GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

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NARRATIVE

TO: Heather Brown

FROM: Susan Jenkins

DATE: August 24, 2017

Facility Name:	**Stepan Company**
AIRS No.:	013-00001
Location:	Winder, GA (Barrow County)
Application #:	24119
Date of Application:	December 28, 2016 and updated May 23, 2017

Background Information

Stepan Company ("Stepan") produces intermediates for laundry detergent manufacturing. The Stepan Winder facility produces these intermediates through batch and continuous reaction processes, each within a dedicated process vessel. The Winder facility's operations include four reactor vessels, three blenders, four batch neutralizers, two continuous sulfonation process lines, one re-blend tank, and numerous storage tanks. They operate under Air Quality Permit No. 2843-013-0001-S-01-0 issued February 12, 1998.

Purpose of Application

Stepan requested that they receive an updated synthetic minor (SM) permit with specific emission limits and operational restrictions to limit facility-wide sulfur dioxide (SO_2) and volatile organic compound (VOC) emissions below 100 tons per year, each. In addition, Stepan requested that the Division include facility-wide individual and total hazardous air pollutant (HAP) emissions limits of 10/25 tpy even though the facility-wide PTE of HAPs did not exceed 10/25 tpy. Stepan rescinded the request for a permit limit on HAPs as part of their updated permit application received by the Division on May 23, 2017. Stepan updated the application again as part of a submittal to the Division on August 23, 2017.

Stepan's application provided detailed emission calculations of VOC, nitrogen oxides (NOx), carbon monoxide (CO), particulate matter (PM, PM_{10}, $PM_{2.5}$) and applicable HAPs. Stepan's initial application lacked a proposed compliance plan regarding how the facility would calculate actual VOC emissions for each applicable process. The facility submitted an *Emission Calculation Protocol for VOC emissions* on May 23, 2017.

Updated Equipment List

The Division prepared Tables 1, 2, and 3 based on Application # 24119 and a review of Division air permit files.

Table 1: Equipment List-Process Units

Emission Units			Associated Control Devices	
Source Code	**Description**	**Installation Date**	**Source Code**	**Description**
Batch Reaction Processes And Associated Equipment				
R01	Alkoxylation process which includes a reactor (8,000 gallons), catch tanks and heat exchangers.	1990	SCR-3500	Scrubber (1998)
T-3300	31,780 gallon storage tank (typically holds propylene oxide), pressurized vessel Repeated under Storage Tanks.	1998	SCR-3500	Scrubber (1998)
T-3400	31,780 gallon storage tank (typically holds ethylene oxide), pressurized vessel Repeated under Storage Tanks.	1998	SCR-3500	Scrubber (1998)
UNLOAD	Railcar Unloading of EO/PO	--	SCR-3500	Scrubber (1998)
R02	Esterification process reactor (6,000 gallons) including process tanks and heat exchangers, and condenser(s)	1978	SCR-NAOHR02	Scrubber (1978)
R04	Intermediate esterification process reactor (8,000 gallons) including process tanks, condenser, and heat exchangers	2009	SCR-NAOHR02	Scrubber (1978)
R05	Process which includes a reactor (8,500 gallons), condenser and heat exchangers.	2001	SCR-NAOHR02	Scrubber (1978)
DMS	Railcar/Truck Dimethyl Sulfate Unloading	--	SCR-8126	DMS Storage Scrubber
T-126	25,000 gallon process tank (typically holds Dimethyl Sulfate), pressurized vessel	1992	SCR-8126	DMS Storage Scrubber
--	R05 Solids – Bag Dump Station	--	N/A	None
--	R05 Solids Conveying Cyclone to R05 Reactor	--	N/A	None
Continuous Process Lines				
R-1002	Sulfonation I Process Line – includes sulfur burner, sulfur dioxide and sulfur trioxide coolers, air dryers, converter, sulfonator (or reactor) , separators, process scrubbers and process mist eliminators.	1977	SCP-DRY1 SCP-DEM11 SCP-DEM12 SCP-NAOH1 SCP-TAIL1	Dry Scrubber (1977) Dry Scrubber Demister 1 (1977) Dry Scrubber Demister 2 (1977) Caustic Scrubber (1977) Tail Gas Demister (1977)

Table 1: Equipment List-Process Units				
Emission Units			**Associated Control Devices**	
Source Code	**Description**	**Installation Date**	**Source Code**	**Description**
R-420	Sulfonation II Process Line – includes sulfur burner, sulfur dioxide and sulfur trioxide coolers, air dryers, converter, sulfonator (or reactor), separators, process scrubbers and process mist eliminators Includes cyclone/acid-gas separator system which is the *recovery device* for purposes of 40 CFR 60 Subpart RRR	1992	SCP-DRY2 SCP-DEM21 SCP-DEM22 SCP-NAOH2 SCP-TAIL2	Dry Scrubber (1992) Scrubber Demister (1992) Scrubber Demister (1992) Caustic Scrubber (1992) Tail Gas Demister (1992)
Batch Neutralizers				
R-BN1	Reactor #1 (8,000 gallons)	1984	N/A	None
R-BN2	Reactor #2 (8,000 gallons)	1987	N/A	None
R-BN3	Reactor #3 (17,000 gallons)	1989	N/A	None
R-BN4	Reactor #4 (17,000 gallons)	1989	N/A	None
T-550	HVP Reblend Process Tank (7,400 gallons)	1994	N/A	None
Cooling Towers				
CT1	Oxide Cooling Tower	1992	N/A	None
CT2	Sulfonation II Process Line Cooling Tower	1992	N/A	None
Blenders				
R-BL1	Blender #1 (10,000 gallons) equipped with a venturi scrubber that operates as process equipment. Also included is a Silverson Mixer and Supersack Loader	1977	N/A	None
R-BL2	Blender #2 (10,000 gallons)	1977	N/A	None
R-BL3	Blender #3 (1,000 gallons)	1988	N/A	None

Note: Stepan proposed on May 23, 2017 that its volatile organic liquid (VOL) storage tanks be listed in groups for operational flexibility so that Stepan can easily change the contents of these tanks as the need arises. The Division reviewed Stepan's request. Table 2 contains the Equipment Group listing as proposed by Stepan.

Note: The vapor pressure thresholds used for Stepan's group of storage tanks correlate with the vapor pressure applicability threshold under 40 CFR 60 Subpart Kb for storage tanks less than 151 m^3 (39,890 gallons) in storage capacity [40 CFR 60.110b(b)]. The same grouping criteria are used even for tanks that are not subject to 40 CFR 60 Subpart Kb due to age or size.

Table 2: Equipment List – Process and Storage Vessels Listed in Order of Storage Volume and Equipment Group #

Equipment Group	Source Code	Capacity (gallons)	Contents	Control Device	Installation Date	Maximum True Vapor Pressure (psia)
--	T-077	10,000	Aqua Ammonium (19%) – Not a VOL	N/A	1978	6.9479
--	T-9035.2	8,000	Sodium Hydroxide (20%) – Not a VOL	N/A	2014	0.3391
Equipment Group 1 Storage Tanks defined as Tanks which contain VOL with a maximum true vapor pressure between 0.19 and 2.2 psia. Each of these storage tanks has a storage capacity less than 151 m^3 (39,890 gallons).						
1	T-029	10,000	Toximul 8242	N/A	1978	0.3496
1	T-030	10,000	Agent 1059-108	N/A	1978	0.4659
1	T-058	10,000	Toximul 8240	N/A	1979	0.3496
1	T-060	10,000	Toximul 8241	N/A	1979	0.2592
1	T-061	10,000	Toximul SE-470	N/A	1979	0.4659
1	T-073	10,000	Isopropyl Alcohol	N/A	1978	1.333
1	T-074	10,000	Ethanol SDA-40B	N/A	1978	1.7224
1	T-075	10,000	Isopropyl Alcohol	N/A	1978	1.3333
1	T-076	10,000	Ethanol	N/A	1978	1.7224
1	T-053	14,000	Agent 1509-83	N/A	1977	0.7998
1	T-082	25,000	Steol 25 S/60 Steol 25 3S/60	N/A	2010	0.7092
1	T-012	30,000	Agent 1411-80A	N/A	1989	0.3496
1	T-120	30,000	Ninate 401-A	N/A	1990	0.6476
1	T-121	30,000	Steol 25 S/60 Steol 25 3S/60	N/A	1990	0.8032
1	T-130	30,000	Steol CS-460	N/A	1995	0.8310
Equipment Group 2: Tanks which contain VOL with a maximum true vapor pressure equal to or greater than 2.2 psia but less than 4.0 psia.						
2	T-080	10,000	Methanol	N/A	1978	3.4825
2	T-136	10,000	Stepantex HS-90	N/A	2003	3.7619
2	T-137	22,500	Stepantex HS-90	N/A	2008	3.7619
2	T-122	30,000	Stepantex HS-90	N/A	1990	3.7619
2	T-124	30,000	Stepantex HS-90	N/A	1990	3.7619
Equipment Group 3: Tanks which contain VOL with a maximum true vapor pressure equal to or greater than 4.0 psia.						
3	T-3300	31,780	Propylene Oxide	SCR-3500, Scrubber	1998	10.99
3	T-3400	31,780	Ethylene Oxide	SCR-3500, Scrubber	1998	26.69

