DRAFT

NORTH CAROLINA DIVISION OF AIR QUALITY

Application Review

Issue Date: TBD

Region: Wilmington Regional Office
County: New Hanover
NC Facility ID: 6500083
Inspector's Name: Ashby Armistead
Date of Last Inspection: 02/23/2022
Compliance Code: 3 / Compliance - inspection

Facility Data

Applicant (Facility's Name): Stepan Company

Facility Address:
Stepan Company
4600 Highway 421 North
Wilmington, NC 28401

SIC: 2821 / Plastics Materials And Resins
NAICS: 325211 / Plastics Material and Resin Manufacturing

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

Permit Applicability (this application only)

SIP: 02D: .0501, .0503, .0515, .0516, .0521, .0524, .1110, .1111, .1806
02Q: .0315, .0317, .0512, .0711
NSPS: Part 60, Subpart IIII
NESHAP: Part 61, Subpart FF
Part 63, Subparts ZZZZ, VVVVVV
PSD: Minor
PSD Avoidance: 02Q .0317
NC Toxics: 02Q .0711
112(r): No RMP required
Other: Synthetic minor under 02Q .0315

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Charity Coury Environmental Specialist (480) 363-8875 4600 Highway 421 North Wilmington, NC 28401	Phillip Cline Site Manager (910) 341-3194 4600 Highway 421 North Wilmington, NC 28401	Charity Coury Environmental Specialist (480) 363-8875 4600 Highway 421 North Wilmington, NC 28401

Application Data

Application Number: 6500083.22A
Date Received: 03/15/2022
Application Type: Renewal
Application Schedule: TV-Renewal

Existing Permit Data
Existing Permit Number: 00164/T56
Existing Permit Issue Date: 04/04/2022
Existing Permit Expiration Date: 09/30/2022

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2021	0.1300	22.45	25.62	21.34	4.38	1.66	1.09 [Dioxane, 1,4-]
2020	0.1400	23.49	20.47	23.02	3.22	1.84	1.08 [Dioxane, 1,4-]
2019	0.1800	30.44	28.48	32.47	3.75	2.52	1.61 [Dioxane, 1,4-]
2018	0.1400	24.07	23.07	24.11	3.30	4.64	3.87 [Dioxane, 1,4-]
2017	0.1400	22.08	33.98	24.86	3.07	2.29	1.57 [Dioxane, 1,4-]

Review Engineer: Russell Braswell

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

Comments / Recommendations:
Issue 00164/T57
Permit Issue Date: TBD
Permit Expiration Date: TBD+5 years

1.0 Purpose of Application

Stepan Company (Stepan) currently operates a chemical factory in New Hanover County under Title V permit 00164T56 (the existing permit). The existing permit expired on September 30, 2022. Before the existing permit expired, and in accordance with General Condition K of the existing permit, Stepan submitted application 6500083.22A in order to renew the Title V permit.

Because this application for permit renewal was received at least six months before the expiration date, the existing permit will remain in effect, regardless of expiration date, until the renewed permit is issued.

2.0 Facility Description

This facility is a chemical factory that primarily produces polyester polyols. According to the inspection report, "the polyols are used in the manufacturing of rigid insulation board or spray foam insulation." According to DAQ's review of the T56 permit revision (issued April 4, 2022), "Stepan's polyester polyols manufacturing is a batch process, not continuous… The new Stepan products are very chemically similar to the historical 'Terates' that have been produced at the site for many years, and they use the same or similar raw materials. The main difference is the Stepan products have much faster batch times."

This facility has previously operated under several different names, most recently the facility was operated under the name "INVISTA, S.ar.l.". The initial Title V permit for this facility was the T32 revision (issued October 28, 2002). This facility has previously manufactured dimethyl terephthalate (DMT); DMT production ended in 2014.

This facility has accepted a facility-wide emission limit avoid the requirements of 15A NCAC 02Q .0500 (i.e., Title V). However, this facility is still required to hold a Title V permit as part of 40 CFR Part 63, Subpart VVVVVV.

3.0 Title V Permit Modifications Following the Previous Renewal

Date	Permit Revision	Application Type	Notes
October 6, 2017	T53	Renewal	This revision renewed the Title V permit. In addition, this revision added several insignificant activities, made corrections to the existing permit, made changes to compliance requirements for MACT Subpart FFFF, and made changes to some avoidance conditions.
November 13, 2018	T54	Minor Mod.	This revision replaced the material handling processes with a new silo and associated bagfilter.
March 12, 2021	T55	Ownership change	This revision changed the ownership of the facility, but made no other changes.

Date	Permit Revision	Application Type	Notes
April 4, 2022	T56	Significant Mod.	• This revision allowed the facility to be designated an area source of HAP, and therefore not subject to major source MACTs, as allowed by the repeal of EPA's OIAI policy. In addition, this revision included facility-wide limits to avoid being designated a major source under Title V. As a result, this permit revision added a condition for MACT Subpart VVVVVV and removed conditions for MACT Subpart G, H, and FFFF and NSPS Subpart NNN. • Also, changed the name of the facility to "Stepan Company" (formerly "INVISTA, S.àr.l. – Wilmington").

4.0 Application Chronology

Date	Event
March 15, 2022	Application received.
April 4, 2022	Permit revision T56 issued.
January 6, 2023	Emails sent to Charity Coury (Environmental Specialist, Stepan) regarding: ○ the flare compliance assessment required by MACT Subpart VVVVVV, ○ potentially moving the emergency-use engines to the list of insignificant activities, and ○ adding an insignificant activity noted on the most recent inspection report. A response was received later that day.
January 10, 2023	An initial draft of the permit and review were sent to DAQ Permits staff for initial review.
March 3, 2023	Letter sent to Charity Coury by email requesting information on Stepan's use of PFAS compounds at the facility.
April 12, 2023	Response received to the March 3 request.
April 14, 2023	A revised draft of the permit and review were sent to DAQ WRO staff, DAQ SSCB staff, and Stepan staff.
XXXX	Public notice / EPA Review
XXXX	Permit issued.

5.0 Changes to the Existing Permit

Page No.	Section	Description of Changes
Throughout	Throughout	• Updated dates and permit numbers. • Updated formatting. Formatting changes are not intended to affect the Permittee's compliance requirements. • Removed "reserved" sections, and renumbered other sections as a result.
9	2.1 A.5	• Updated permit condition for avoidance of MACT Subpart JJJJJJ avoidance to match current DAQ standard.

Page No.	Section	Description of Changes
11 - 13	2.1 B.3, 4, and 5	• Updated permit conditions for NSPS Subpart IIII and MACT Subpart ZZZZ to reflect regulatory updates.
18	2.1 C.2	• Updated monitoring requirements for 02D .0521 to match current DAQ standard.
22	2.1 E.2	• Removed requirement to perform a compliance assessment on the flare. Noted that the Permittee has applied for a waiver, and DAQ has granted that waiver.
33	2.2 A.5 (new)	• Added requirement regarding the disclosure of the use of PFAS compounds. This condition is state-enforceable only.
34	2.3	• Corrected the basis for the permit shield for 02D .0614.
35	3. (new)	• Created this section. • Moved list of insignificant activities to this section to match current DAQ format.

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

6.0 Regulatory Overview and Rules Review

Stepan is subject to the following State Implementation Plan (SIP) rules, in addition to the General Conditions:

- 15A NCAC 02D .0501(c) "Compliance with Emission Control Standards"
- 15A NCAC 02D .0503 "Particulates from Fuel Burning Indirect Heat Exchangers"
- 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 .0524 "New Source Performance Standards"
- 15A NCAC 02D .1110 "National Emission Standards for Hazardous Air Pollutants"
- 15A NCAC 02D .1111 "Maximum Achievable Control Technology"
- 15A NCAC 02D .1806 "Control and Prohibition of Odorous Emissions" [state-enforceable only]
- 15A NCAC 02Q .0315 "Synthetic Minor Facilities"
- 15A NCAC 02Q .0317 "Avoidance Conditions"
- 15A NCAC 02Q .0512 "Permit Shield and Application Shield"
- 15A NCAC 02Q .0711 "Emission Rates Requiring a Permit"

In addition to the above, Stepan is subject to NC's reporting requirement for the use of PFAS materials.

Below is a discussion of Stepan's requirements for all applicable rules. This section will also discuss several nonapplicable rules.

