Commonwealth of Kentucky
Division for Air Quality

STATEMENT OF BASIS / SUMMARY

Conditional Major, Operating
Permit: F-25-023

Danimer Scientific LLC
605 Rolling Hills Road
Winchester, KY 40391

June 5, 2025
Dylan Sears, Reviewer

SOURCE ID:	21-049-00069
AGENCY INTEREST:	110040
ACTIVITY:	APE20240002 & APE20250002

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SECTION 1 – SOURCE DESCRIPTION

SIC Code and description: 3999, Manufacturing Industries, NEC (other miscellaneous products not specially provided for previously)

Single Source Det. ☐ Yes ☒ No If Yes, Affiliated Source AI:

Source-wide Limit ☒ Yes ☐ No If Yes, See Section 4, Table A

28 Source Category ☐ Yes ☒ No If Yes, Category:

County: Clark
Nonattainment Area ☒ N/A ☐ PM_{10} ☐ $PM_{2.5}$ ☐ CO ☐ NO_X ☐ SO_2 ☐ Ozone ☐ Lead
If yes, list Classification:

PTE* greater than 100 tpy for any criteria air pollutant ☒ Yes ☐ No
If yes, for what pollutant(s)?
☐ PM_{10} ☐ $PM_{2.5}$ ☐ CO ☐ NO_X ☐ SO_2 ☒ VOC

PTE* greater than 250 tpy for any criteria air pollutant ☐ Yes ☒ No
If yes, for what pollutant(s)?
☐ PM_{10} ☐ $PM_{2.5}$ ☐ CO ☐ NO_X ☐ SO_2 ☐ VOC

PTE* greater than 10 tpy for any single hazardous air pollutant (HAP) ☐ Yes ☒ No
If yes, list which pollutant(s):

PTE* greater than 25 tpy for combined HAP ☐ Yes ☒ No

*PTE does not include self-imposed emission limitations.

Description of Facility:

Danimer Scientific, LLC. (Danimer Scientific) uses proprietary processing to produce polyesters biosynthesized by a soil bacterium fed by inexpensive oils derived from the seeds of plants such as canola, soy, and palm. The seeds are crushed in a cold press, yielding a high quality oil feedstock.

A biopolymer is produced through proprietary manipulations of the nutrient environment and extremely controlled and optimized calculations. To extract the biopolymer from the cells of the cultivated microorganisms, Danimer Scientific uses a proprietary extraction process in which the biomass is removed to isolate the final purified product. A solution containing alcohol is used at a point during downstream processing resulting in emissions. The resulting material is then dried, producing clean white powder ready to be pelletized.

SECTION 2 – CURRENT APPLICATION AND EMISSION SUMMARY FORM

Permit Number: F-25-023 Activities: APE20240002

Received: October 03, 2024 Application Complete Date(s): May 23, 2025

Permit Action: ☐ Initial ☒ Renewal ☐ Significant Rev ☐ Minor Rev ☐ Administrative

Construction/Modification Requested? ☐Yes ☒No

Previous 502(b)(10) or Off-Permit Changes incorporated with this permit action ☒Yes ☐No

Description of Action:

APE20220003
502(b)(10) Change:
On October 31, 2022, The Division for Air Quality received an application to replace the carrier solvent from methanol to isopropanol for lines two and three. This permit action lowers the PTE of methanol to less than 10 tons per year. As a result, the source-wide methanol limit of less than or equal to 9.0 TPY has been removed.

APE20240001
502(b)(10) Change:
On May 31, 2024, The Division for Air Quality received an application to install a temporary low NOx boiler to replace Boiler T during repair, the unit has been removed upon the repair of Boiler T and thus no changes to the permit will be incorporated.

APE20240002 (Renewal)
On October 03, 2024 the Division for Air Quality received an application for the renewal of the F-19-040 R2 permit where no additional changes were requested. On Augst 27, 2024, upon request, the Division received an updated application containing the signature of the responsible official.

APE20250002 (Administrative Amendment)
On June 2, 2025 The Division for Air Quality received an administrative amendment for a name and ownership change from Danimer Scientific Kentucky Inc. to Danimer Scientific LLC Additionally, the responsible official was updated to Kevin Welsh, Plant Director.

