	0.378	-	-	No
Cadmium	2.62	7.17E-03	2.99E-04	0.507	-	-	**YES**
Chromium	3.34	9.15E-03	3.81E-04	0.008	-	-	**YES**
Formaldehyde	2123.83	55.52	2.31	-	-	0.16	**YES**
n-Hexane	4360.32	11.95	0.50	-	46.3	-	No
Manganese	1.65	4.53E-03	1.89E-04	-	1.3	-	No
Mercury	0.66	1.81E-03	7.54E-05	-	0.025	-	No
Nickel	5.21	1.43E-02	5.94E-04	-	0.3	-	No
Toluene	9.74	2.67E-02	1.11E-03	-	197.96	58.97	No
Xylenes	1.04	2.84E-03	1.18E-04	-	113.7	68.44	No

Air Dispersion Modeling

CertainTeed has requested the authorization of using a silicone-based additive and to account for the additional formaldehyde emissions from wallboard production for the board dryer, as well as update

metal emissions data from the kettles and board dryer based on recent metals testing conducted at the facility. An analysis of emissions of air toxic substances has identified that the proposed changes will result in an increase in emissions of arsenic, cadmium, chromium, and formaldehyde of sufficient amounts to trigger the need for an air toxic modeling evaluation as required by the NC's air toxic rules 15A NCAC 02D .1100. A summary the proposed emission rates for air toxic substances is shown in the Table below.

The emission rates used for the modeling analysis are as follows:

Table 2: Emission Rates

Source ID	Stack/Model ID	Arsenic (lb/yr)	Cadmium (lb/yr)	Non-Specific Chromium VI Compounds as CHRVI Equivalent (lb/yr)	Formaldehyde lb/hr
ES-09	ES09	7.93E-02	3.23E-01	4.11E-01	2.48E-03
ES-10	ES10	7.93E-02	3.23E-01	4.11E-01	2.48E-03
ES-39	ES39	1.16E-01	1.49E-02	2.07E-02	0.00E+00
ES-40	ES40	3.46E-01	1.46E+00	1.86E+00	2.30E+00
ES-02	ES02	1.02E-01	4.76E-01	6.06E-01	3.67E+03
ES-01A	ES01A	9.11E-04	1.81E-04	2.89E-04	0.00E+00
ES-01B	ES01B	9.11E-04	1.81E-04	2.89E-04	0.00E+00
ES-01C	ES01C	8.55E-05	1.72E-05	2.73E-05	0.00E+00
ES-03	ES03	8.55E-05	1.72E-05	2.73E-05	0.00E+00
ES-06	ES06	1.60E-03	3.20E-04	5.08E-04	0.00E+00
ES-07	ES07	8.55E-05	1.72E-05	2.73E-05	0.00E+00
ES-16	ES16	5.72E-04	1.15E-04	1.81E-04	0.00E+00
ES-20	ES20	5.72E-04	1.15E-04	1.81E-04	0.00E+00
ES-23	ES23	8.62E-04	1.72E-04	2.73E-04	0.00E+00
ES-24	ES24	2.50E-03	5.01E-04	7.93E-04	0.00E+00
ES-19, ES-33, ES-36, ES-38	ES19	1.52E-02	4.37E-04	6.95E-03	0.00E+00
ES-41	ES41	8.62E-03	1.48E-03	2.40E-03	0.00E+00
ES-42	ES42	2.48E-03	4.25E-04	6.90E-04	5.15E-04
ES-12, ES-14	ES12	1.31E-03	2.63E-04	4.17E-04	0.00E+00
ES-21	ES21	1.43E-03	2.86E-04	4.55E-04	0.00E+00
ES-43	ES43	4.37E-04	7.51E-05	1.22E-04	0.00E+00

Air Quality Model Considerations

A list of model considerations are included below:

(1) For the analysis the American Meteorological/Environmental Protection Agency Regulatory Model (AERMOD) dispersion model was used (Version 21112).
(2) The CertainTeed facility is located in Person County. Based upon guidance from the NC DEQ, meteorological data from Danville (surface) and Greensboro (upper air) meteorological data were

used for the years 2014-2018. This data set was processed by NC DEQ and made available on their website.