6.1 15A NCAC 02D .0501(c) "Compliance with Emission Control Standards"

Applicability: This rule requires facilities to not cause exceedances of the ambient air quality standards in 15A NCAC 02D .0400. In cases where the emission limits under 15A NCAC 02D .0500 are not sufficient to demonstrate compliance with the standards, DAQ can place additional emission limits in the permit. DAQ determined that a specific limit under 02D .0501(c) was necessary for this facility as part of the T47 permit revision (issued July 18, 2012).

Emission limits: Based on air dispersion modeling, DAQ determined that the sulfur content of fuel oil fired at this facility cannot exceed 0.1% by weight. In addition, diesel fuel fired in the generators and fire pumps are limited to a sulfur content of 15 ppm.

Monitoring, Recordkeeping, and Reporting: Stepan must keep records of fuel oil sulfur content based on the oil supplier's certification. Stepan must submit a semiannual summary report of the fuel oil content.

Compliance: Based on the most recent inspection report, Stepan appears to be in compliance with this rule. Continued compliance will be determined with subsequent inspections and reports.

6.2 15A NCAC 02D .0503 "Particulates from Fuel Burning Indirect Heat Exchangers"

Applicability: This rule applies to indirect heat exchangers (such as boilers). The boilers and heat exchanger at this facility (ID Nos. BLR1, BLR5, and B7600) are subject to this rule. Engines are not indirect heat exchangers, and therefore are not subject to this rule.

Emission limits: This rule limits PM emissions from indirect heat exchangers. The PM emission limit is determined by the following formula: $E = 1.090 \times Q^{-0.2594}$, where *E* is the limit (pounds per million Btu) and *Q* is the total heat input of emission sources subject to this rule. For each source, *Q* is determined at the time that source is installed. *Q* and *E* are not recalculated for existing sources when another subject source is added to or removed from the facility. As a result, *E* can differ between emission sources based on the configuration of the facility at the time the individual source was installed. For each subject emission source at this facility, *E* is 0.22 pounds per million Btu.

The subject sources at this facility can burn natural gas, propane, and No. 2 fuel oil. In order to calculate PM emissions from the combustion of these fuels, the emission factors published by EPA in AP-42 can be applied. The published emission factors are not in units of pounds per million Btu, so the emission factor must be converted:

- PM from natural gas (AP-42 Chapter 1.4, Table 1.4-2; PM [Total]):

$$\frac{7.6\ \text{lb}}{\text{million scf}} \times \frac{1\ \text{scf}}{1{,}020\ \text{Btu}} = \frac{0.007\ \text{lb}}{\text{million Btu}}$$

  Therefore, natural gas is expected to comply with the PM limit by a wide margin.

- PM from propane (AP-42 Chapter 1.5, Table 1.5-1; PM, Total):

$$\frac{0.7\ \text{lb}}{1{,}000\ \text{gal}} \times \frac{1{,}000\ \text{gal}}{91.5\ \text{million Btu}} = \frac{0.008\ \text{lb}}{\text{million Btu}}$$

  Therefore, propane is expected to comply with the PM limit by a wide margin.

- PM from No. 2 fuel oil (AP-42 Chapter 1.3, Tables 1.3-1 and 1.3-2; Filterable PM + CPM-TOT):

$$\frac{[2+1.3]\ \text{lb}}{1{,}000\ \text{gal}} \times \frac{1{,}000\ \text{gal}}{140\ \text{million Btu}} = \frac{0.023\ \text{lb}}{\text{million Btu}}$$

  Note that AP-42 Chapter 1.3 differentiates emission factors for sources with heat input greater than or less than 100 million Btu per hour. However, the PM emission factor is the same for either

case. Based on the above, No. 2 fuel oil is expected to comply with the PM limit by a wide margin.

Monitoring, Recordkeeping, and Reporting: Based on the wide margin of compliance for natural gas, propane, and No. 2 fuel oil, DAQ has determined that no monitoring, recordkeeping, or reporting is required to demonstrate compliance with 15A NCAC 02D .0503. DAQ has determined that this conclusion is still accurate, and no monitoring, recordkeeping, or reporting is required.

Compliance: Stepan is expected to remain in compliance with this rule.

6.3 15A NCAC 02D .0515 "Particulates from Miscellaneous Industrial Processes"

Applicability: This rule applies to sources of PM that exhaust through a stack or vent and that are not subject to another PM standard under 02D .0500. The only source at this facility subject to this rule is the silo (ID No. T-7906).

Emission limits: The PM emission limit for this rule is determined for each individual source using the following formulas: $E = 4.10 \times P^{0.67}$ (for $P \leq 30$ tons/hr), or $E = 55.0 \times P^{0.11} - 40$ (for $P > 30$ tons/hr), where E is the limit (pounds per hour) and P is the process rate (tons per hour).

The silo is controlled by a bagfilter. By using the bagfilter, the silo is expected to comply with this rule by a wide margin.

Monitoring, Recordkeeping, and Reporting: In order to demonstrate that the silo's bagfilter is operating properly, Stepan must conduct annual and monthly inspections of the bagfilter. Stepan must keep records of monitoring activities and submit a semiannual summary report. DAQ has determined that this conclusion is still accurate, and no monitoring, recordkeeping, or reporting is required.

Compliance: Based on the most recent inspection report, Stepan appears to be in compliance with this rule. Continued compliance will be determined with subsequent inspections and reports.

6.4 15A NCAC 02D .0516 "Sulfur Dioxide from Combustion Sources"

Applicability: This rule applies to combustion sources that emit sulfur dioxide (SO_2) and that are not subject to another SO_2 emission standard NSPS or MACT. Each combustion source at this facility is subject to this rule.

Emission limits: In all cases, the limit for this rule is 2.3 pounds of SO_2 emitted per million Btu heat input.

In general, SO_2 emitted by combustion sources is a function of the amount of sulfur present in the fuel. In the case of flares that control VOC and HAP emissions, sulfur compounds in the gas stream sent to the flare could create additional SO_2 emissions. However, the flare at this facility (ID No. G-1955) is not expected to control any sulfur compounds.

Fuel burning sources at this facility can burn natural gas, propane, and No. 2 fuel oil. In order to calculate SO_2 emissions from the combustion of these fuels, the emission factors published by EPA in AP-42 can be applied. The published emission factors are not in units of pounds per million Btu, so the emission factor must be converted:

- SO_2 from natural gas (AP-42 Chapter 1.4, Table 1.4-2; SO_2):

$$\frac{0.6\text{ lb}}{\text{million scf}} \times \frac{1\text{ scf}}{1{,}020\text{ Btu}} = \frac{0.001\text{ lb}}{\text{million Btu}}$$

  Therefore, natural gas is expected to comply with the SO_2 limit by a wide margin.

- SO_2 from propane (AP-42 Chapter 1.5, Table 1.5-1; SO_2, S=0.18):

$$\frac{[0.1 \times 0.18]\text{ lb}}{1{,}000\text{ gal}} \times \frac{1{,}000\text{ gal}}{91.5\text{ million Btu}} = \frac{0.0002\text{ lb}}{\text{million Btu}}$$

  Therefore, propane is expected to comply with the SO_2 limit by a wide margin.

- SO_2 from No. 2 fuel oil in a boiler (AP-42 Chapter 1.3, Table 1.3-1; SO_2, S=0.1):

$$\frac{[142 \times 0.1]\text{ lb}}{1{,}000\text{ gal}} \times \frac{1{,}000\text{ gal}}{140\text{ million Btu}} = \frac{0.10\text{ lb}}{\text{million Btu}}$$

  Note that AP-42 Chapter 1.3 differentiates emission factors for sources with heat input greater than or less than 100 million Btu per hour. However, the SO_2 emission factor is the same for either case. Furthermore, Stepan is limited to No. 2 fuel oil with a sulfur content of 0.1% (*i.e.*, S=0.1) under 02D .0501(c). Based on the above, No. 2 fuel oil with S=0.1 is expected to comply with the SO_2 limit by a wide margin.

- SO_2 from diesel (USLD) in a stationary internal combustion engine:

  According to AP-42 Chapter 3.3, Table 3.3-1, the SO_2 emission factor for diesel fuel is 0.29 pounds per million Btu. Therefore, diesel is expected to comply with the SO_2 limit by a wide margin.

Monitoring, Recordkeeping, and Reporting: Based on the wide margin of compliance for natural gas, propane, and No. 2 fuel oil, DAQ has determined that no monitoring, recordkeeping, or reporting is required to demonstrate compliance with 15A NCAC 02D .0516. DAQ has determined that this conclusion is still accurate, and no monitoring, recordkeeping, or reporting is required.

Compliance: Stepan is expected to remain in compliance with this rule.