Table 3: Equipment List – Fuel Burning Sources				
Source Code	**Input Heat Capacity (MMBtu/hr)**	**Description**	**Installation Date**	**Construction Date**
E-001	16.7	400 hp Steam Generator Boiler #1 (Source Code #4) Natural gas fired only	1977	1977
E-002	16.7	400 hp Steam Generator Boiler #2 (Source Code #8) Natural gas fired only	1985	1985
E-005	9.9	Hot Oil Heater Natural gas fired only. Indirect fired Unit	2006	2006
GEN1	--	536.4 hp (or 400 kW) Standby emergency generator, firing diesel fuel	1996	1996
GEN2	--	469.35 hp (or 350 kW) Standby emergency generator, firing diesel fuel	2016	2016
FP1	--	215 hp Standby Fire Water Pump Engine, firing diesel fuel	1978	1978
FP2	--	215 hp Standby Fire Water Pump Engine, firing diesel fuel	1978	1978

Emissions Summary

The Table 4 emissions values are taken from facility submitted emission protocol. Emissions values of HAPs and GHG emissions are taken from Stepan's application.

Facility-Wide Emissions
(in tons per year)

Table 4: Facility-Wide Emissions		
Pollutant	**Potential Emissions**	
	Uncontrolled (tpy)	**Controlled (tpy)**
PM_f	14.86	14.86
PM_{10}	13.85	13.85
$PM_{2.5}$	11.99	11.99
NOx	30.36	30.36
SO_2	**614.1**	**18.56**
CO	18.56	18.56
VOC	**113.86**	**<100**
Max. Individual HAP	4.34	0.50
Total HAP	5.47	1.63

Hazardous air pollutant (HAP) emitted from Stepan-Winder are specified in Table 5. This data is taken from Stepan's application.

Table 5: Facility-Wide HAP Emissions		
HAP	**Potential Emissions (tpy)**	
	Uncontrolled	**Controlled**
Cumene	0.03	0.03
Dimethyl Sulfate	0.10	0.10
Ethylene Oxide	4.34	0.50
Methanol	0.29	0.29
Naphthalene	6.11E-03	6.11E-03
Propylene Oxide	0.26	0.26
Xylene	0.05	0.05
Totals	**5.47**	**1.63**

Regulatory Review

Sulfuric Acid Mist Emissions from the Continuous Process Lines

The Division limited sulfuric acid mist (H_2SO_4) emissions from Sulfonation I and II Process Lines as part of Stepan's 1998 Synthetic Minor (SM) Permit. The numerical values are 0.05 lb/hr (Sulfonation I Process Line) and 0.25 lb/hr (Sulfonator II Process Line). These numerical emission limits are carried over to Stepan's updated SM permit. The monitoring, recordkeeping, and reporting requirements associated with the SO_2 emission limits serve as surrogate requirements for providing a reasonable assurance of compliance with the H_2SO_4 emission limits.

Table 6 summarizes compliance testing on these continuous processes for purposes of H_2SO_4 emissions. The information in this table is provided for legacy purposes.

Table 6: Summary of Performance Testing on Sulfonation I Process Line		
Test Date	**Process Location of Test**	**Results**
December 1992 through February 1993	Caustic Scrubber outlet (Assume no VOC Control) Old Source Code: 1M Current Source Code: SCP-DRY1	Avg H_2SO_4 = 0.01 lb/hr, Limit is 0.05 lb/hr based on processing: Sulfur at 400 lb/hr, and Organic feed rate of 2,800 lbs/hr
February 14, 2000	Caustic Scrubber outlet (Assume no VOC Control Old Source Code: 1M Current Source Code: SCP-DRY1	Avg H_2SO_4 = 0.002 lb/hr, Limit is 0.05 lb/hr

Table 6: Summary of Performance Testing on Sulfonation II Process Line		
Test Date	**Process Location of Test**	**Results**
December 1992 through February 1993	Caustic Scrubber outlet (Assume no VOC Control) Old Source Code: 6M Current Source Code: SCP-DRY2	Avg H_2SO_4 = 0.007 lb/hr, Limit is 0.25 lb/hr based on processing: Sulfur at 1,300 lb/hr, and Organic feed rate of 10,00 lbs/hr
February 14, 2000	Caustic Scrubber outlet (Assume no VOC Control Old Source Code: 6M Current Source Code: SCP-DRY2	Avg H_2SO_4 = 0.004 lb/hr, Limit is 0.25 lb/hr

Avoidance of 40 CFR 70 for Facility-Wide SO_2 Emissions

The uncontrolled SO_2 PTE from the facility is approximately 613 tpy as specified in Table 4 of this narrative. Approximately 100% of the facility-wide SO_2 emissions are from the two continuous process plants referred to as Sulfonation I and II Process Lines. Negligible SO_2 emissions are generated from the diesel fired emergency generators and fire pump engines as long as Stepan only combusts diesel fuel with a maximum sulfur content of 0.0015 weight percent or less.

Table 7 summarizes the regulatory mechanisms for limiting facility-wide SO_2 emissions.

Table 7: Avoidance of 40 CFR 70 Limitations for Facility-Wide SO_2 Emissions	
Pollutant	**Regulatory Mechanism**
SO_2	Existing Permit limit for Sulfonation I Process Line of 1.0 lb/hr Existing Permit limit for Sulfonation II Process Line of 2.0 lb/hr New Restriction: Facility may only combust natural gas in its boilers, as proposed by Stepan. New Restriction: Facility may only combust diesel fuel in GEN1, GEN2, FP1, and FP2 that contains 0.0015 weight percent sulfur or less.

Table 8 summarizes the monitoring requirements imposed in the existing permit. These monitoring requirements serve to provide a reasonable assurance of compliance with the emission limits in Table 7. In addition, the operating ranges are specified by Stepan and they are not based on site-specific testing.

Table 8: Monitoring Requirements for Avoidance of 40 CFR Part 70 for SO_2 Emissions				
APCD Unit ID	**APCD Description**	**Pollutants Controlled**	**Monitoring Parameter**	**Frequency of Monitoring**
SCP-DRY1	Dry Packed Bed Scrubber	H_2SO_4 Mist	Pressure Drop	Continuously monitors and records the pressure drop. Not required by existing SM Permit. Reduce data to a daily block average.