(3) Receptors in NAD83 coordinates were located on the boundary of the facility and at 25-meter intervals and 50-meter intervals out to a distance to ensure that the worst case predicted impacts were well within the interior of the grid. All worst-case impacts were found at or near the boundary of the facility and well within the outer edges of the receptor network. Receptor elevations were determined using the USEPA's AERMAP terrain processor and an applicable portion of a NED data set.

(4) Building structures parameters at the facility were entered into the dispersion model and evaluated using the BPIP-Prime computer algorithm. This program developed by the USEPA, calculates wind direction and dependent building dimensions.

(5) Modeling results were generated for 1-hr, 24-hour and annual averaging periods for each year of meteorological data.

Modeling results in comparison to the corresponding NC Ambient Air Levels (AALs) are summarized in Table 3. The worst-case predicted impacts listed in Table 3 indicated compliance with NC AAL.

Table 3: Modeling Results

Substance	2014	2015	2016	2017	2018	AAL
Annual Arsenic ($\mu g/m^3$)	0.00002	0.00002	0.00002	0.00003	0.00002	0.0021
Annual Cadmium ($\mu g/m^3$)	0.00003	0.00003	0.00003	0.00004	0.00003	0.0055
Annual Chromium* ($\mu g/m^3$)	0.00004	0.00004	0.00004	0.00005	0.00004	0.000083
Formaldehyde (1-hr) ($\mu g/m^3$)	7.7	7.1	7.5	6.9	7.7	150

*Non-Specific Chromium VI Compounds VI Equivalent

The submitted air pollutant dispersion modeling analysis (October 10, 2022) was reviewed by Nancy Jones, Meteorologist DAQ Air Quality Analysis Branch (AQAB) on December 16, 2022. Ms. Jones states in her memorandum that four toxic pollutants, arsenic, cadmium, chromium, and formaldehyde, were evaluated facility wide in the modeling. AERMOND (2112) was used with five years (2104-2018) of meteorological surface date from Danville, VA and upper air data from Greensboro. 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 spaced at 25-meter intervals along the fenceline and at a 50-meter intervals out to a distance of 1 km which resulted in the following impacts:

TAP	Averaging Period	Concentration at Property Boundary $\mu g/m^3$	AAL $\mu g/m^3$	% AAL
Arsenic	Annual	0.00003	0.0021	1
Cadmium	Annual	0.00004	0.0055	1

Chromium	Annual	0.00005	0.000083	60
Formaldehyde	1-hour	7.7	150	5

The modeling adequately demonstrates compliance, on a source-by-source bases, for all toxics modeled. Since none of the modeled toxic air pollutants' emissions exceed their respective AAL, DAQ has determined that there is no existence of an unacceptable risk to human health resulting from activities at the facility. The emission limitations in the 02D .1100 stipulation have been updated in Air Permit No. 01757T29.

VIII. Facility Emissions Review

A. K10 Conical Kettle (ID No. ES-09) and associated Bagfilter (ID No. DC-09) K20 Conical Kettle (ID No. ES-10) and associated Bagfilter (ID No. DC-10)

Calculations assume the average of individual metal test results, plus a 20 percent safety factor to remain conservative. The emission factor is multiplied by PTE of PM from the kettles to estimate metal emissions. A summary of the updated PTE for the kettles (ID Nos. ES-09 and ES-10) are included in the table below:

Table 4: Kettle 10 (ES-09)