6.5 15A NCAC 02D .0521 "Control of Visible Emissions"

Applicability: This rule applies to sources of visible emissions (VE) that are not subject to another VE standard under 02D .0500. Generally, this rule is not applied to sources that are not expected to produce any VE (*e.g.*, from a storage tank). The boilers, engines, flare, and silo are subject to this rule.

Emission limits: The VE limit for this rule depends on the construction date of the individual source in question. At this facility, the VE limit is 20% for each source subject to this rule except BLR1, which has a limit of 40%. The rule allows for one exceedance of the specific limit per hour, and four exceedances per 24-hour period.

Monitoring and Recordkeeping: DAQ has previously determined that no specific monitoring, recordkeeping, or reporting is required for the boilers, engines, or flare at this facility to demonstrate compliance with the VE emission limit. For the silo, Stepan must conduct a monthly observation of the silo to ensure that VE is not above normal. DAQ has determined that this conclusion is still accurate, and no monitoring, recordkeeping, or reporting is required.

Reporting: Stepan must keep records of VE observations and submit a semiannual summary report.

Compliance: Based on the most recent inspection report, Stepan appears to be in compliance with this rule. Continued compliance will be determined with subsequent inspections and reports.

6.6 15A NCAC 02D .0524 "New Source Performance Standards" (NSPS; 40 CFR Part 60)

This rule incorporates the NSPS rules under 40 CFR Part 60 into North Carolina's SIP. Each NSPS rule that applies to this facility is discussed below. In addition, several potentially applicable NSPS rules are discussed below.

6.6.1 NSPS Subpart Db "Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units" [not applicable]

Applicability: This rule applies to steam-generating units (*i.e.*, boilers) with a heat input capacity greater than 100 million Btu per hour and that were constructed or modified after June 19, 1984. The boilers BLR1 and BLR5 were constructed before that date and have not been modified or reconstructed following that date. Therefore, this rule does not apply.

6.6.2 NSPS Subpart Dc "Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units" [not applicable]

Applicability: This rule applies to steam-generating units with a heat input capacity between 10 and 100 million Btu per hour and that were constructed or modified after June 9, 1989.

- The boilers BLR1 and BLR5 have capacities greater than this range.
- The heater B7600 was constructed before that date and has not been modified or reconstructed after that date.

Therefore, this rule does not apply.

6.6.3 NSPS Subparts VV, III, and NNN "Synthetic Organic Chemical Manufacturing Industry" (SOCMI) [not applicable]

Applicability: These rules apply to facilities that produce specific organic chemicals and were constructed after 1981. These rules have previously applied to the operations at Stepan. As of the issuance of the T50 permit revision (issued November 12, 2013), this facility no longer produces any chemicals subject to these rules. According to the application review associated with the T50 permit revision, "The Permittee shall cease operation of the DMT production lines on or before December 31, 2013. As of January 1, 2014, the Permittee shall no longer operate a process unit as defined in paragraph 60.480(f) of 40 CFR Part 60, Subpart VV or as a process unit that produces any of the chemicals listed in §60.617 or in §60.667 as a product, co-product, by-product, or intermediate." Therefore, these rules do not apply to this facility.

6.6.4 Subpart IIII "Standards of Performance for Stationary Compression Ignition Internal Combustion Engines"

Applicability: This rule applies to stationary compression ignition engines constructed after July 11, 2005. The fire pump engines (ID Nos. FP-1500-E through H) were constructed before this date and are not subject to this rule. The emergency generators (ID Nos. EG20 and EG125) are subject to this rule.

Requirements: The requirements of this rule differ based on the type of engine. For the purposes of this rule, these engines are emergency-use with a capacity less than 30 liters per cylinder. For these engines, the rule requires:

- Comply with the emission standards in 40 CFR 60.4202.
- Follow manufacturer's recommendations.
- Only use ultra-low sulfur diesel.
- Install a non-resettable hour meter on each engine.
- Operate only for testing or emergencies.

Monitoring and Recordkeeping: Stepan must keep records of engine inspection and maintenance, diesel sulfur content, and engine certification.

Reporting: Stepan must submit a semiannual summary report.

Updates to the existing permit: The existing permit condition has been updated to reflect regulatory updates. The most relevant change is a restriction on operation for demand response.

Compliance: Based on the most recent inspection report, Stepan appears to be in compliance with this rule. Continued compliance will be determined with subsequent inspections and reports.

6.7 15A NCAC 02D .0530 "Prevention of Significant Deterioration" (PSD) [not applicable]

Applicability: This rule applies to facilities that make a major modification or construct a new major source as defined in 40 CFR 51.166. Stepan has accepted an emission limit under 02Q .0317 in order to avoid being designated as a major source for PSD. Therefore, this rule does not apply to this facility.

6.8 15A NCAC 02D .0614 "Compliance Assurance Monitoring" (40 CFR Part 64) [not applicable]

Applicability: The compliance assurance monitoring (CAM) rule requires owners and operators to conduct monitoring to provide a reasonable assurance of compliance with applicable requirements under the act. Per 02D .0614(a), this rule potentially applies to any facility required to obtain a permit under 02Q .0500 (*i.e.*, a Title V permit). Monitoring focuses on emissions units that rely on pollution control device equipment to achieve compliance with applicable standards. An emission unit is subject to CAM, under 40 CFR Part 64, if all of the following three conditions are met:

I. The unit is subject to any (non-exempt, e.g., pre-November 15, 1990, Section 111 or 112 standard) emission limitation or standard for the applicable regulated pollutant.
II. The unit uses any control device to achieve compliance with any such emission limitation or standard.
III. The unit's pre-control potential emission rate exceeds 100 percent of the amount required for a source to be classified as a major source, i.e., either 100 tpy (for criteria pollutants) or 10 tpy of any individual/25 tpy of any combination of HAP.

This facility is required to obtain a permit under 02Q .0500.[1] Therefore, CAM applicability must be examined for any emission source with a control device. CAM applicability for each control device at this facility is examined in the table below.

Control Device	Associated Emission Sources	Applicable Emission Limits	Triggers CAM?	Notes
Flare (ID No. G-1955), Controlling VOC and HAP	Polyester polyol production, Wastewater distillation	10 megagrams of benzene in facility waste per year (NESHAP Subpart FF)	No	1
		Limit organic HAP per §63.982(b) (MACT Subpart VVVVVV)	No	2
		VOC less than major source threshold (15A NCAC 02Q .0315)	No	3
		HAP less than major source threshold (15A NCAC 02Q .0317)	No	3
Scrubber tank (ID No. S-7001-4), Controlling VOC and HAP	Material storage	10 megagrams of benzene in facility waste per year (NESHAP Subpart FF)	No	1
		Limit organic HAP per §63.982(b) (MACT Subpart VVVVVV)	No	2
		VOC and HAP less than major source threshold (15A NCAC 02Q .0315)	No	3
		VOC less than major source threshold (15A NCAC 02Q .0317)	No	3
Bagfilter (ID No. S-7906-12), Controlling PM	Silo	PM emission limit based on throughput (15A NCAC 02D .0515)	No	4
		PM less than major source threshold (15A NCAC 02Q .0315)		
		PM less than major source threshold (15A NCAC 02Q .0317)		

Notes:

1: This emission limit applies to the entire facility, but the control devices used at this facility do not control benzene in the facility's waste. Therefore, no control device can trigger CAM for benzene emissions per Condition II above.

2: This is an emission limit proposed by EPA after November 15, 1990 and pursuant to Section 112 of the federal Clean Air Act. Therefore, this limit is exempt from CAM applicability per 15A NCAC 02D .0614(b)(1)(A) and Condition I above.

3: This limit is an emission cap approved pursuant to the rules of Subchapter 02Q. Therefore, this limit is exempt from CAM applicability per 15A NCAC 02D .0614(b)(1)(E) and Condition I above.

4: Based on the T54 permit revision (issued November 13, 2018), the silo has a pre-control emission factor of 0.7 pounds of PM per 1,000 pounds of material loaded, and the silo has a maximum annual loading of 14,163 tons per year. Therefore, potential pre-control PM emissions from the silo can be calculated:

$$\left(\frac{0.7\ \text{lb}_{\text{PM}}}{1{,}000\ \text{lb}_{\text{loaded}}}\right) \times \left(\frac{2{,}000\ \text{lb}_{\text{loaded}}}{1\ \text{ton}_{\text{loaded}}}\right) \times \left(\frac{14{,}163\ \text{ton}_{\text{loaded}}}{1\ \text{year}}\right) \times \left(\frac{1\ \text{ton}_{\text{PM}}}{2{,}000\ \text{lb}_{\text{PM}}}\right) = \mathbf{9.91\ tpy}$$

[1] Although this facility is not a major source under the definition of "major source" in 40 CFR 70.2, it is still required to hold a permit under Part 70 per 40 CFR 63.11494(e), and therefore, Stepan is required to obtain a permit under 02Q .0500.