F-25-023 Emission Summary		
Pollutant	2024 Actual (tpy)	Revised PTE F-25-023 (tpy)
CO	6.95	45.00
NO_X	8.27	53.51
PT	5.28	10.42
PM_{10}	5.28	10.42
$PM_{2.5}$	5.28	10.42
SO_2	0.050	0.32
VOC	11.69	96.97* (Allowable ≤ 90.0)
Greenhouse Gases (GHGs)		
Carbon Dioxide	9,910	64,169
Methane	0.189	1.222
Nitrous Oxide	0.118	0.762
CO_2 Equivalent (CO_2e)	9950	64,426
Hazardous Air Pollutants (HAPs)		
Hexane	0.149	0.963
Methanol	0.010	2.924
Combined HAPs:	0.159	3.95

* Reflects controlled emissions as modified per permit F-25-023, whereas uncontrolled emissions are greater than major source thresholds.

SECTION 3 – EMISSIONS, LIMITATIONS AND BASIS

Emission Units: 107 – (901) Boiler #4, Fermentation Boiler (PLT1), 111 – (902) Boiler #6 (PLT1), 904 – (904) Boiler T					
Pollutant	**EU**	**Emission Limit or Standard**	**Regulatory Basis for Emission Limit or Standard**	**Emission Factor Used and Basis**	**Compliance Method**
PM	107	0.38 lb/mmBtu	401 KAR 59:015, Section 4(1)(c)	7.6 lb/mmscf, AP-42 Ch. 1.4	Assumed when burning only Natural Gas
		20% Opacity	401 KAR 59:015, Section 4(2)	NA	
SO_2		1.55 lb/mmBtu	401 KAR 59:015, Section 5(1)(c)(2)	0.6 lb/mmscf, AP-42 1.4	
PM	111	0.33 lb/mmBtu	401 KAR 59:015, Section 4(1)(c)	7.6 lb/mmscf, AP-42 Ch. 1.4	
		20% Opacity	401 KAR 59:015, Section 4(2)	NA	
SO_2		1.20 lb/mmBtu	401 KAR 59:015, Section 5(1)(c)(2)	0.6 lb/mmscf, AP-42 1.4	
PM	904	0.31 lb/mmBtu	401 KAR 59:015, Section 4(1)(c)	7.6 lb/mmscf, AP-42 Ch. 1.4	
		20% Opacity	401 KAR 59:015, Section 4(2)	NA	
SO_2		1.07 lb/mmBtu	401 KAR 59:015, Section 5(1)(c)(2)	0.6 lb/mmscf, AP-42 Ch. 1.4	

Initial Construction Date: 107 – 2002; 111 – 2004; 904 –2021

Process Description:

Emission Unit 107 (901) Boiler #4, Fermentation Boiler (PLT1)
Model: HURST S3-X-800-150
Max Capacity: 33.6 mmBtu/hr
Fuel Type: Natural Gas

Emission Unit 111 (902) Boiler #6 (PLT1)
Model: HURST S4-X-1000-150
Maximum Capacity: 42 mmBtu/hr
Fuel Type: Natural Gas

Emission Unit 904 (904) Boiler T
Model: Cleaver Brooks CBEX
Maximum Capacity: 48.98 mmBtu/hr
Fuel Type: Natural Gas

Applicable Regulation:
401 KAR 59:015, New indirect heat exchangers, applies to the particulate matter and sulfur dioxide emissions for each indirect heat exchanger commenced on or after April 9, 1972 with a heat input capacity at or below 250 mmBtu/hour, and more than one (1) mmBtu/hour.

Emission Units: 107 – (901) Boiler #4, Fermentation Boiler (PLT1), 111 – (902) Boiler #6 (PLT1), 904 – (904) Boiler T
401 KAR 60:005, Section 2(2)(d), 40 C.F.R. 60.40c through 60.48c (Subpart Dc), Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units, applies to each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 29 megawatts (MW) (100 million British thermal units per hour (mmBtu/hr)) or less, but greater than or equal to 2.9 MW (10 mmBtu/hr). **Comments:** Pursuant to 401 KAR 52:030, Section 10, the permittee shall monitor and maintain records of the monthly amount of natural gas usage in each boiler unit (cubic feet/month). Emission factors are based on AP-42 Chapter 1.4.