Table 8: Monitoring Requirements for Avoidance of 40 CFR Part 70 for SO_2 Emissions				
APCD Unit ID	**APCD Description**	**Pollutants Controlled**	**Monitoring Parameter**	**Frequency of Monitoring**
SCP-DEM11	Demister	Sulfonic Acid	Pressure Drop	Continuously monitors and records the pressure drop. Existing permit condition 22 does not require continuous recording although Stepan is already operating a CMS that also continuously records. Reduce data to a daily block average.
SCP-DEM12	Demister	Sulfonic Acid	Pressure Drop	Continuously monitors and records the pressure drop. Existing permit condition 22 does not require continuous recording although Stepan is already operating a CMS that also continuously records. Reduce data to a daily block average.
SCP-NAOH1	Caustic Scrubber	H_2SO_4 SO_2	pH	Continuously monitors and records the pH. Existing permit does not require continuous monitoring and recording. Existing permit requires Stepan to measure and record pH or the weight of caustic in the scrubbing solution (existing permit condition 21). Stepan's application indicates that they operate a CMS for measurement and recording of pH. Reduce data to a daily block average.
SCP-NAOH1	Caustic Scrubber	H_2SO_4 SO_2	Pressure Drop	Continuously monitors and records the pressure drop. Existing permit condition 18. Reduce data to a daily block average.
SCP-NAOH1	Caustic Scrubber	H_2SO_4 SO_2	Scrubbant Flow Rate	Continuously monitors and records the scrubbant flow rate in gpm. Existing permit condition 20. Reduce data to a daily block average.
SCP-TAIL1	Tail Gas Demister	H_2SO_4	Pressure Drop	Continuously monitors and records the pressure drop. Required by existing permit condition 22. Reduce data to a daily block average.

Table 8: Monitoring Requirements for Avoidance of 40 CFR Part 70 for SO_2 Emissions				
APCD Unit ID	**APCD Description**	**Pollutants Controlled**	**Monitoring Parameter**	**Frequency of Monitoring**
--	Cyclone/Acid-Gas Separator System for Sulfonation II Process Line	--	Pressure drop	Continuously monitors and records the pressure drop. Existing permit condition 22 does not require continuous recording although Stepan is already operating a CMS that also continuously records. Satisfies the requirement in 40 CFR 60.703(c).
SCP-DRY2	Dry Packed Bed Scrubber	H_2SO_4 Mist	Pressure Drop	Continuously monitors and records the pressure drop. Not required by existing SM Permit. Reduce data to a daily block average.
SCP-DEM21	Demister	Sulfonic Acid	Pressure Drop	Continuously monitors and records the pressure drop. Existing permit condition 22 does not require continuous recording although Stepan is already operating a CMS that also continuously records. Reduce data to a daily block average.
SCP-DEM22	Demister	Sulfonic Acid	Pressure Drop	Continuously monitors and records the pressure drop. Existing permit condition 22 does not require continuous recording although Stepan is already operating a CMS that also continuously records. Reduce data to a daily block average.
SCP-NAOH2	Caustic Scrubber	H_2SO_4 SO_2	pH	Continuously monitors and records the pH. Existing permit does not require continuous monitoring and recording. Existing permit requires Stepan to measure and record pH or the weight of caustic in the scrubbing solution (existing permit condition 21). Stepan's application indicates that they operate a CMS for measurement and recording of pH. Reduce data to a daily block average.

Table 8: Monitoring Requirements for Avoidance of 40 CFR Part 70 for SO_2 Emissions				
APCD Unit ID	**APCD Description**	**Pollutants Controlled**	**Monitoring Parameter**	**Frequency of Monitoring**
SCP-NAOH2	Caustic Scrubber	H_2SO_4 SO_2	Pressure Drop	Continuously monitors and records the pressure drop. Existing permit condition 18. Reduce data to a daily block average.
SCP-NAOH2	Caustic Scrubber	H_2SO_4 SO_2	Scrubbant Flow Rate	Continuously monitors and records the scrubbant flow rate in gpm. Existing permit condition 20. Reduce data to a daily block average.
SCP-TAIL2	Tail Gas Demister	H_2SO_4	Pressure drop	Continuously monitors and records the pressure drop. Existing permit condition 22 does not require continuous recording although Stepan is already operating a CMS that also continuously records. Reduce data to a daily block average.

During the times when the Sulfonation I Process Line is in operation, the Permittee shall operate the control devices in accordance with the operating conditions summarizes in Table 9 as provided by Stepan.

Table 9: Operating Conditions for Devices Comprising the Control of Emissions from Sulfonation I Process Line	
a.	The Permittee shall maintain a daily pressure drop block average within the range of 2 to 50 inches of water for dry scrubber SCR-DRY1.
b.	The Permittee shall maintain a daily pressure drop block average within the range of 3 to 80 inches of water for demister SCP-DEM11.
c.	The Permittee shall maintain a daily pressure drop block average within the range of 3 to 80 inches of water for demister SCP-DEM12.
d.	The Permittee shall maintain a daily pressure drop block average within the range of 1 to 40 inches of water for demister SCP-TAIL1.
e.	The Permittee shall maintain a daily pressure drop block average within the range of 1 to 10 inches of water for scrubber SCP-NAOH1.
f.	The Permittee shall maintain a daily pH block average within 5 to 12 for scrubber NAOH1.
g.	The Permittee shall maintain a daily scrubbant flow rate block average greater than 30 gallons per minute for scrubber SCP-NAOH1.

During the times when the Sulfonation II Process Line is in operation, the Permittee shall operate the control devices in accordance with the operating conditions summarizes in Table 10 as provided by Stepan.

Table 10: Operating Conditions for Devices Comprising the Control of Emissions from Sulfonation II Process Line	
a.	The Permittee shall maintain the daily pressure drop block average within the rage of 0.1 to 1.0 psi for the cyclone/acid-gas separator system immediately downstream of Sulfonation II Process Line Reactor.
b.	The Permittee shall maintain a daily pressure drop block average within the range of 2 to 50 inches of water for dry scrubber SCR-DRY2.
c.	The Permittee shall maintain a daily pressure drop block average within the range of 3 to 80 inches of water for demister SCP-DEM21.
d.	The Permittee shall maintain a daily pressure drop block average within the range of 3 to 80 inches of water for demister SCP-DEM22.
e.	The Permittee shall maintain a daily pressure drop block average within the range of 1 to 40 inches of water for demister SCP-TAIL2.
f.	The Permittee shall maintain a daily pressure drop block average within the range of 1 to 10 inches of water for scrubber NAOH2.
g.	The Permittee shall maintain a daily pH block average within 5 to 12 for scrubber SCP-NAOH2.
h.	The Permittee shall maintain a daily scrubbant flow rate block average greater than 80 gallons per minute for scrubber SCP-NAOH2.

Dimethyl Sulfate Emission from Railcar/Truck Unloading

Stepan controls emissions of dimethyl sulfate from railcar/truck unloading and from process vessel T126 by venting these activities through a scrubber (SCR-8126). Stepan's existing permit does not impose any monitoring requirements for this scrubber. No monitoring requirements are imposed in the updated SM permit.

Avoidance of 40 CFR 70 for Facility-Wide VOC Emissions

The uncontrolled VOC PTE from the facility is approximately 113.86 tpy as specified in Table 4 of this narrative. Based on data supplied by Stepan, approximately 72% of the facility-wide uncontrolled VOC emissions are from the batch neutralizers (BN1, BN2, BN3, and BN4) and the batch reactors (R01, R02, R04, and R05).

Stepan requested a regulatory operational restriction on batch neutralizers BN1, BN2, and BN4 to in order to restrict the facility-wide VOC emissions less than 100 tpy. The Division found this VOC compliance plan inadequate to restrict the facility-wide VOC emissions to less than 100 tpy. The Division and Stepan discussed the need for Stepan to readdress their proposed facility-wide VOC emissions compliance plan for Stepan's facility-wide VOC emissions to be less than 100 tpy. Stepan used a VOC control efficiency for scrubber SCR-NAOHR02 of 97%. This scrubber serves reactors R02, R04, and R05, on a combined basis. Stepan is unable to verify this VOC control efficiency through performance testing because the process is not equipped with test ports and the stack cannot be reached without overcoming safety concerns. With this in mind, Stepan proposed to use an 80% VOC control efficiency for scrubber SCR-NAOHR02. The Division concurs with this conclusion.