The major source threshold for PM is 100 tpy. Therefore, the silo does not have pre-control potential emissions greater than the major source threshold, and CAM is not triggered per Condition III above.

Based on the above analysis, CAM does not apply to any control device at this facility. Note that the existing permit includes a "permit shield" for CAM, as allowed by 15A NCAC 02Q .0512.

Updates to the existing permit: The basis for that permit shield is incorrect and will be corrected in the new permit. See Section 6.16 for a discussion of the permit shield. This correction will not affect the facility's CAM applicability.

6.9 15A NCAC 02D .1110 "National Emission Standards for Hazardous Air Pollutants" (NESHAP; 40 CFR Part 61)

This rule incorporates the NESHAP rules under 40 CFR Part 61 into North Carolina's SIP. The only NESHAP that applies to this facility is Subpart FF

6.9.1 NESHAP Subpart FF "National Emission Standard for Benzene Waste Operations"

Applicability: This rule applies to chemical manufacturing plants that include facilities to treat, store, or dispose of hazardous waste. The wastewater processes at this facility are subject to this rule.

Emission standards: The requirements of this rule are based on the annual amount of benzene in the facility's waste. For facilities at which the total annual benzene quantity in the facility waste is less than 10 megagrams per year, the facility must determine the annual benzene quantity in the waste to show it is less than 10 megagrams per year.

Monitoring and Recordkeeping: Stepan must calculate the annual benzene quantity for the previous year by January 30 of each year. Stepan must keep records of the calculation and measurement methods.

Reporting: Stepan must submit an annual report of the benzene quantity. In addition, Stepan must submit a report if there is a process change that could increase the benzene quantity.

Compliance: Based on the most recent inspection report, Stepan appeared to be in compliance with this rule. Continued compliance will be determined with subsequent inspections and reports.

6.10 15A NCAC 02D .1111 "Maximum Achievable Control Technology" (MACT; 40 CFR Part 63)

This rule incorporates the MACT rules under 40 CFR Part 63 into North Carolina's SIP. The MACT rules apply to facilities based on if a facility a major source or area source of hazardous air pollutants (as defined in 40 CFR 63.2). For the purposes of MACT applicability, this facility is an area source of HAP. Rules that apply exclusively to major sources (*e.g.,* Subpart FFFF or DDDDD) therefore do not apply to this facility.

Note that this facility was previously a major source of HAP. As part of the T55 permit revision (issued April 4, 2022), Stepan accepted a facility-wide limit on HAP emissions, thereby becoming an area source of HAP. This limit is included in the permit under 15A NCAC 02Q .0315 "Synthetic Minor Facilities."

6.10.1 MACT Subparts F and H "Synthetic Organic Chemical Manufacturing Industry" (SOCMI) and Subpart FFFF "Miscellaneous Organic Chemical Manufacturing" [not applicable]

Applicability: These rules apply to chemical factories that produce specific organic chemicals and are major sources of HAP. Stepan has previously been subject to these rules because it was a major source of HAP and produced at least one chemical subject to the rule.

However, as discussed in the T55 permit revision, this facility has been reclassified as an area source of HAP. Because the facility is now an area source of HAP, and EPA's former policy of "once in, always in" (OIAI) no longer applies[2], these subparts no longer apply to the facility.

6.10.2 MACT Subpart ZZZZ "National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines"

Applicability: This rule applies to all stationary reciprocating internal combustion engines (RICE). Each generator and fire pump at this facility is subject to this rule. The requirements of this rule differ based on several aspects of the individual engines. For the purposes of this rule:

- EG125 and EG20 are new, compression ignition, emergency-use engines located at an area source of HAP.
- FP-1500-E, F, G, and H are existing, compression ignition, emergency-use engines located at an area source of HAP.

Requirements: For engines that are subject to a rule under NSPS (*i.e.,* "new" under this rule), the MACT only requires that those engines comply with the relevant NSPS. EG125 and EG20 are subject to NSPS Subpart IIII, and therefore must only comply with that rule.

For existing emergency-use engines, this rule requires:

- Perform regular maintenance (oil change, belts, hoses, etc.)
- Good work practices (minimize idle periods, startups and shutdowns)
- Operate only for emergencies or testing
- Use ultra-low sulfur diesel

Monitoring and Recordkeeping: Stepan must keep records of engine inspection and maintenance, diesel sulfur content, and engine certification.

Reporting: Stepan must submit a semiannual summary report.

Updates to the existing permit: The existing permit condition has been updated to reflect regulatory updates.

Compliance: Based on the most recent inspection report, Stepan appears to be in compliance with this rule. Continued compliance will be determined with subsequent inspections and reports.

[2] See the EPA memorandum "*Potential to Emit for MACT Standards - Guidance of Timing Issues*" (issued May 16, 1995) for the origin of the OIAI policy. See the regulatory update "*Reclassification of Major Sources as Area Sources Under Section 112 of the Clean Air Act*" (85 FR 73854) for the codified end of the OIAI policy.

6.10.3 MACT Subpart JJJJJJ "National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources" [not applicable]

Applicability: This rule applies to boilers located at area sources of HAP. Stepan has accepted an operating limit in order to avoid applicability of this rule. Therefore, this rule does not apply to this facility.

Note that Subpart JJJJJJ defines a "boiler" as a unit "…in which water is heated to recover thermal energy…" (see 40 CFR 63.11237). The heater (ID No. B7600) does not use water as a heat transfer medium, and is therefore not a boiler under this rule. This definition of boiler is different than the one used in NSPS Subpart Dc.

6.10.4 MACT Subpart VVVVVV "National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources"

Applicability: This rule applies to facilities that operate a chemical manufacturing process unit (CMPU) at an area source of HAP. The rule defines a CMPU based on the materials used in or made by the CMPU. The chemical manufacturing processes at Stepan are subject to this rule. Note that, per 40 CFR 63.11494(e), a facility subject to this rule must obtain a permit under 40 CFR Part 70 (*i.e.,* a Title V permit) regardless of potential or actual emissions from the facility.

Emission limits, Monitoring, Recordkeeping, and Reporting: DAQ initially evaluated this facility with respect to Subpart VVVVVV with the T55 permit revision (issued April 4, 2022). See Appendix 1 for DAQ's review of Stepan's requirements under this rule.

Updates to the Existing Permit: Condition 2.1 I.2.u of the existing permit requires the facility to complete a compliance assessment on the flare (ID No. G-1955), except as allowed by 40 CFR 63.997(b). On February 2, 2022, Stepan sent a letter to DAQ requesting a waiver from the compliance assessment as allowed by 40 CFR 63.997(b). DAQ granted the waiver on August 11, 2022.[3] The renewed permit will be updated to reflect that the compliance assessment requirement has been waived.

Compliance: DAQ has not performed a compliance inspection of this facility since the T55 permit revision was issued. Compliance with this rule will be determined during the next inspection.

6.11 15A NCAC 02D .1424 "Large Non-Electric Generating Units" and 15A NCAC 02D .1425 "NOx SIP Call Budget" [not applicable]

Applicability: These rules apply to large non-electric generating units (large non-EGUs) as defined by 02D .1402. According to that definition, a large non-EGU has a heat input capacity of at least 250 million Btu per hour. Each of the boilers at this facility has a heat input capacity less than that amount, so this rule does not apply to this facility.

6.12 15A NCAC 02D .1806 "Control and Prohibition of Odorous Emissions" [state-enforceable only]

Applicability: This rule applies to facilities that emit, or could emit, odorous emissions. This rule is state-enforceable only.

[3] See letter from Stephen Hall (Chief, Technical Services Section, DAQ) to Phillip Cline (Site Manager, Stepan) "*Approval of Waiver of Initial Flare Compliance Assessment*," August 11, 2022.

Requirements: If a facility causes or contributes to odor complaints outside of the facility's boundary, DAQ can require that facility to implement odor controls. At this time, DAQ has not required Stepan to implement controls specifically for odors.

Compliance: There have not been any substantiated odor complaints for this facility. Continued compliance will be evaluated during subsequent inspections and odor complaint investigations (if applicable).