Emission Unit: 903 4SRB, Spark Ignition Emergency Generator, 905 4SRB, Spark Ignition Emergency Generator

Emission Unit	Pollutant	Emission Limit or Standard	Regulatory Basis for Emission Limit or Standard	Emission Factor Used and Basis	Compliance Method
903	NOx	2 g/hp-hr	40 CFR 60.4233(e), Table 1 to 40 CFR 60, Subpart JJJJ	19.02 lb/mmscf (Manufacturer)	Purchasing an engine certified according to 40 CFR 60, Subpart JJJJ, for the same model year and according to 40 CFR 60.4243(a)
	CO	4 g/hp-hr		62.62 lb/mmscf (Manufacturer)	
	VOC	1 g/hp-hr		3.08 lb/mmscf (Manufacturer)	
905	NOx	2 g/hp-hr		2.28 lb/mmscf (Manufacturer)	
	CO	4 g/hp-hr		79.69 lb/mmscf (Manufacturer)	
	VOC	1 g/hp-hr		38.71 lb/mmscf (Manufacturer)	

Initial Construction Date: 903 – 01/2020; 905 – 05/2022

Process Description:

Emission Unit 903 (903) 4SRB, Spark Ignition Emergency Generator
Model: Kohler 150REZGC (EPA Certified with 3-Way Catalyst)
Fuel: Natural Gas
Power Output: 259 hp, 150 KW
Fuel Consumption: 1,965 scf/hr @ 100% Load

Emission Unit 905 (905) 4SRB, Spark Ignition Emergency Generator
Model: Kohler KG100 (EPA Certified with 3-Way Catalyst)
Fuel: Natural Gas
Power Output: 204 hp, 152 kW
Fuel Consumption: 1,473 scf/hr @ 100% Load

**Emission Unit: 903 4SRB, Spark Ignition Emergency Generator,
905 4SRB, Spark Ignition Emergency Generator**

Applicable Regulation:
401 KAR 63:002 Section 2(4)(eeee), 40 C.F.R. 63.6580 through 63.6675, Tables 1a through 8, and Appendix A (Subpart ZZZZ), National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines, applies to stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. Pursuant to 40 CFR 63.6590(c)(1), an affected source must meet the requirements of 40 CFR 63, Subpart ZZZZ by meeting the requirements of 40 CFR 60, Subpart JJJJ. No further requirements apply for such engines under 40 CFR 63, Subpart ZZZZ.

401 KAR 60:005, Section 2(2)(eeee), 40 C.F.R. 60.4230 through 60.4248, Tables 1 through 4 (Subpart JJJJ), Standards of Performance for Stationary Spark Ignition Internal Combustion Engines, applies to manufacturers, permittee's, and operators of stationary spark ignition (SI) internal combustion engines (ICE) as specified in 40 CFR 60.4230(a)(1) through (6). Emission units 903 and 905 are emergency stationary SI ICE and were constructed after June 12, 2006 and manufactured after January 1, 2009, therefore they are subject to the requirements of 40 CFR 60, Subpart JJJJ.

Comments:
Pursuant to 40 CFR 60.4243(b)(1), if the permittee does not operate and maintain the certified stationary SI internal combustion engine and control device according to the manufacturer's emission-related written instructions, the engines will be considered non-certified engines, and the permittee must demonstrate compliance according to 40 CFR 60.4243(a)(2)(ii), and must conduct an initial performance test within 1 year of engine startup to demonstrate compliance according to 40 CFR 60.4244(a) through (g).

**Emission Units: 660 – Tank Vent A Clean Solution Storage;
650 – Tank Vent B Used Solution Storage; 760 – Tank Vent C Clean Solution Storage;
750 – Tank Vent D Used Solution Storage**

Initial Construction Date: 660, 650 – 01/2020; 760, 750 – 05/2022

Process Description:
Emission Unit 660 (660) Tank Vent A Clean Solution Storage
Annual Throughput: 11,048,112 gallons
Average Vapor Pressure: 1.83 psia
Maximum Vapor Pressure: 2.10 psia

Emission Unit 650 (650) Tank Vent B Used Solution Storage
Annual Throughput: 13,022,266 gallons
Average Vapor Pressure: 1.56 psia
Maximum Vapor Pressure: 1.79 psia