Pollutant	Kettle 10 (ES-09)				Proposed Increase in Emissions	
	Current PTE		Proposed PTE			
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
PM	1.10	4.82	1.10	4.82	-	-
PM_{10}	1.10	4.82	1.10	4.82	-	-
$PM_{2.5}$	1.10	4.82	1.10	4.82	-	-
SO_2	0.02	0.09	0.02	0.09	-	-
NO_x	5.35	23.44	5.35	23.44	-	-
CO	5.96	26.12	5.96	26.12	-	-
VOC	0.18	0.80	0.18	0.80	-	-
Formaldehyde	2.49E-03	0.01	2.49E-03	0.01	-	-
Arsenic	7.17E-06	3.14E-05	9.11E-06	3.97E-05	1.94E-06	8.33E-06
Cadmium	3.66E-05	1.60E-04	3.69E-05	1.62E-04	3.62E-07	1.55E-06
Chromium	4.66E-05	2.04E-04	4.69E-05	2.05E-04	3.57E-07	1.53E-06
Total HAP	0.06	0.27	0.06	0.27	1.28E-05	5.48E-05

Updated emissions represent recent DSG metals testing.

Table 5: Kettle 20 (ES-10)

Pollutant	Kettle 20 (ES-10)				Proposed Increase in Emissions	
	Current PTE		Proposed PTE			
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
PM	1.10	4.82	1.10	4.82	-	-
PM_{10}	1.10	4.82	1.10	4.82	-	-
$PM_{2.5}$	1.10	4.82	1.10	4.82	-	-
SO_2	0.02	0.09	0.02	0.09	-	-
NO_x	5.35	23.44	5.35	23.44	-	-
CO	5.96	26.12	5.96	26.12	-	-

VOC	0.18	0.80	0.18	0.80	-	-
Formaldehyde	2.49E-03	0.01	2.49E-03	0.01	-	-
Arsenic	7.17E-06	3.14E-05	9.11E-06	3.97E-05	1.94E-06	8.33E-06
Cadmium	3.66E-05	1.60E-04	3.69E-05	1.62E-04	3.62E-07	1.55E-06
Chromium	4.66E-05	2.04E-04	4.69E-05	2.05E-04	3.57E-07	1.53E-06
Total HAP	0.06	0.27	0.06	0.27	1.28E-05	5.48E-05

Updated emissions represent recent DSG metals testing.

B. Dry End Seal Exhaust (ID No. ES-39)
Wallboard Dryer Exhaust (ID No. ES-40)

The Facility processes a variety of board types based on client specifications. Each board type emits varying amounts of criteria pollutants and HAPs/TAPs depending on the formation. The board dryer emissions were reevaluated to account for use of a silicone-based additive, and to incorporate stack test data from a similar facility in Moundsville, West Virgina. A 20 percent safety factor was applied to all stack test derived emission factors to account for future variability in testing. Emissions from pollutants that are not expected to be emitted from the wallboard itself were calculated using emission factors from AP-42 Section 1.4, *Natural Gas Combustion*.

Hourly PTE emissions assumes the worst case between the updated PTE of board without silicone oil usage, and the PTE of board with silicone oil. To remain conservative, annual PTE assumes the total from board without silicone oil usage and board with silicone oil.

The PTE for various HAPs/TAPs were updated based on recent metals testing at the facility. Updated calculations assume the average of individual metal test results, plus a 20 percent safety factor to remain conservative. The emission factor is multiplied by the PTE of PM from the board dryer to estimate HAPs/TAPs emissions. A summary of the facility-wide TPER evaluation is included in Table 1 above.

The PTE assumes worst-case emissions. The proposed permit modification will allow for future operational flexibility. Emissions from other air emitting sources at the facility are not expected to change as a result of this permit modification. A summary of the updated PTE for the wallboard dryer (ID Nos. ES-39 and ES-40) are included in the table below:

Table 6: Dry End Seal Exhaust (ES-39)

Pollutant	Dry End Seal Exhaust (ES-39)				Proposed Increase in Emissions	
	Current PTE		Proposed PTE			
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
PM	2.52	11.04	6.17	17.11	3.65	6.07
PM_{10}	2.52	11.04	6.17	17.11	3.65	6.07
$PM_{2.5}$	2.52	11.04	6.17	17.11	3.65	3.65
Arsenic	1.47E-06	6.44E-06	2.09E-05	5.80E-05	1.94E-05	5.16E-05
Cadmium	2.53E-07	1.11E-06	2.68E-06	7.44E-06	2.43E-06	6.33E-06
Chromium	4.10E-07	1.79E-06	3.74E-06	1.04E-05	3.33E-06	8.57E-06
Total HAP	2.69E-05	1.18E-04	9.66E-05	2.68E-04	6.98E-05	1.40E-04

Updated emissions represent emissions from silicone oil usage and recent board metals testing.
Emissions from other criteria pollutants represented under Wallboard Dryer (ID No. ES-40).