6.13 15A NCAC 02D .2100 "Risk Management Program" (a.k.a. §112(r); Section 112(r) of the Clean Air Act) [not applicable]

Applicability: This rule applies to facilities that store materials above their respective threshold quantities in 40 CFR 68.130. Such facilities are required to prepare and submit a Risk Management Plan (RMP). In the application on Form A3, Stepan indicated that an RMP is not required for this facility because no such materials are stored in quantities above their thresholds. Because no RMP is required, this rule does not apply. Note that other portions of §112(r), such as the General Duty Clause, may still apply to this facility; but those requirements are outside the purview of the Title V permit.

6.14 15A NCAC 02Q .0315 "Synthetic Minor Facilities"

Applicability: This rule allows a facility to implement emission limits in order to avoid being designated a major source, defined by 40 CFR 70.2 (*i.e.*, a Title V facility). In order to avoid being designated a major source, Stepan has accepted facility-wide emission limits on CO, NOx, SO_2, VOC, and total/combined HAP. These facility-wide limits were first included in the Title V permit as part of the T55 permit revision (issued April 4, 2022).

Note that, regardless of compliance with 02Q .0315, Stepan is required to obtain a Title V permit under MACT Subpart VVVVVV (see 40 CFR 63.11494(e)).

Emission limits: The major source threshold for CO, NOx, SO_2, and VOC is less than 100 tpy, each. The major source threshold for total HAP is less than 25 tpy, and for individual HAP is less than 10 tpy.

Monitoring and Recordkeeping: Stepan must calculate the facility-wide HAP emissions on a monthly basis in order to show compliance with the HAP limits. DAQ has determined that the monitoring and recordkeeping required by PSD avoidance is sufficient to comply with criteria pollutant emission limits, and the monitoring and recordkeeping required by MACT Subpart VVVVVV is sufficient to demonstrate compliance with the HAP limits.

Reporting: Stepan must submit a semiannual summary report of the HAP emissions.

Compliance: Based on the most recent inspection report, Stepan appeared to be in compliance with this rule. Continued compliance will be determined with subsequent inspections and reports.

6.15 15A NCAC 02Q .0317 "Avoidance Conditions"

This rule allows a facility to accept an enforceable limit in order to avoid the applicability of another rule. Stepan has accepted limits in order to avoid the applicability of 15A NCAC 02D .0530 (PSD) and 40 CFR Part 63, Subpart JJJJJJ.

6.15.1 Avoidance of 15A NCAC 02D .0530 (PSD Avoidance)

Applicability: A facility is a major source for PSD if it has emissions of a regulated NSR pollutant (defined in 40 CFR 51.166(b)(49)) greater than the major source threshold. For facilities included in 40 CFR 51.166(b)(1)(i)(*a*), the threshold is 100 tpy. Stepan is a chemical process plant, which is included in the above list, therefore the major source threshold is 100 tpy.

Stepan has accepted facility-wide emission limits on NOx, CO, SO_2, and VOC, and therefore has avoided being designated a major source for PSD. Note that HAP is not a regulated NSR pollutant, and is therefore not covered under PSD avoidance.

Monitoring and Recordkeeping: Stepan must keep records of the total amount of natural gas, propane, and fuel oil used throughout the facility. Stepan must keep records of raw material usage and total polyester polyols produced. Stepan must calculate the facility-wide emissions of NOx, CO, SO_2, and VOC on a monthly basis to demonstrate compliance with the emission limits. Stepan must also comply with the monitoring for the flare (ID No. G-1955) required under MACT Subpart VVVVVV.

Reporting: Stepan must submit a semiannual summary report of the monitoring and recordkeeping.

Compliance: Stepan appears to be in compliance with this rule based on the most recent inspection report. Continued compliance will be determined with subsequent inspections and reports.

6.15.2 Avoidance of 15A NCAC 02D .1111 (MACT Avoidance, 40 CFR Part 63, Subpart JJJJJJ)[4]

Applicability: 40 CFR Part 63, Subpart JJJJJJ applies to certain types of boilers located at area sources of HAP. However, that rule also specifically states that a "gas-fired boiler" is not subject to this rule (see 40 CFR 63.11195(e)). The rule also allows a "gas-fired boiler" to burn liquid fuel "during periods of gas curtailment, gas supply interruption, startups, or for periodic testing, maintenance, or operator training on liquid fuel" (see 40 CFR 63.11237). Stepan has agreed to only fire liquid fuel during the periods listed in the definition of gas-fired boiler. Therefore, each boiler at this facility is a gas-fired boiler, and 40 CFR Part 63, Subpart JJJJJJ does not apply.

Note that the heater (ID No. B7600) is not a boiler under this rule, and therefore is not subject to this avoidance condition (see Section 6.10.3 for details).

Monitoring and Recordkeeping: Stepan must keep records of the use of liquid fuels in the boilers. The records must show that liquid fuels were only fired under circumstances allowed by the definition of gas-fired boilers.

Reporting: Stepan must submit a semiannual summary report.

Updates to the existing permit: This avoidance condition has been rewritten to match DAQ's standard approach to avoidance of Subpart JJJJJJ. In the existing permit, the facility was (in theory) allowed to exceed the thresholds for a gas-fired boiler and then apply for a new permit. Under the new permit, Stepan must apply for a permit before exceeding those thresholds.

[4] Note that other rules under 40 CFR Part 63 apply to this facility. Therefore, this facility is still subject to 15A NCAC 02D .1111.

Compliance: Stepan appears to be in compliance with this rule based on the most recent inspection report. Continued compliance will be determined with subsequent inspections and reports.

6.16 15A NCAC 02Q .0512 "Permit Shield and Application Shield"

Applicability: A permit may include, if deemed necessary, a statement that specific rules are not applicable to a facility (a "permit shield"). The existing permit includes a permit shield for 15A NCAC 02D .0614 "Compliance Assurance Monitoring" because that rule only applies to major sources as defined in 40 CFR 70.2. Stepan has accepted a facility-wide limit to avoid being designated as a major source, and therefore that rule does not apply. As discussed below, the basis for this permit shield is incorrect and will be corrected.

Updates to the existing permit: Stepan has accepted a facility-wide emission limit in order to comply with 15A NCAC 02Q .0315 "Synthetic Minor Facilities." As a result, this facility is not a major source per the definition of "major source" at 40 CFR 70.2. In 40 CFR 64.2(a), the CAM rule specifies that CAM only applies to an "emissions unit at a major source that is required to obtain a part 70…permit" (40 CFR 64.2(a), emphasis added). Therefore, the existing permit includes a permit shield for CAM, with the basis being that Stepan is not a major source under Part 70.

However, in NC's rule that incorporates the CAM rule into NC's SIP, CAM applicability is different. In 02D .0614(a), CAM applies to an "emissions unit at a facility required to obtain a permit pursuant to 15A NCAC 02Q .0500" (02D .0614(a), emphasis added). Note that this definition does not require a facility to be a major source, only that the facility be subject to 02Q .0500.

Stepan is required to obtain a permit pursuant to 15A NCAC 02Q .0500 because Stepan is required to obtain a Part 70 permit (regardless of major source status) under MACT Subpart VVVVVV (see 40 CFR 63.11494(e)). Therefore, there cannot be a simple blanket exemption from 02D .0614. Instead, a full CAM applicability analysis is required.

Based on the CAM applicability analysis in Section 6.8, above, CAM will not apply to this facility. Therefore, the only change needed to the existing permit is to change the basis of the permit shield:

2.3 Permit Shield for Non-Applicable Requirements

~~A. 15A NCAC 02D .0614 "Compliance Assurance Monitoring" is not applicable, because the facility is not a "major source" for Title V purposes.~~

A. As of the issuance of permit revision T57, 15A NCAC 02D .0614 "Compliance Assurance Monitoring" is not applicable to this facility because each emission source controlled by the flare (**ID No. G-1955)** and scrubber tank **(ID No. S-7001-4)** is exempt from CAM applicability based on one of the exemptions in 15A NCAC 02D .0614(b)(1), and the raw material silo **(ID No. T-7906)** does not have potential emissions greater than the major source threshold and so does not meet the applicability test in 15A NCAC 02D .0614(a)(3).

Monitoring, Recordkeeping, Reporting, and Compliance: There are no specific requirements associated with a permit shield.

6.17 15A NCAC 02Q .0711 "Emission Rates Requiring a Permit" [state-enforceable only]

Applicability: This rule limits the emission rates of toxic air pollutants (TAP) from facilities. When making a modification, a facility must demonstrate that the emission rates of all TAPs listed in 02Q .0711 are below

their respective TAP permitting emission rates (TPER). TAP emissions from sources listed in 02Q .0702(a)(1)-(27) are not considered when determining compliance with the TPERs. If a facility exceeds a TPER, that facility must demonstrate compliance with the acceptable ambient levels (AAL) in 02D .1104. The existing permit includes a list of TAPs that have been evaluated in the past.