Stepan provided a revised facility-wide VOC emissions compliance plan to the Division on May 23, 2017 (plan is dated May 19, 2017).

A facility-wide VOC emissions limit will be established in the new SM Permit. Stepan will be required to keep monthly records of operational parameters used in computing VOC emissions based on the VOC emission factors provided in their *Emission Calculation Protocol (Dated May 19, 2017).*

Table 11 summarizes the monitoring requirements imposed in the existing permit. These monitoring requirements serve to provide a reasonable assurance of compliance with the facility-wide VOC emissions limit. In addition, the operating ranges are specified by Stepan and they are not based on site-specific testing.

Table 11: Monitoring Requirements for Avoidance of 40 CFR Part 70 for VOC Emissions

APCD Unit ID	APCD Description	Pollutants Controlled	Monitoring Parameter	Frequency of Monitoring
SCR-3500	Reactor R01, UNLOAD, and T3300 and T3400 Scrubber	VOC Ethylene Oxide (EO) Propylene Oxide (PO)	Percent acid, on a weight percent basis, in the scrubbant.	Existing permit does not prescribe monitoring for this scrubber (i.e., alkoxylation). Stepan monitors and records the percent weight of acid in the scrubbant at least once per calendar month. Measure percent weight of acid in the scrubbant at least once per calendar month of operation.
SCR-3500	Reactor R01, UNLOAD, and T3300 and T3400 Scrubber	VOC Ethylene Oxide (EO) Propylene Oxide (PO)	Scrubbant Flow Rate, scrubbant is sulfuric acid solution.	Existing permit does not prescribe monitoring for this scrubber (i.e., alkoxylation). Stepan continuously monitors and records the scrubbant flow rate. Reduce data to a daily block average.
SCR-3500	Reactor R01, UNLOAD, and T3300 and T3400 Scrubber	VOC Ethylene Oxide (EO) Propylene Oxide (PO)	Gas flow rate entering the scrubber	Existing permit does not prescribe monitoring for this scrubber (i.e., alkoxylation). Stepan continuously monitors and records the gas flow rate entering the scrubber. Reduce data to a daily block average.

Table 11: Monitoring Requirements for Avoidance of 40 CFR Part 70 for VOC Emissions				
APCD Unit ID	**APCD Description**	**Pollutants Controlled**	**Monitoring Parameter**	**Frequency of Monitoring**
SCR-NAOHR02	Reactors R02, R04, and R05 Scrubber	VOC Dimethyl Sulfate IPA[1]	Caustic concentration on a weight percent basis, scrubbant is KOH solution.	Stepan measures and records the percent by weight of caustic in the scrubbing solution at a minimum frequency of once per week of operation. Existing permit condition 17. Stepan is required to measure and record the caustic concentration of the scrubbant, on a percent weight basis, at least once per week, for any week reactor R02, R04 and/or R05 is/are in operation.
SCR-NAOHR02	Reactors R02, R04, and R05 Scrubber	VOC Dimethyl Sulfate IPA	Pressure Drop	Continuously monitor and records the pressure drop. Stepan currently continuously monitors and records this parameter which is above and beyond what is required by existing permit condition 16. Reduce data to a daily block average.
SCR-NAOHR02	Reactors R02, R04, and R05 Scrubber	VOC Dimethyl Sulfate IPA	Scrubbant flow rate.	Existing permit does not require monitoring of this operational parameter. Stepan continuously monitors and records the scrubbant flow rate. Reduce data to a daily block average.

During the times when the Alkoxylation Process line (R01) is in operation, the Permittee shall operate Scrubber SCR-3500 in accordance with the following operating conditions summarized in Table 12.

Table 12: Operating Conditions Scrubber SCR-3500	
a.	The Permittee shall maintain the percent scrubbant range within 4 to 7 percent acid [inclusive], measured once per calendar month of operation.
b.	The Permittee shall maintain the scrubbant volume flow rate, on a daily block average, greater than 35 gallons per minute (gpm).
c.	The Permittee shall maintain the gas flow rate, on a daily block average, less than 250 scfm.

During the times when the Esterification Process line (Reactor R02), or Intermediate Esterification Process Line (Reactor R04), and/or Reactor R05 is/are in operation, the Permittee shall operate Scrubber SCR-NAOH2 in accordance with the following operating conditions summarized in Table 13.

[1] IPA represents isopropyl alcohol.

Table 13: Operating Conditions Scrubber SCR-NAOHR02	
a.	The Permittee shall maintain the scrubbant caustic concentration above 5 weight percent measured once per calendar week of operation.
b.	The Permittee shall maintain the pressure drop, on a daily block average, is outside the range of 0.3 to 20 inches of water.
c.	The Permittee shall maintain the scrubbant volume flow rate, on a daily block average, greater than 20 gallons per minute (gpm).

40 CFR 60 Subpart Kb [NSPS Kb] – "Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced after July, 23, 1984": Table 14 summarizes the applicability of NSPS Kb for each VOL storage vessel at Stepan.

Stepan noted in their application that Storage Tanks T-3300 and T-3400 do not meet the exemption in 40 CFR 60.110b(d)(2) because these tanks are equipped with safety relief devices such as uncontrolled pressure relief devices. The Division disagrees with Stepan's conclusion. The Division believes that Storage Tanks T3300 and T3400 meet the exemption in 40 CFR 60.110b(d)(2) because Stepan exhausts tank loading and unloading through a closed vent system and a scrubber before exhausting these tanks to the atmosphere. In addition, these tanks operate as pressurized vessels in excess of 204.9 kPa (29.7 psia) during normal operation.

Table 14 summarizes the applicability of NSPS Kb for each VOL storage vessel at Stepan.

Table 14: Applicable Part 60 Regulation for each VOL Storage Vessel at Stepan

Applicable VOL Storage Vessels per NSPS Kb: 40 CFR 60.110b(a) and (b):
(a): Constructed, reconstructed, or modified after July 23, 1984;
(b): Option 1: Vessel volume ≥39,894 gallons and storing a liquid with a maximum true vapor pressure >0.5075 psia
(b): Option 2: Vessel volume ≥19,815 and <39,894 gallons and storing a liquid with a maximum true vapor pressure >2.175 psia

Equipment Group	Source Code	Capacity (gallons)	Contents	Installation Date	True Vapor Pressure (psia)	Subject to NSPS Kb?
Storage Vessels Not Subject to NSPS Kb because of applicability date of before July 23, 1984						
1	T-029	10,000	Toximul 8242	1978	0.3496	No
1	T-030	10,000	Agent 1059-108	1978	0.4659	No
1	T-053	14,000	Agent 1509-83	1977	0.7998	No
1	T-058	10,000	Toximul 8240	1979	0.3496	No
1	T-060	10,000	Toximul 8241	1979	0.2592	No
1	T-061	10,000	Toximul SE-470	1979	0.4659	No
1	T-073	10,000	Isopropyl Alcohol	1978	1.333	No
1	T-074	10,000	Ethanol SDA-40B	1978	1.7224	No
1	T-075	10,000	Isopropyl Alcohol	1978	1.3333	No
1	T-076	10,000	Ethanol	1978	1.7224	No
2	T-080	10,000	Methanol	1978	3.4825	No

Table 14: Applicable Part 60 Regulation for each VOL Storage Vessel at Stepan

Applicable VOL Storage Vessels per NSPS Kb: 40 CFR 60.110b(a) and (b):
(a): Constructed, reconstructed, or modified after July 23, 1984;
(b): Option 1: Vessel volume ≥39,894 gallons and storing a liquid with a maximum true vapor pressure >0.5075 psia
(b): Option 2: Vessel volume ≥19,815 and <39,894 gallons and storing a liquid with a maximum true vapor pressure >2.175 psia