Emission Units: 660 – Tank Vent A Clean Solution Storage; 650 – Tank Vent B Used Solution Storage; 760 – Tank Vent C Clean Solution Storage; 750 – Tank Vent D Used Solution Storage

Emission Unit 760 (760) Tank Vent C Clean Solution Storage
Description:
Annual Throughput: 22,096,224 gallons
Average Vapor Pressure: 1.83 psia
Maximum Vapor Pressure: 2.10 psia

Emission Unit 750 (750) Tank Vent D Used Solution Storage
Description:
Annual Throughput: 26,044,532 gallons
Average Vapor Pressure: 1.56 psia
Maximum Vapor Pressure: 1.79 psia

Applicable Regulation:
401 KAR 63:020, Potentially hazardous matter or toxic substances. [State-Origin Requirement], applies to each affected facility which emits or may emit potentially hazardous matter or toxic substances, provided that such emissions are not elsewhere subject to the provisions of the administrative regulations of the Division. This applies to the methanol emissions from the tanks.

Comments:
Refer to **Table A - Group Requirements** of **Section 4 – Source Information and Requirements**

401 KAR 60:005, Section 2(2)(r), 40 C.F.R. 60.110b through 60.117b (Subpart Kb), Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984, applies to each storage vessel with a capacity greater than or equal to 75 cubic meters (m^3) that is used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after July 23, 1984. Pursuant to 40 CFR 60.110b(b), 40 CFR 60, Subpart Kb does not apply to storage vessels with a capacity greater than or equal to 75 m^3 but less than 151 m^3 storing a liquid with a maximum true vapor pressure less than 15.0 kPa (2.18 psia). Emission units 660, 650, 760, and 750 each have a capacity within the specified range above, and have a true vapor pressure of less than 2.18 psia, therefore 40 CFR 60, Subpart Kb does not apply.

Bioplastics Production Area
Emission Units: 501 – Mixer, 502 – Filter #2, 503 – Filter #2 Ventilation, 601 – Dryer, 511 – Mixer (T541), 512 – Filter #2 (T530), 513 – Filter #2 Ventilation (TV530), 621 – Dryer (T621), 522 – Mixer (T541), Filter #2 (T550), 523 – Filter #2 Ventilation (TV550), 641 – Dryer(T641), 653 –Solution Recovery Skid, 656 – Solution Recovery Skid

Initial Construction Date: 501, 502, 503, 601, 653 – 01/2020, HX-685 & HX 686 as control for 502 – 05/2021; 511, 512, 513, 621, 521, 522, 523, 641, 656, HX-695 & HX 696 as control for 512 and 522 – 05/2022

Process Description:

Emission Unit 501 (501) Line 1 Mixer
Material Blending
Max Annual Production: 9.6 Million Pounds of Bioplastic per Year
Average Hourly Production: 0.548 Tons of Bioplastic per Hour
Control: None

Emission Unit 502 (502) Line 1 Filter #2
Filters and Removes excess liquid.
Max Annual Production: 9.6 Million Pounds of Bioplastic per Year
Average Hourly Production: 0.548 Tons of Bioplastic per Hour
Control: Single Pass Shell and Tube Condensers HX-685 and HX-686 in series

Emission Unit 503 (503) Line 1 Filter #2 Room Ventilation
Ventilation for room housing Filter #2.
Max Annual Production: 9.6 Million Pounds of Bioplastic per Year
Average Hourly Production: 0.548 Tons of Bioplastic per Hour

Emission Unit 601 (601) Line 1 Dryer
Max Annual Production: 9.6 Million Pounds of Bioplastic per Year
Average Hourly Production: 0.548 Tons of Bioplastic per Hour

Emission Unit 653 (653) Line 1 Solution Recovery Skid
Multi-Stage Distillation for 501
Max Annual Production: 9.6 Million Pounds of Bioplastic per Year
Average Hourly Production: 0.548 Tons of Bioplastic per Hour

Emission Unit 511 (511) Line 2 Mixer T511
Material Blending
Max Annual Production: 9.6 Million Pounds of Bioplastic per Year
Average Hourly Production: 0.548 Tons of Bioplastic per Hour
Control: None