Note that 02Q .0702(a)(27)(A) and (B) specifically exempt sources subject to rules under 40 CFR Part 61 and Part 63; most of this facility is subject to one of the rules.

Monitoring and Recordkeeping: Stepan must keep records demonstrating that the listed TPERs have not been exceeded.

Reporting: There are no specific reporting requirements associated with this rule. However, Stepan must submit a permit application before exceeding any of the listed TPERs.

Compliance: Based on the most recent inspection report, Stepan appears to be in compliance with this rule. Continued compliance will be determined during subsequent inspections.

6.18 Disclosure of Information Relating to Emissions of Fluorinated Chemicals [state-enforceable only]

The North Carolina Department of Environmental Quality (DEQ, parent agency of DAQ) is working aggressively to address the impacts of polyfluoroalkyl substances (PFAS) in North Carolina. North Carolina has been a national leader on PFAS since 2017 when the public became aware that PFAS had been discovered in the Cape Fear River.

Steps have been taken at the state and Federal level to improve understanding of the scope of PFAS contamination, the health impacts, and to determine ways to prevent future contamination and protect human health. To that end, DEQ published the Action Strategy for PFAS in June 2022 that outlines the agency's current and planned work to determine the extent of existing PFAS contamination, protect North Carolina residents and drinking water supplies and prevent future contamination.

Based on the results of water sampling in the area of Stepan, DAQ presented Stepan a list of screening questions to access the planned use of PFAS in the production processes and potential emissions. The list of questions, and Stepan's responses, are included in Appendix 2.

Based on Stepan's responses, DAQ concludes that Stepan should continue to disclose the presence of PFAS-containing materials at the facility within 30 days of becoming aware of that the materials are in-use at the facility. The following specific condition will be added to the permit:

2.2 A.5:

State-enforceable only

5. DISCLOSURE OF INFORMATION RELATING TO EMISSIONS OF FLUORINATED CHEMICALS

The Permittee shall have an ongoing duty to disclose the presence of materials containing fluorinated chemicals at the facility that have the potential to result in the emission of fluorinated chemicals to the environment. Such disclosures shall be in writing and submitted to the Regional Supervisor, DAQ within thirty days of the Permittee becoming aware of such information, unless such information has already been disclosed to DAQ by the Permittee. The disclosure shall describe the identity, quantity, and use of such material to the extent known. DAQ may require the permittee to conduct analysis or testing of fluorinated chemical emissions as necessary to properly evaluate emissions sources at the facility. As used in this condition, the term "fluorinated chemicals" includes but is not limited to per- and polyfluoroalkyl substances (PFAS). [15A NCAC 02Q. 0308(a); 15A NCAC 02Q.0309(b)]

Compliance with this condition will be determined during subsequent inspections.

7.0 Compliance Status and Other Regulatory Concerns

Compliance status: This facility was most recently inspected on February 23, 2022 by Ashby Armistead. Stepan appeared to be in compliance with the existing permit during that inspection.

Compliance history: Stepan was issued an "informal" Notice of Violation on March 1, 2022 based on Stepan's semiannual compliance report, which stated that an oxygen sample line for a VOC header was venting to the atmosphere, which was a violation of MACT Subpart H. DAQ did not take any enforcement action, and DAQ considers the matter resolved as of March 10, 2022. Note that, as of the issuance of the T56 permit revision, MACT Subpart H no longer applies to this facility.

No other compliance issues have been noted with Stepan since the previous Title V permit renewal.

Application fee: Title V permit renewals do not require an application fee.

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 02Q .0103. A PE Seal was not required for this Title V permit renewal.

Zoning: A Zoning Consistency Determination per 15A NCAC 02Q .0304(b) was not required for this Title V permit renewal.

8.0 Facility Emissions Review

Summary: The table on the first page of this permit review presents the criteria pollutant (plus total HAP) from the latest available approved facility emissions inventory (2021). Based on the data available, Stepan is in compliance with the facility-wide annual emission limits in the Title V permit.

Title V: Stepan is not classified as a major source for Title V because the facility has accepted a facility-wide emission limit of 100 tpy for each Title V pollutant and 10/25 tpy for individual/total HAP. Note that

Stepan is still required to hold a Title V permit as part of MACT Subpart VVVVVV. This permit renewal will not affect Stepan's status as a non-major source for Title V.

HAP: Stepan is classified as an area source of HAP (i.e., not a major source) because the facility has accepted a facility-wide limit on HAP emissions to less than the thresholds in 40 CFR 63.2 (i.e., less than 10/25 tpy of individual/total HAP). This permit renewal will not affect Stepan's status as an area source of HAP.

PSD: Stepan is classified as a minor source for PSD because the facility has accepted a facility-wide limit on emissions of regulated NSR pollutants to less than the threshold in 40 CFR 51.166(b)(1). Because this facility is a chemical manufacturer (which is one of the named source categories), the threshold is 100 tpy. This renewal will not affect Stepan's status as a minor source for PSD.

9.0 Draft Permit Review Summary

Initial draft: An initial draft of the Title V permit and this application review were sent to DAQ Permits staff (Booker Pullen, Rahul Thaker) on January 10, 2023. Comments were received on April 5, 2023. The comments pointed out typos in the permit and application review.

Subsequent draft: A revised draft of the Title V permit and this application review were sent to DAQ WRO staff (Ashby Armistead, Dean Carroll), DAQ SSCB staff (Samir Parekh), and Stepan staff (Charity Coury) on April 12, 2023.

- Stepan staff noted a typo in the draft permit, but had no other comments (by email on April 21, 2023).
- DAQ WRO staff noted a typo in the draft permit, but had no other comments (by email on May 12, 2023).
- DAQ SSCB staff had no comments.

10.0 Public Notice and EPA 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 .0518(b), the EPA will have a 45-day review period. Based on an agreement between DAQ and EPA, this period will generally coincide with the 30-day public notice 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 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 above. DAQ voluntarily provides notice to each bordering State (Virginia, Tennessee, Georgia, and South Carolina).

- The Public Notice and EPA Review periods began on XXXX
- The Public Notice period ended on XXXX
- The EPA Review period ended on XXXX

11.0 Recommendations

This permit application has been reviewed by NC DAQ to determine compliance with all procedures and requirements. NC DAQ has determined that this facility appears to be complying with all applicable requirements.

This permit engineer recommends issuance of Permit No. 00164T57. WRO and Stepan staff have received a draft copy of this permit and all submitted comments that were incorporated as described in Section 9.0.

Appendix 1: Facility requirements under 40 CFR Part 63, Subpart VVVVVV

(The following is taken from DAQ's review of the T56 permit revision, issued April 4, 2022)

Consistent with §63.11496(h), for each surge control vessel and bottoms receiver that meets the applicability criteria for storage tanks specified in Table 5 to this Subpart, the Permittee shall meet the emission limits and control requirements specified in Table 5 to this Subpart.

As per the Permittee, the facility does not have a tank that collects bottoms from either distillation operation. Even if Stepan does collect, the bottoms from any distillation operation, those would not contain more than a few ppm of HAP. The HAP (mainly 1,4 dioxane) comes off the top of the first distillation column and goes directly into the tank truck for shipment with no storage in between. In addition, the facility does not have any surge control vessels as defined in this regulation.

In accordance with §63.11496(i), references to SSM provisions in Subparts that are referenced in paragraphs (a) through (h) of §63.11496 or Tables 2 through 5 to this Subpart do not apply.

§63.11497 - Standards and Compliance Requirements for Storage Tanks

The emission limits and other requirements in Table 5 to this Subpart and in paragraph (b) of this Section for organic HAP emissions apply if the storage tank meets the applicability criteria in Table 5 to this Subpart.