Equipment Group	Source Code	Capacity (gallons)	Contents	Installation Date	True Vapor Pressure (psia)	Subject to NSPS Kb?
Storage Vessels Not Subject to NSPS Kb because Vessel Volume is less than 19,815 gallons						
2	T-136	10,000	Stepantex HS-90	2003	3.7619	No
Storage Vessels Not Subject to NSPS Kb because Vessel Volume is greater than or equal to 19,815 gallons and less than 39,894 gallons and maximum true vapor pressure is less than 2.175 psia						
1	T-082	25,000	Steol 25 S/60 Steol 25 3S/60	2010	0.7092[2]	No
1	T-120	30,000	Ninate 401-A	1990	0.6476	No
1	T-121	30,000	Steol 25 S/60 Steol 25 3S/60	1990	0.8032	No
1	T-130	30,000	Steol CS-460	1995	0.8310	No
1	T-012	30,000	Agent 1411-80A	1989	0.3496	No
Exempt	T-126	25,000	Dimethyl Sulfate	1992	0.024	No
Storage Vessels Subject to NSPS Kb because Vessel Volume is greater than or equal to 19,815 gallons and less than 39,894 gallons and maximum true vapor pressure is greater than 2.175 psia						
2	T-122	30,000	Stepantex HS-90	1990	3.7619	Yes
2	T-124	30,000	Stepantex HS-90	1990	3.7619	Yes
2	T-137	22,500	Stepantex HS-90	2008	3.7619	Yes
3	T-3300	31,780	Propylene Oxide	1998	10.99	Yes
3	T-3400	31,780	Ethylene Oxide	1998	26.69	Yes

Table 15 summarizes the VOC emission standards, testing, and reporting and recordkeeping requirements for these NSPS Kb storage tanks:

Table 15: Summary of Applicable Sections of NSPS Kb	
Legal Citation	**Requirement**
Standards for VOC 40 CFR 60.112b(a)(3)	Applies for a storage vessel which meets one of the following criteria: Option 1: Vessel volume ≥ 39,894 gallons and contains a VOL, that, as stored has a maximum true vapor pressure ≥ 0.754 psia and < 11.1070 psia. Stepan does not have a storage vessel which meets these criteria. Option 2: Vessel volume ≥19,815 gallons and <39,894 gallons and contains a VOL, that, as stored has a maximum true vapor pressure ≥ 4.0 psia and < 11.1070 psia. Tank T3300 meets these criteria.

[2] Per Form 2.02 of Georgia SIP Application.

Table 15: Summary of Applicable Sections of NSPS Kb	
Legal Citation	**Requirement**
Standards for VOC 40 CFR 60.112b(b)	Applies to a storage vessel that has a storage volume ≥19,815 gallons which contains a VOL that, as stored, has a maximum true vapor pressure ≥ 11.1070 psia. Tank T3400 meets this criteria.
Testing and Procedures 40 CFR 60.113b(c)	Maintain at the site documentation that the control device will achieve the required control efficiency during maximum loading conditions. Stepan has complied with this requirement.
Monitoring of Operations 40 CFR 60.116b(b)	Applies to Tanks T122, T124, T137, T3300, and T3400: Requires Stepan to keep readily accessible records showing the dimension of the applicable storage vessel and an analysis showing the capacity of the storage vessel.
Monitoring of Operations 40 CFR 60.116b(c) 40 CFR 60.116b(g)	Applies for a storage vessel which meets one of the following criteria: Option 1: Vessel volume ≥ 39,894 gallons and contains a VOL, that, as stored has a maximum true vapor pressure ≥ 0.5075 psia. Stepan does not have a storage vessel which meets these criteria. Option 2: Vessel volume ≥19,815 gallons and <39,894 gallons and contains a VOL, that, as stored has a maximum true vapor pressure ≥ 2.175 psia. Tanks T122, T124, T137, T3300, and T3400 meet these criteria. Stepan shall maintain a record of the VOL stored, the period of storage, and the maximum true vapor pressure of that VOL during the respective storage period, excluding tanks T-3300 and T-3400 per 40 CFR 60.116b(g).

40 CFR 60 Subpart RRR – "Standards of Performance for Volatile Organic Compound Emissions from Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes: The Sulfonation II Process Line is subject to this NSPS based on date of installation (after June 29, 1990) and the type of products produced by the Process Line. Table 16 identifies products produced by the Sulfonation II Process Line that trigger applicability per 40 CFR 60.707.

Table 16: NSPS RRR Applicability for Sulfonation II Process Line	
CAS No.	**Listed Chemical Name**
68081-81-2	Benzensulfonic acid C_{10-16}-akyl derivatives, sodium salts
27176-87-0	Dodecylbenzenesulfonic acid
25155-30-0	Dodecylbenzenesulfonic acid, sodium salt
No CAS No. available	Linear alcohols, ethoxylated, and sulfated, sodium salt, mixed
9016-45-9	Nonylphenol, ethoxylated

The *affected facility* that is subject to NSPS RRR includes a reactor and the recovery system into which the reactor's vent stream is discharged per 40 CFR 60.700(b). The Sulfonation II reactor exhausts through a cyclone separator, an acid/gas separator, dry scrubber, scrubber demisters, caustic scrubber, and tail gas demister all operating in series. In the particular case of the Sulfonation II Process Line, the *affected facility* consists of the Sulfonation II reactor, cyclone separator, and acid/gas separator. *This is a change from Stepan's existing air permit which does not include the "acid/gas separator" in the NSPS RRR definition of affected facility.* The Sulfonator II reactor has a two-stage recovery system, which includes a cyclone followed by an acid-gas separator.

Of note, Stepan conducted stack testing for VOC from the Sulfonation II reactor in 2000, in order to support the TRE calculations required under NSPS RRR. The regulation requires the testing to be conducted at the outlet of the final recovery device (40 CFR 70.4(d)(1)(B)). The stack test report indicates that the testing was conducted at the outlet of the cyclone separator. However, at the time, the term "cyclone separator" had been used to refer to the entire recovery system, not an individual recovery device. Stepan has confirmed that the test ports are located after the separator and that the 2000 stack testing was conducted at the outlet of the separator, not in the space between the cyclone and the acid-gas separator.

Subpart RRR provides three alternative emission standards as part of 40 CFR 60.702. Stepan complies with 40 CFR 60.702(c) which requires the Permittee to maintain the *total resource effectiveness (TRE)* index value greater than 1.0 before any VOC emission control device. The TRE index value is computed immediately after the Sulfonation II reactor and cyclone separator.

Table 17 summarizes the Division's review of NSPS RRR.

Table 17: Summary of Review of Applicable Sections of NSPS RRR

Legal Citations	Discussion
Monitoring: 40 CFR 60.703(e)	**Applicable:** Stepan shall provide the Division information describing the operation of the recovery device (*in this case, the cyclone separator*) and the process parameter(s) which would indicate proper operation and maintenance of the device. Stepan is required to continuously monitor the pressure drop across the cyclone/acid-gas separator system for Sulfonation II Process Line.
Testing 40 CFR 60.704	Stepan has satisfied the initial performance testing requirements in December 1992-February 1993 using the testing requirements of 40 CFR 63.115 for Sulfonation II Process Line. The TRE index value was computed immediately after the Sulfonation II reactor and cyclone separator and determined to be greater than 1.0. Stepan retested Sulfonation II Process Line to verify compliance with NSPS RRR using the testing requirements of NSPS RRR on February 10, 2000. The TRE index value was computed immediately after the caustic scrubber SCP-NAOH2 and determined to be greater than 1.0. It should be noted that the caustic scrubber is the primary control device for Sulfonation II Process Line and is located downstream of the final recovery device. Stepan assumes no VOC control from the use of the caustic scrubber. Per 40 CFR 60.704(f), Stepan shall recalculate the TRE index value for Sulfonation II reactor and cyclone separator whenever process changes are made. Examples of process changes include changes in production capacity, feedstock type, or catalyst type, or whenever this is replacement, removal, or addition of recovery equipment. The TRE index value shall be recalculated based on test data, or on best engineering estimates of the effects of the change on the recovery system.
40 CFR 60.705(a)	Initial Notification Requirement. Stepan triggers this regulatory provision if and when they elect to comply with an alternative provision of 40 CFR 60.702.
40 CFR 60.705(b)	**Applicable:** Stepan shall keep an up-to-date, readily accessible record of all