Emission Unit 512 (530) Line 2 Filter #2 T530
Filters and Removes excess liquid.
Max Annual Production: 9.6 Million Pounds of Bioplastic per Year
Average Hourly Production: 0.548 Tons of Bioplastic per Hour
Control: Single Pass Shell and Tube Condensers HX-695 and HX-696 in series

Bioplastics Production Area
Emission Units: 501 – Mixer, 502 – Filter #2, 503 – Filter #2 Ventilation, 601 – Dryer, 511 – Mixer (T541), 512 – Filter #2 (T530), 513 – Filter #2 Ventilation (TV530), 621 – Dryer (T621), 522 – Mixer (T541), Filter #2 (T550), 523 – Filter #2 Ventilation (TV550), 641 – Dryer(T641), 653 –Solution Recovery Skid, 656 – Solution Recovery Skid

Emission Unit 513 (531) Line 2 Filter #2 Room Ventilation T530
Ventilation for room housing Filter #2. (T530)
Max Annual Production: 9.6 Million Pounds of Bioplastic per Year
Average Hourly Production: 0.548 Tons of Bioplastic per Hour

Emission Unit 621 (621) Line 2 Dryer T621
Max Annual Production: 9.6 Million Pounds of Bioplastic per Year
Average Hourly Production: 0.548 Tons of Bioplastic per Hour

Emission Unit 521 (541) Line 3 Mixer T541
Material Blending
Max Annual Production: 9.6 Million Pounds of Bioplastic per Year
Average Hourly Production: 0.548 Tons of Bioplastic per Hour
Control: None

Emission Unit 522 (550) Line 3 Filter #2 T550
Filters and Removes excess liquid.
Max Annual Production: 9.6 Million Pounds of Bioplastic per Year
Average Hourly Production: 0.548 Tons of Bioplastic per Hour
Control: Single Pass Shell and Tube Condensers HX-695 and HX-696 in series

Emission Unit 523 (551) Line 3 Filter #2 Room Ventilation (TV550)
Ventilation for room housing Filter #2. (T550)
Max Annual Production: 9.6 Million Pounds of Bioplastic per Year
Average Hourly Production: 0.548 Tons of Bioplastic per Hour

Emission Unit 641 (641) Line 3 Dryer (T641)
Max Annual Production: 9.6 Million Pounds of Bioplastic per Year
Average Hourly Production: 0.548 Tons of Bioplastic per Hour

Emission Unit 656 (656) Lines 2 & 3 Solution Recovery Skid
Multi-Stage Distillation for 511 and 521
Max Annual Production: 19.2 Million Pounds of Bioplastic per Year
Average Hourly Production: 1.096 Tons of Bioplastic per Hour

Applicable Regulation:
401 KAR 63:020, Potentially hazardous matter or toxic substances. [State-Origin Requirement], applies to each affected facility which emits or may emit potentially hazardous matter or toxic substances, provided that such emissions are not elsewhere subject to the provisions of the administrative regulations of the Division. This applies to the methanol emissions from the emission units in the Bioplastics Production Area.

Bioplastics Production Area
Emission Units: 501 – Mixer, 502 – Filter #2, 503 – Filter #2 Ventilation, 601 – Dryer, 511 – Mixer (T541), 512 – Filter #2 (T530), 513 – Filter #2 Ventilation (TV530), 621 – Dryer (T621), 522 – Mixer (T541), Filter #2 (T550), 523 – Filter #2 Ventilation (TV550), 641 – Dryer(T641), 653 –Solution Recovery Skid, 656 – Solution Recovery Skid

Comments:
Refer to **Table A - Group Requirements** of **Section 4 – Source Information and Requirements**

For emission units in the Bioplastics Production Area [501, 502, 503, 601, 653, 511, 512, 513, 621, 521, 522, 523, 641, and 656], the emission factor for VOC for line 1 [501, 502, 503, 601 and 653]is the sum of methanol and ethanol emission factors; the emission factor for VOC or for line 2 [511, 512, 513, 621, and 656] and line 3 [521, 522, 523, and 641] is the sum of isopropanol and ethanol emission factors.