Each of the permitted tanks is listed in Table 5-3 below:

Table 5-3 Storage Tanks

Unit ID	Description	Design Capacity	Vent Configuration	Proposed Applicable Regulation(s)
CMPU Emission Sources				
R7100A-D and associated equipment	Polyester polyols reactors, reflux columns and cooling tanks	60,000 metric tonnes throughput	Flare	GACT 6V Continuous Process Vent, Table 3.1.b.
T-7102	Molten Feed Tank	8,000 gal	Flare	GACT 6V Continuous Process Vent, Table 3.1.b.
T-7002-A,B,C	Raw Material Fixed-Roof Storage Tanks	30,292 gal (MTVP of Total Organic HAP < 0.02psi [0.14kPa])	ATM or ATM via S-7001-4 (scrubber)	GACT 6V Storage Tank; No Table 1 HAP
T-7001	Raw Material Fixed-Roof Storage Tank	30,000 gal (MTVP of Total Organic HAP <0.39 psi [0.14kPa])	ATM or ATM via S-7001-4 (scrubber)	GACT 6V Storage Tank; No Table 1 HAP
T-7003	Fixed Roof Storage Tank	32,000 gal (MTVP of Total Organic HAP <0.39 psi [0.14kPa])	ATM	GACT 6V Storage Tank; No Table 1 HAP
T-1939AR	Polyester Polyols Process Water Tank	100,000 gal (MTVP of Total Organic HAP <0.02 psi [0.14kPa])	ATM	GACT 6V Storage Tank
T-6101-6	Polyester Polyols Process Water Tank	22,000 gal (MTVP of Total Organic HAP <0.02 psi [0.14kPa])	ATM	GACT 6V Storage Tank

Unit ID	Description	Design Capacity	Vent Configuration	Proposed Applicable Regulation(s)
A-7230 T-7230-7	Process Water Distillation Column and Reflux Tank	2,600 gal	Flare	GACT 6V Continuous Process Vent, Table 3.1.b.
A-6105 T-6105-5	Process Water Distillation Column and Reflux Tank	1,175 gal	Flare	GACT 6V Continuous Process Vent, Table 3.1.b.
T-6516B	Recycle Tank	20,000 gal	ATM	Contains HAP only as impurities; not a GACT 6V Storage Tank
T-6109R	Raw Material Tank	20,000 gal (no HAP)	None	GACT 6V Storage Tank; No Table 1 HAP
Wastewater Truck Loading	Distilled Reactor Overheads Wastewater Truck Loading	325 gpm	Flare	GACT 6V Wastewater System (Table 6.1.)
T-1922C and T-1922D	Two wastewater equalization open top tanks	2,000,000 gal each	Open top	GACT 6V Wastewater System (Table 6.1.)
T-1941	#2 Aeration Basin	-	Open top	GACT 6V Wastewater System (Table 6.1.)
Control Device/Utilities				
G-1955	Polyester Polyols Flare	20 million Btu/hr	N/A	GACT 6V Control Device §63.982(b)
ICT-1	Polyester Polyols Cooling Tower	3,750 gpm	ATM	GACT 6V Exempt Heat Exchange System §63.11499

The table above details the storage capacity and the maximum true vapor pressure (MTVP) of its contents. Storage tank control device requirements in Subpart 6V are only applicable for storage tanks with at least 20,000 gallons design capacity that are storing Subpart 6V Table 1 HAPs with total organic HAP MTVPs at least 5.2 kPa. There are only two tanks at the facility over 20,000 gallons that store a mixture containing acetaldehyde (Table 1 HAP). Those are T-1939AR and T-6101-6, both of which store the same process water stream with a MTVP of organic HAP of approximately 0.14 kPa, which is much less than the lowest vapor pressure threshold for control, 5.2kPa. Therefore, no storage tank at the facility requires any add-on control devices. In summary, none of the storage tanks is required to comply with the standards and compliance requirements in §63.11497.

§63.11498 - Standards and Compliance Requirements for Wastewater Streams

In accordance with §63.11498(a), the Permittee must comply with the requirements therein and in Table 6, Item 1 to this Subpart for all wastewater streams from a CMPU subject to this Subpart.

If the partially soluble HAP concentration in a wastewater stream is equal to or greater than 10,000 parts per million by weight (ppmw) and the wastewater stream contains a separate organic phase, then the requirements in Table 6, Item 2 to this Subpart also apply for that wastewater stream. Partially soluble HAP are listed in Table 7 to this Subpart.

In all cases, except where the wastewater stream is hard piped to a combustion unit or hazardous waste treatment unit, as specified in Table 6, Item 2.b to this Subpart, the owner/operator is required to determine the total concentration of partially soluble HAP in each wastewater stream using process knowledge, engineering assessment, or test data. The Permittee must reevaluate the concentration of partially soluble HAP if he/she makes any process or operational change that affects the concentration of partially soluble HAP in a wastewater stream.

The facility generates wastewater in the CMPU. Process water is initially generated in the reactors, condensed, and stored in the fixed roof polyester polyols process water tanks T-1939AR and T-6101-6, prior to distillation in column A-7230 and then column A-6105. There are two wastewater streams that are discharged from the CMPU. One stream is the distillation column A-7230 overhead stream that contains concentrated impurities such as 1,4 dioxane which is sent directly to a tank truck for disposal as a hazardous waste. The other wastewater stream is the distillation column A-6105 overheads, contains low HAP concentrations, and is sent to the onsite wastewater treatment plant.

For the wastewater stream from the A-7230 overheads, the partially soluble HAP present are acetaldehyde, acrolein, and benzene. Numerous sampling activities have been conducted over the past two years for this stream. The maximum acetaldehyde concentration was found to be 2,010 ppmw, acrolein concentrations have been found only below detection levels, 25 ppmw, and the highest benzene concentration detected has been 22.5 ppmw. Using these maximum concentrations, the total partially soluble HAP concentration in this wastewater stream is 2,057.5 ppmw. It should be noted that 1,4 dioxane is not a partially soluble HAP listed in Table 7 of Subpart VVVVVV.

For the wastewater stream from the A-6105 overheads, the partially soluble HAP believed to be present are acetaldehyde, acrolein, and benzene. Numerous sampling activities have been conducted over the past two years for this stream. The maximum acetaldehyde concentration was found to be 7.07 ppmw, and acrolein and benzene concentrations have not been detected above minimum detection levels, the highest being 5 ppmw. Using these maximum concentrations, the total partially soluble HAP concentration in this wastewater stream is not over 17.07 ppmw.

Since the total partially soluble HAP concentration in both these streams is less than 10,000 ppmw, the stream must comply only with Table 6, Item 1 (and not Item 2), which requires discharge to onsite or offsite wastewater treatment or hazardous waste treatment and maintaining records identifying each wastewater stream and documenting the type of treatment that it receives. The A-7230 overheads stream is shipped offsite as hazardous waste and used for energy recovery while being combusted. The A-6105 stream is sent to the onsite waste treatment system which uses aerobic biodegradation for treatment.

References to SSM provisions in Subparts that are referenced in §63.11498(a) or Table 6 to this Subpart do not apply.

§63.11499 - Standards and Compliance Requirements for Heat Exchange Systems

Consistent with §63.11499(a), if the cooling water flow rate in a heat exchange system is equal to or greater than 8,000 gal/min and is not meeting one or more of the conditions in §63.104(a), then the Permittee must comply with one of the requirements specified in Table 8 to this Subpart.

As previously stated, the heat exchange system utilized in the CMPU meets the exemption condition in §63.104(a)(1) and is therefore exempt from the monitoring requirements in Table 8 of Subpart VVVVVV. Specifically, the heat exchange system for the CMPU is operated with the minimum pressure on the cooling

water side at least 35 kilopascals greater than the maximum pressure on the process side. In summary, §63.11499 does not apply to the CMPU.

§63.11501 - Notification, Recordkeeping, and Reporting Requirements

- According to §63.11501(a), the Permittee must meet the requirements of the General Provisions in 40 CFR Part 63, Subpart A, as shown in Table 9 to this Subpart. The General Provisions in other parts do not apply except when a requirement in an overlapping standard, which the Permittee determined is at least as stringent as Subpart VVVVVV and with which the Permittee has opted to comply, requires compliance with general provisions in another part.

- Per §63.11501(b), the facility must submit the Notification of compliance status (NOCS) required in §63.9(h), containing the information as below:

  - The certification signed by the RO certifying that the facility complies with the management practices in §63.11495, process vents requirements in §63.11496, surge control vessels, bottoms receivers and storage tanks requirements in §63.11497, wastewater streams requirements in §63.11498, and heat exchange systems requirements in §63.11499. The facility has complied with this requirement by submitting the NOCS as part of this application.

  - If the Permittee establishes an operating limit for a parameter that will not be monitored continuously in accordance with §§63.11496(g)(4) and 63.2450(k)(6), the Permittee is required to provide the information as specified in §§63.11496(g)(4) and 63.2450(k)(6). The Permittee only uses flare for compliance. Thus, this requirement does not apply.

  - A list of all transferred liquids that are reactive or resinous materials, as defined in §63.11502(b). The facility does not use any liquids which are reactive or resinous.