Table 17: Summary of Review of Applicable Sections of NSPS RRR	
Legal Citations	**Discussion**
	measurements and calculations performed to determine the TRE index value of the vent stream per 40 CFR 60.705(b)(v).
40 CFR 60.705(g)	**Applicable** because Stepan demonstrates compliance with 40 CFR 60.702(c). Stepan shall keep up-to-date, readily accessible records of: (1) Any changes in production capacity, feedstock type, or catalyst type, or of any replacement, removal or addition of recovery equipment or reactors; (2) Any recalculation of the TRE index value performed pursuant to 40 CFR 60.704(f); and (3) The results of any performance test performed pursuant to the methods and procedures required by 40 CFR 60.704(d).
40 CFR 60.705(l)	Stepan shall submit to the Division semiannual reports of the following recorded information: (1) **Applicable:** Exceedances of monitored parameters recorded under 40 CFR 60.705(g). (6) **Applicable:** Any recalculation of the TRE index value as recorded under 40 CFR 60.705(g).
40 CFR 60.705(q)	The Division will specify appropriate reporting and recordkeeping requirements for Sulfonator II Process line *affected facility* complies with the *TRE index value* using a recovery device other than an absorber, condenser, or carbon adsorber. The Division did not specify additional recordkeeping or reporting per this legal citation.

Side note: Existing permit condition numbers 32.a and 33 pertains to NSPS RRR. These existing permit conditions references *excess TOC (less methane and ethane) emissions as specified in 40 CFR 60.605(g).* 40 CFR 60.605(g) is not an applicable requirement for Sulfonator II Process Line. In addition, 40 CFR 60.705(g) does not define or use the phrase *excess TOC (less methane and ethane)* emissions. As such, existing permit condition numbers 32.a and 33 are not carried over to Stepan's updated SM permit.

Fuel-Burning Sources: Stepan operates the following fuel-burning sources as summarized in Table 18.

Table 18: Fuel-Burning Sources at Stepan

Source Code	Input Heat Capacity (MMBtu/hr)	Description	Installation Date	Construction Date	Applicable Rules
E-001	16.7	400 hp Steam Generator Boiler #1 (Source Code #4) Natural gas fired only	1977	1977	Georgia Rule (d) for PM and opacity.[3] Georgia Rule (g) for fuel sulfur content.[4]
E-002	16.7	400 hp Steam Generator Boiler #2 (Source Code #8) Natural gas fired only	1985	1985	Georgia Rule (d) for PM and opacity. Georgia Rule (g) for fuel sulfur content.
E-005	9.99	Hot Oil Heater Natural gas in-direct fired only	2006	2006	Georgia Rule (d) for PM and opacity. Georgia Rule (g).
GEN1	400 kW	536.40 hp Standby emergency generator, firing diesel fuel	1996	1996	Georgia Rule (g) Georgia Rule (b) Max. fuel sulfur content is 0.0015 weight percent.
GEN2	350 kW	469.35 hp Standby emergency generator, firing diesel fuel	2016	2016	Georgia Rule (g) Georgia Rule (b) Max. fuel sulfur content is 0.0015 weight percent.
FP1	160.39 kW	Standby Fire Water Pump Engine, firing diesel fuel	1978	1978	Georgia Rule (g) Georgia Rule (b) Max. fuel sulfur content is 0.0015 weight percent.
FP2	160.39 kW	Standby Fire Water Pump Engine, firing diesel fuel	1978	1978	Georgia Rule (g) Georgia Rule (b) Max. fuel sulfur content is 0.0015 weight percent.

Georgia Rule 391-3-1-.02(2)(d): Boilers E-001 and E-002 and hot oil heater E-005 are subject to the PM standard specified in Georgia Rule 391-3-1-.02(2)(d)2. These same pieces of equipment are subject to the opacity standard of twenty (20) percent, except for one six-minute average of twenty-seven (27) percent, per Georgia Rule 391-3-1-.02(2)(d)3. These units should easily comply with both components of this state rule because the devices are fired with natural gas.

[3] Georgia Rule (d) pertains to Georgia Rule 391-3-1-.02(2)(d).
[4] Georgia Rule (g) pertains to Georgia Rule 391-3-1-.02(2)(g).

Georgia Rule 391-3-1-.02(2)(g): Georgia Rule (g) limits the fuel sulfur content for each unit specified in Table 18 and Georgia Rule (g) limits the fuel sulfur content to no more than 2.5 weight percent. Boiler E-001 and E-002 and hot oil heater E-005 combust natural gas and should easily comply with this fuel sulfur content. No monitoring of the fuel sulfur content of natural gas is imposed by the updated SM permit.

Units GEN1, GEN2, FP1, and FP2 are limited to firing diesel fuel with no more than 0.0015 weight percent sulfur. Stepan is required to retain diesel fuel supplier certifications that the diesel fuel does not contain fuel sulfur in amount exceeding 0.0015 weight percent.

Georgia Rule 391-3-1-.02(2)(b): Georgia Rule (b) limits the visible emissions from GEN1, GEN2, FP1, and FP2 no more than forty (40) percent. No monitoring is prescribed in the permit to provide a reasonable assurance of compliance because these units are not operated as part of normal source operation.

40 CFR 60 Subpart IIII – "Stationary Compression Ignition Internal Combustion Engines": Emergency generator GEN1 and fire pump engines FP1 and FP2 were installed prior to June 12, 2006 and these units have not been modified or reconstructed since that date. As such, GEN1, FP1, and FP2 are not subject to this NSPS. GEN2 was installed in 2016 and as a result is subject to NSPS IIII. Stepan did not provide a regulatory analysis for this NSPS.

40 CFR 63 Subpart ZZZZ – RICE NESHAP: Stepan indicated that emergency generators GEN1 and GEN2 and fire pump engines FP1 and FP2 are subject to this NESHAP. Stepan did not provide a regulatory analysis for this NESHAP.

Discussion of Non-Applicable Regulations:
Georgia Rule 391-3-1-.02(2)(vv) – "Volatile Organic Liquid Handling and Storage: This state rule does not apply to Stepan because the Winder facility is located in Barrow County.

Georgia Rule 391-3-1-.02(2)(lll) – "NOx Emissions from Fuel-Burning Equipment: Boilers E-001 and E-002 are not subject to this state rule because they were installed prior to May 1, 1999. Hot oil heater E-005 is not subject to this state rule because it has a maximum heat input rating of less than 10 MMBtu/hr

40 CFR 60 Subpart Dc – Standard of Performance for Small Industrial-Commercial-Institutional Steam Generating Units: A steam generating unit is subject to NSPS Dc if construction, reconstruction, or modification commenced after June 9, 1989, and if the unit has a heat input capacity between 10 MMBtu/hr and 100 MMBtu/hr. Boiler E-001 and E-002 were constructed prior to 1989 and as such are not subject to NSPS Dc. Hot oil heater E-005 is not subject to NSPS Dc because it has a maximum heat input rating of less than 10 MMBtu/hr.

40 CFR 60, Subpart VV – Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for Which Construction, Reconstruction, or Modification Commenced After January 5, 1981 and on or before November 7, 2006: This subpart regulates VOC emissions from equipment leaks for SOCMI facilities for which construction, reconstruction, or modification occurred after January 5, 1981 and on or before November 7, 2006. The affected source under this subpart is all equipment (e.g., pumps, compressors, valves, etc.) within a process unit that produces, as an intermediate or final product, one of the listed chemicals in 40 CFR 60.489.

Stepan determined that the Sulfonation II Process Line, the batch neutralizers, the blenders, and reactor R05 were installed between 1981 and 2006. Stepan determined that NSPS Subpart VV **is not** an

applicable requirement, in this case, because the applicable equipment does not produce, as an intermediate or final product, one of the listed chemicals in 40 CFR 60.489.