Table 7: Wallboard Dryer (ES-40)

Pollutant	Wallboard Dryer (ES-40)				Proposed Increase in Emissions	
	Current PTE		Proposed PTE			
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
PM	1.96	8.58	6.17	12.16	4.21	3.58
PM_{10}	1.96	8.58	6.17	8.58	4.21	-
$PM_{2.5}$	1.96	8.58	6.17	8.58	4.21	-
SO_2	0.09	0.40	0.09	0.40	-	-
NO_x	3.37	14.77	6.77	30.41	3.40	15.64
CO	12.11	53.03	14.98	61.82	2.88	8.78
VOC	4.99	21.86	16.00	70.47	11.01	48.61
Formaldehyde	0.14	0.62	2.30	1.02	2.16	0.39
Arsenic	3.12E-05	1.37E-04	9.11E-05	1.73E-04	1.98E-05	3.64E-05
Cadmium	1.66E-04	7.26E-04	3.69E-04	7.31E-04	2.49E-06	4.47E-06
Chromium	2.11E-04	9.25E-04	4.69E-04	9.31E-04	3.43E-06	6.03E-06
Total HAP	0.42	1.82	2.58	2.26	2.16	0.44

Updated emissions represent emissions from silicone oil usage and recent board metals testing.
SO_2 will not change as a result of this permit modification. Emissions from natural gas combustion only.
VOC annual emissions increase represents addition of formaldehyde emissions from silicone oil usage and increase from additives.
Hourly PTE emissions assumes the worst case between the updated PTE of board without silicone oil usage, and the PTE of board with silicone oil. To remain conservative, annual PTE assumes the total from board without silicone oil usage and board with silicone oil.

IX. Stipulation Review

The facility was last inspected by Abdul Kadir on **March 15, 2022**. Based on his observations the facility appeared to be in compliance with their Title V permit requirements.

Compliance History (5-year)

03/06/20 NOV issued for submitting an incomplete annual compliance certification (ACC).

05/22/19 NOV issued for not recording the results of the monthly visual inspections of two bagfilters (ID Nos. ES-30 and ES-41) for August 2018 through February 2019. A violation of 15A NCAC 02D .0515 *Particulates from Miscellaneous Industrial Processes*.

All violations have been resolved.

X. Affected State(s) Review

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. Consistent with 15A NCAC 02Q .0525, the EPA will have a 45-day review period. 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 pursuant shall be provided to EPA. Also, pursuant to 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 02Q .0521.

XI. Conclusions, Comments, and Recommendations

PE Seal

Pursuant to 15A NCAC 02Q .0112 "Application Requiring a Professional Engineering Seal," a professional engineer's seal (PE Seal) is required to seal technical portions of air permit applications for new sources and modifications of existing sources as defined in Rule .0103 of this Section that involve:

(1) design;
(2) determination of applicability and appropriateness; or
(3) determination and interpretation of performance; of air pollution capture and control systems.

A professional engineer's seal (PE Seal) was not required for this significant modification, because particulate emission sources with air flow rates of less than or equal to 10,000 actual cubic feet per minute apply to the emission sources in this application.

Zoning

A zoning consistency determination was not required for this significant modification, because there is no physical or operational changes to the emission sources in this application.

Recommendations

RRO recommends issuance of the permit and was sent a DRAFT permit prior to issuance (See Section III of this document for a discussion).

The Raleigh Central Office (RCO) recommends issuance of Air Permit No. 10024T06, after completion of both public comment and EPA review periods.