- Per §63.11501(c), the Permittee must maintain files of all information required by this Subpart for at least 5 years following the date of each occurrence according to the requirements in §63.10(b)(1). If the Permittee is subject, he/she must comply with the recordkeeping and reporting requirements of §63.10(b)(2)(iii) and (vi) through (xiv), and the applicable requirements specified in paragraphs (c)(1) through (8) of this Section, as below:

  - For each CMPU, the Permittee shall keep records of

    - Management practice inspections, repairs, and reasons for any delay of repair, as specified in §63.11495(a)(5).

    - Records identifying wastewater streams and the type of treatment they receive, as specified in Table 6 to this subpart.

    - Records of the date, time, and duration of each malfunction of operation of process equipment, control devices, recovery devices, or continuous monitoring systems used to comply with this subpart that causes a failure to meet a standard. The record must include a list of the affected sources or equipment, an estimate of the volume of each regulated pollutant emitted over the standard, and a description of the method used to estimate the emissions.

- Records of actions taken during periods of malfunction to minimize emissions in accordance with §63.11495(d), including corrective actions to restore malfunctioning process and air pollution control and monitoring equipment to its normal or usual manner of operation.

- For continuous process vents subject to Table 3 to this Subpart, when emissions are routed to a flare, the Permittee shall keep records of the flare compliance assessment, as specified in §63.998(a)(1)(i), keep records of the pilot flame monitoring, as specified in §63.998(a)(1)(ii) and (iii), and keep records of the closed-vent system, as specified in §63.998(d)(1).

- For continuous process vents subject to Table 3 to this Subpart, the Permittee must keep records of the occurrence and duration of each startup and shutdown of operation of process equipment, or of air pollution control and monitoring equipment.

- The Permittee shall submit a semiannual compliance report that contain the information specified in paragraphs (d)(1) through (7) of §63.11501, as applicable. Reports are required only for semiannual periods during which the Permittee experienced any of the events described in paragraphs (d)(1) through (8) of §63.11501.

  - The Permittee shall clearly identify any deviation from the requirements of this Subpart.

  - The Permittee must provide the following information for each delay of leak repair beyond 15 days for any process equipment, storage tank, surge control vessel, bottoms receiver, and each delay of leak repair beyond 45 days for any heat exchange system with a cooling water flow rate less than 8,000 gal/min: information on the date the leak was identified, the reason for the delay in repair, and the date the leak was repaired.

  - The Permittee must report each process change that affects a compliance determination and submit a new certification of compliance with the applicable requirements in accordance with the procedures specified in paragraph (b) of §63.11501.

  - If a malfunction occurred during the reporting period, the report must include the number of instances of malfunctions that caused emissions in excess of a standard. For each malfunction that caused emissions in excess of a standard, the report must include a list of the affected sources or equipment, an estimate of the volume of each regulated pollutant emitted over the standard, and a description of the method used to estimate the emissions. The report must also include a description of actions you took during a malfunction of an affected source to minimize emissions in accordance with §63.11495(d), including actions taken to correct a malfunction.

- According to §§63.997(b)(2) 63.999(a)(1)(iii), the Permittee has submitted on February 2, 2022 a waiver request for performance of the required, initial flare compliance assessment in §63.987(b)(1). The request includes information justification for such waiver including technical infeasibility, or the impracticality, of the flare compliance assessment. If approved by the DAQ, the Permittee is not required to conduct initial flare compliance assessment.

Appendix 2: PFAS Screening Questions and Applicant Response

On March 3, 2023, DAQ the following PFAS screening questions. Stepan responded by email on April 12, 2023 (Stepan's responses are underlined in red).

Addressing Emerging Contaminants Screening Questions

1. Will your facility use any material or products in your operations that contain fluorinated chemicals? If so, please identify such materials or products and the fluorinated chemicals they contain. There are no fluorinated chemicals used in the manufacturing process.

2. Will your facility formulate/create products or byproducts (directly or indirectly) containing fluorinated chemicals (across multiple media)? If so, please identify such products or byproducts and the fluorinated chemicals they contain. Our facility does not formulate/create products or byproducts (directly or indirectly) containing fluorinated chemicals.

3. Will your facility generate solid, liquid, or gaseous related emissions, discharges, or wastes/products containing fluorinated chemicals? If so, please identify such waste streams or materials and the fluorinated chemicals they contain. Incoming water used by the plant is from regional surface water and groundwater sources that contain PFAS. Water treatment prior to use as process water results in sludges that contain PFAS. PFAS in incoming water passes through the facility as water discharges at NPDES permitted outfalls. PFAS in these discharges are commensurate with incoming water. Please see the previously submitted analytical results for the fluorinated chemical identities.

4. Do your facility's processes or operations use equipment, material, or components that contain fluorinated chemicals (e.g., surface coating, clean room applications, solvents, lubricants, fittings, tubing, processing tools, packaging, facility infrastructure, air pollution control units)? Could these processes or operations directly or indirectly (e.g., through leaching, chemical process, heat treatment, pressurization, etc.) result in the release of fluorinated chemicals into the environment? Commercially available products are used to maintain and repair equipment (i.e., pipe dope, lubricants) that may contain a fluorinated chemical. Products are used per manufacturer specifications and any release to the environment is incidental and may be considered *de minimis*.

5. List the fluorinated chemicals identified (i.e., through testing or desktop review) above in your response under the appropriate methods/approaches? If one is not, are they on any other known US or International target lists?

- OTM-45 (air emissions)
- Methods 533 & 537.1 (drinking water)

EPA 537M BY ID EPA 537 MOD (please see previously submitted analytical results for these chemicals):

CAS	Name
375-22-4	Perfluorobutanoic acid
2706-90-3	Perfluoropentanoic acid
307-24-4	Perfluorohexanoic acid
375-85-9	Perfluoroheptanoic acid
335-67-1	Perfluorooctanoic acid
375-95-1	Perfluorononanoic acid
335-76-2	Perfluorodecanoic acid
2058-94-8	Perfluoroundecanoic acid
307-55-1	Perfluorododecanoic acid
72629-94-8	Perfluorotridecanoic acid
376-06-7	Perfluorotetradecanoic acid
375-73-5	Perfluorobutanesulfonic acid

2706-91-4 Perfluoropentanesulfonic acid
355-46-4 Perfluorohexanesulfonic acid
375-92-8 Perfluoroheptanesulfonic acid
1763-23-1 Perfluorooctanesulfonic acid
68259-12-1 Perfluorononanesulfonic acid
335-77-3 Perfluorodecanesulfonic acid
754-91-6 PFOSA
2355-31-9 MeFOSAA
2991-50-6 EtFOSAA

- SW-846: Method 8327 (water)
- Draft Method 1633 (water, solids, tissue)
- "Total PFAS" Draft Method 1621 for Adsorbable Organic Fluorine (wastewater)
- Non targeted analytical methods
- Qualitative approach through suspect screening

6. Are there other facilities or operations in the U.S. or internationally engaged in the same or similar activities involving fluorinated chemicals addressed in your response to the above questions? If so, please provide facility identification information? In addition, are there any ISO (International Organization for Standardization) certification requirements? No Stepan facilities use fluorinated chemicals in the manufacturing process, nor do they formulate/create products or byproducts containing fluorinated chemicals.

7. Do you plan to store AFFF on site, use it in fire training at the site, use it for fighting fires at the facility, or include it in a fire fighting system at the site? No AFFF is stored or used at the facility nor is AFFF use or storage planned.

8. Are other emerging contaminants (e.g., 1,4-dioxane, brome, perchlorate, 1,2,3-Trichloropropane) used in some capacity within your facility or operations? During our polyol reaction, 1,4 dioxane is coincidentally manufactured as a byproduct. The reactor overheads system collects the 1,4 dioxane vapors which are routed to the flare for destruction. The condensed 1,4 dioxane, water, and unused raw material mixture from the reactor overheads is processed at the facility, with the concentrated 1,4 dioxane ultimately sent off-site as hazardous waste. The emissions from this process are included in the Title V permit renewal application.

9. Do you need technical assistance to answer the above questions? No assistance is required.

In identifying any fluorinated chemicals or emerging contaminants in response to any of the above questions, please use CAS numbers (if available) and specify the relevant quantities of any such chemicals. If your answers to any of the above questions rely on assumptions or, if information necessary to respond to any of these questions is unavailable, please state. If any of the information requested is deemed a "trade secret" under N.C.G.S. § 66-152(3) and subject to confidential treatment under N.C.G.S. § 132-1.2(1) as required under the Public Record Act, please contact us to discuss proper designation of this information.