40 CFR 60, Subpart VVa – Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006: This subpart regulates VOC emissions from equipment leaks for SOCMI facilities for which construction, reconstruction, or modification occurred after November 7, 2006. The affected source under this subpart is all equipment (e.g., pumps, compressors, valves, etc.) within a process unit that produces, as an intermediate or final product, one of the listed chemicals in 40 CFR 60.489.

Stepan determined that reactors R04 and R05 were installed after 2006. Stepan determined that NSPS Subpart VVa **is not** an applicable requirement, in this case, because the applicable equipment does not produce, as an intermediate or final product, one of the listed chemicals in 40 CFR 60.489.

40 CFR 60, Subpart NNN – Volatile Organic Compound Emissions from the Synthetic Organic Chemical Manufacturing Industry Distillation Operations: The *affected facility* under NSPS Subpart NNN is a distillation unit that is part of a process unit at SOCMI facility that produces any of the chemicals listed in 40 CFR 60.667 as a product, co-product, by-product, or intermediates; and for which construction, reconstruction, or modification commenced after December 30, 1983.

Stepan determined that reactor R02 performs operations meeting the definition of distillation unit and, as a result, is potentially subject to NSPS Subpart NNN. Reactor R02 was installed in 1978, which is prior to the 1983 applicability date of NSPS Subpart NNN. Therefore, NSPS Subpart NNN **is not** an applicable requirement in this case.

40 CFR 63, Subpart JJJJJJ – "Industrial, Commercial, and Institutional Boiler Area Sources": Boilers E-001 and E-002 are natural gas fired only boilers and as such are exempt from this regulation per 40 CFR 63.11195(e). Hot oil heater E-005 meets the definition of *process heater* under 40 CFR 63.11237 and, as such, is not subject, to this regulation.

Note: Boilers E-001 and E-002 do have the capability of burning No. 2 fuel oil and historically they combusted this fuel in these boilers. In the most recent years, Stepan has only fired boilers E-001 and E-002 on natural gas and they have removed the No. 2 fuel oil storage tanks.

40 CFR 63, Subpart VVVVVV – Chemical Manufacturing Area Sources: This regulation applies to chemical manufacturing process units (CMPU) that use or produce at least one of the HAP listed in Table 1 of the rule and that are located at an area source of HAP per 40 CFR 63.11494(a).

Stepan determined that their facility does not utilize any Table 1 HAP as a feedstock, nor does it produce any Table 1 HAP as a by-product or product. Therefore, Subpart VVVVV **does not** apply.

40 CFR 63, Subpart BBBBBBB – Chemical Preparations Industry Area Sources: This subpart is potentially applicable to area sources of HAP that perform mixing, blending, milling, and extruding operations to manufacture chemical preparations. The rule only applies to chemical preparations operations that involve a product or intermediate containing a "target HAP," where "target-HAP" means metal compounds of chromium, lead, manganese, and nickel, per 40 CFR 63.11588. The Winder facility does not utilize or produce materials containing "target HAP" as defined by this rule. Therefore, Subpart BBBBBBB **does not** apply.

Toxic Impact Assessment

A toxic impact assessment is not applicable because the facility is not making a physical change, change in the method of operation, or change in products produced based on this permit application.

Discussion of Permit Conditions

Table 19 specifies the permit conditions included in updated SM Permit No. 2843-013-0001-S-02-0:

Table 19: Summary of Updated SM Permit

New Permit Condition No.	Existing Permit Condition No.	Discussion
1.1	3	**No change** to General Requirement.
1.2	37	**No change** to permit condition pertaining to circumvention.
1.3	2	**Updated Permit Condition:** General Requirement section of permit. Condition language has been updated.
1.4	6	**No change** to General Requirement.
1.5	N/A	**New Permit Condition:** General Requirement section of permit.
2.1	N/A	**New Permit Condition:** Facility-wide VOC emissions limit of 100 tons during any consecutive twelve-month period.
2.2	12.a	**No change** to existing SO_2 emission limit from Sulfonation I Process Line.
2.3	12.b	**No change** to existing H_2SO_4 emission limit from Sulfonation I Process Line.
2.4	13.a	**No change** to existing SO_2 emission limit from Sulfonation II Process Line.
2.5	13.b	**No change** to existing H_2SO_4 emission limit from Sulfonation II Process Line.
2.6	N/A	**New Permit Condition:** Establishes maximum diesel fuel sulfur content for purposes of Avoidance of 40 CFR Part 70.
2.7	N/A	**New Permit Condition:** Restricts fuel combusted in Boilers E-001 and E-002 and Hot Oil Heater E-005 to natural gas for purposes of avoidance of 40 CFR 63 Subpart JJJJJJ and of 40 CFR Part 70.
2.8	39	**Updated Permit Condition:** Establishes 40 CFR 60 Subparts A and RRR as applicable to Sulfonation II Process Line.
2.9	11	**Updated Permit Condition:** Establishes emission standard under 40 CFR 60 Subpart RRR.
2.10	40	**Updated Permit Condition:** Establishes 40 CFR 60 Subparts A and Kb as applicable for specified storage vessels.
2.11	40	**Updated Permit Condition:** Establishes the applicable emission standard per 40 CFR 60 Subpart Kb for storage tanks T-3300 and T-3400.
2.12	9	**No change** to Georgia Rule (d) requirement for E-005.
2.13	9	**No change** to Georgia Rule (d) requirement for E-001 and E-002.

Table 19: Summary of Updated SM Permit		
New Permit Condition No.	**Existing Permit Condition No.**	**Discussion**
2.14	10	**No change** to Georgia Rule (d) visible emissions requirement.
2.15	N/A	**New Permit Condition:** Establishes an operational restriction on generators GEN1 and GEN2 and fire pump engines FP1 and FP2 for purposes of avoidance of Georgia Rule 391-3-1-.02(2)(mmm).
2.16	N/A	**New Permit Condition:** Establishes the visible emissions limit, per Georgia Rule 391-3-1-.02(2)(g), for GEN1, GEN2, FP1, and FP2.
2.17	N/A	**New Permit Condition:** Establishes Georgia Rule 391-3-1-.02(2)(e) as applicable to the facility operations, excluding fuel-burning equipment.
2.18	N/A	**New Permit Condition:** Establishes Georgia Rule 391-3-1-.02(2)(b) as applicable to the facility operations, excluding fuel-burning equipment.
3.1	38	**Updated Permit Condition:** Standard (and current) air permit language regarding fugitive emissions.
4.1	N/A	**New Permit Condition:** Standard condition added pertaining to routine maintenance on air pollution control equipment.
4.2	N/A	**New Permit Condition:** Standard condition added pertaining to spare parts inventory for control equipment.
4.3	N/A	**New Permit Condition:** Requires the Permittee to route the Sulfonation I Process Line Reactor through control equipment which includes a dry scrubber, a demister, and a caustic scrubber.
4.4	N/A	**New Permit Condition:** Requires the Permittee to route the Sulfonation II Process Line Reactor through control equipment which includes a dry scrubber, a demister, and a caustic scrubber.
4.5	N/A	**New Permit Condition:** Specifies the parametric operating ranges for control devices servicing Sulfonation I Process Line.
4.6	N/A	**New Permit Condition:** Specifies the parametric operating ranges for control devices servicing Sulfonation II Process Line.
4.7	N/A	**New Permit Condition:** Requires the Permittee to route the exhaust gases from process vessel T126 to a scrubber.
4.8	N/A	**New Permit Condition:** Requires the Permittee to route the gases from unloading dimethyl sulfate to a scrubber.
4.9	N/A	**New Permit Condition:** Requires the Permittee to route the Alkoxylation process (including reactor R01) through control equipment which includes a scrubber.

Table 19: Summary of Updated SM Permit		
New Permit Condition No.	**Existing Permit Condition No.**	**Discussion**
4.10	N/A	**New Permit Condition:** Requires the Permittee to route the railcar unloading (UNLOAD) of ethylene oxide and propylene oxide through control equipment which includes a scrubber.
4.11	N/A	**New Permit Condition:** Requires the Permittee to route the exhaust gases from Storage tanks T-3300 and T-3400 to a scrubber.
4.12	N/A	**New Permit Condition:** Specifies the parametric operating ranges for control devices servicing the Alkoxylation process (including reactor R01) and UNLOAD.
4.13	N/A	**New Permit Condition:** Requires the Permittee to route the Esterification process (including reactor R02) through control equipment which includes a scrubber.
4.14	N/A	**New Permit Condition:** Requires the Permittee to route the Intermediate Esterification process (including reactor R04) through control equipment which includes a scrubber.
4.15	N/A	**New Permit Condition:** Requires the Permittee to route the Reactor R05 through control equipment which includes a scrubber.
4.16	19	**Updated Permit Condition:** Specifies the parametric operating ranges for control device servicing the R02, R04, and R05.
5.1	N/A	**New Permit Condition:** Standard language added regarding operation of control equipment and the maintenance of records corresponding to operation of control devices outside of their approved parametric monitoring ranges.
5.2	5	**Updated Permit Condition:** Standard language regarding continuous monitoring systems.
5.3.a	N/A	**New Permit Condition:** Specifies monitoring requirements for the scrubber serving the Alkoxylation Process including Reactor R01.
5.3.b	17	**Updated Permit Condition:** Specifies monitoring requirements for the scrubber serving the Reactors R02, R04, and R05.
5.4.a	N/A	**Updated Permit Condition:** Corresponds to pressure drop monitoring for dry scrubber that is part of the Sulfonation I Process Line.
5.4.b	22	**Updated Permit Condition:** Corresponds to pressure drop monitoring for demister 1 that is part of the Sulfonation I Process Line.
5.4.c	22	**Updated Permit Condition:** Corresponds to pressure drop monitoring for demister 2 that is part of the Sulfonation I Process Line.

Table 19: Summary of Updated SM Permit		
New Permit Condition No.	**Existing Permit Condition No.**	**Discussion**
5.4.d	22	**Updated Permit Condition:** Corresponds to pressure drop monitoring for tail gas demister that is part of the Sulfonation I Process Line.
5.4.e	21	**Updated Permit Condition:** Specifies monitoring of pH of the scrubbing solution in the caustic scrubber that is part of Sulfonation I Process Line.
5.4.f	18	**Updated Permit Condition:** Specifies monitoring of pressure drop across the caustic scrubber that is part of Sulfonation I Process Line.
5.4.g	20	**Updated Permit Condition:** Specifies monitoring of scrubbant flow rate across the caustic scrubber that is part of Sulfonation I Process Line.
5.4.h	22	**Updated Permit Condition:** Corresponds to pressure drop monitoring for cyclone/acid-gas separator system immediately downstream of Sulfonation II Process Line Reactor.
5.4.i	N/A	**Updated Permit Condition:** Corresponds to pressure drop monitoring for dry scrubber that is part of the Sulfonation II Process Line.
5.4.j	22	**Updated Permit Condition:** Corresponds to pressure drop monitoring for demister 1 that is part of the Sulfonation II Process Line.
5.4.k	22	**Updated Permit Condition:** Corresponds to pressure drop monitoring for demister 2 that is part of the Sulfonation II Process Line.
5.4.l	22	**Updated Permit Condition:** Corresponds to pressure drop monitoring for tail gas demister that is part of the Sulfonation II Process Line.
5.4.m	21	**Updated Permit Condition:** Specifies monitoring of pH of the scrubbing solution in the caustic scrubber that is part of Sulfonation II Process Line.
5.4.n	18	**Updated Permit Condition:** Specifies monitoring of pressure drop across the caustic scrubber that is part of Sulfonation II Process Line.
5.4.o	20	**Updated Permit Condition:** Specifies monitoring of scrubbant flow rate across the caustic scrubber that is part of Sulfonation II Process Line.
5.4.p	N/A	**New Permit Condition:** Specifies monitoring requirement for scrubber serving the Alkoxylation Process including Reactor R01.
5.4.q	N/A	**New Permit Condition:** Specifies monitoring requirement for scrubber serving the Alkoxylation Process including Reactor R01.

Table 19: Summary of Updated SM Permit		
New Permit Condition No.	**Existing Permit Condition No.**	**Discussion**
5.4.r	16	**Updated Permit Condition:** Specifies monitoring of pressure drop across the caustic scrubber that is part of the control equipment for Reactors R02, R04, and R05.
5.4.s	N/A	**New Permit Condition:** Specifies monitoring of scrubbant flow rate across the caustic scrubber that serves Reactors R02, R04, and R05.
5.5	N/A	**New Permit Condition:** Requires the installation and operation of a non-resettable monitoring system for the hours of operation of generators and fire pumps.
5.6	N/A	**New Permit Condition:** Specifies NSPS RRR maintenance of NSPS RRR monitoring of the cyclone separator immediately downstream of the Sulfonation II Process Line Reactor per 40 CFR 60.703(e).
5.7	40	**Updated Permit Condition:** Specifies the monitoring requirements for applicable storage tanks per 40 CFR 60 Subpart Kb.
6.1	4 26 27 28 29	**Updated Permit Conditions:** The permit language for the general performance testing requirements is included in this updated air permit.
6.2	N/A	**New Permit Condition:** Prescribes the requirements of NSPS RRR for Sulfonation II Process Line.
6.3	N/A	**New Permit Condition:** Prescribes the requirements of NSPS RRR for Sulfonation II Process Line.
6.4	23	**Updated Permit Condition:** Prescribes the requirements of NSPS RRR for Sulfonation II Process Line.
6.5	24	**Updated Permit Condition:** Prescribes the requirements of NSPS RRR for Sulfonation II Process Line.
7.1	N/A	**New Permit Condition:** General requirement regarding startup and shutdown and malfunctions.
7.2	N/A	**New Permit Condition:** General requirement regarding continuous monitoring devices.
7.3 7.4 7.5	N/A	**New Permit Conditions:** Recordkeeping requirements related to verifying compliance with the facility-wide VOC emissions limit.
7.6	N/A	**New Permit Condition:** Recordkeeping requirements related to maximum sulfur content in diesel fuel combusted at the facility.
7.7 7.8	40	**Updated Permit Condition:** Specifies NSPS Kb recordkeeping for storage tanks T-122 and T-124.
7.9	31	**Updated Permit Condition:** Specifies recordkeeping prescribed by NSPS RRR.
7.10	N/A	**New Permit Condition:** Stepan must maintain an up-to-date equipment list as provided in the updated SM Permit.

Table 19: Summary of Updated SM Permit		
New Permit Condition No.	**Existing Permit Condition No.**	**Discussion**
7.11	N/A	**New Permit Condition:** Defines reportable incidences for purpose of semi-annual reporting requirements.
7.12	N/A	**New Permit Condition:** VOC report.
8.1	N/A	**New Permit Condition:** Standard "Special Condition" added.
8.2	N/A	**New Permit Condition:** Emission Statements for sources located in affected counties, which includes Barrow County.
8.3	N/A	**New Permit Condition:** Standard air permit fee condition added.
8.4	N/A	**New Permit Condition:** Standard revocation language.
N/A	7 8 14 15 30	**Not carried over** to the new SM permit because the boilers will no longer burn No. 2 fuel oil per new permit restriction (and requested by Stepan).
N/A	25	**Not carried over** to the updated SM Permit. The permit condition pertains to testing.
N/A	32	**Not carried over** to the updated SM Permit because the content of condition is not supported by underlying regulation which in this case is NSPS RRR.

Summary & Recommendations

Stepan submitted application assigned number 24119 to modernize its air permit and to ensure that the permit accounts for all current operations at the Winder facility. Representatives of the Winder facility met with the Division on November 10, 2016 to discuss the path forward to achieve this goal. The Division visited the plant on February 1, 2017.

Stepan has reviewed the narrative and permit generated based on this permit application. Their comments and concerns have been incorporated in the narrative and permit. No public advisory was issued based on this application.

I recommend issuance of Permit No. 2843-013-0001-S-02-0.