The permittee shall use the most recently approved controlled emission factors for VOC, methanol, and/or isopropanol to calculate emissions at emission units 502, 512, and 522.

If the 3-hour rolling average outlet gas temperature exceeds the maximum operating temperature limit established for the outlet gas temperature of condenser HX-686 during the most recent performance test approved by the Division, then the permittee shall assume zero control of emissions from condensers HX-685 and HX-686.

If the 3-hour rolling average outlet gas temperature exceeds the maximum operating temperature limit established for the outlet gas temperature of condenser HX-696 during the most recent performance test approved by the Division, then the permittee shall assume zero control of emissions from condensers HX-695 and HX-696.

The duration that the established 3-hour rolling average outlet gas temperatures are above the respective operating temperature limits established for condensers HX-686 and HX-696 shall be recorded; and the most recently approved uncontrolled emission factors for emission units 502, 512, and 522 shall be used to calculate the uncontrolled emissions for VOC during those periods.

The coolant liquid flowrates of condensers HX-685 and HX-686, and HX-695 and HX-696 shall be monitored as indicators of proper operation of the condensers, but are not subject to any operating limitations.

In permit F-19-040, the facility was required to conduct initial testing to determine the emissions of methanol and VOC from the Line 1 Mixer (emission unit 501). Subsequent testing, witnessed by the Division, was conducted on the unit by the facility to determine the methanol and VOC emissions after improvement in operation. Based on the actual recorded temperature for emission unit 501 since it began operation, the facility has conducted an updated engineering estimate of the emissions of methanol and VOC. The Division has verified the mass balance calculations based on the lower temperature of operation and corresponding vapor pressure. Therefore, the PTE from emission unit 501 is not required to be verified through additional testing at this stage. Furthermore, this engineering estimate has been applied to the mixers for Lines 2 and 3 (emission units 511 and 521), with no testing being required for these mixers in permit F-19-040 R2.

The emissions factors for methanol and VOC emissions from the Solution Recovery Skids (emission units 653 and 656) were also updated due to the same observations and improvements made to Line 1. However,

Bioplastics Production Area **Emission Units: 501 – Mixer, 502 – Filter #2, 503 – Filter #2 Ventilation, 601 – Dryer, 511 – Mixer (T541), 512 – Filter #2 (T530), 513 – Filter #2 Ventilation (TV530), 621 – Dryer (T621), 522 – Mixer (T541), Filter #2 (T550), 523 – Filter #2 Ventilation (TV550), 641 – Dryer(T641), 653 –Solution Recovery Skid, 656 – Solution Recovery Skid**
the Dryers (emission units 601, 621, and 641) were not affected by the improvements made to the bioplastics production process. As a result of the APE20220003 502(b)(10) change, the carrier solvent for line 2 [511, 512, 513, 621, and 656] and line 3 [521, 522, 523, and 641] was changed from methanol to isopropanol. The change resulted in source-wide methanol PTE to fall below 10 tpy. Therefore, the source wide limit of methanol has been removed.

SECTION 3 – EMISSIONS, LIMITATIONS AND BASIS (CONTINUED)

Testing Requirements\Results

Emission Unit(s)	Control Device	Parameter	Regulatory Basis	Frequency	Test Method	Permit Limit	Test Result	Throughput & Operating Parameter(s) Established During Test	Activity Graybar	Date of last Compliance Testing
501	None	VOC EF	401 KAR 52:030, Section 10, to preclude 401 KAR 52:020	Within 180 days of startup to determine EFs	Method 25A	NA	2.794* lb/ton	0.678 tons Bioplastic per hour	CMN202 00001	11/18/2020
		Methanol EF			Method 308		0.664* lb/ton			
501	None	Methanol EF		Test to determine EFs	Method 308	NA	3.642* lb/ton	0.513 tons Bioplastic per hour		12/2/2020-12/4/2020
502	None	VOC EF		Within 180 days of startup to determine EFs	Method 25A	NA	9.079* lb/ton	1.408 tons Bioplastic per hour		12/2/2020-12/4/2020
		Methanol EF			Method 308		1.629* lb/ton			
501	None	VOC EF	401 KAR 52:030, Section 10, to preclude 401 KAR 52:020 and 401 KAR 51:017	Test to determine EFs	Method 25A	NA	0.286 lb/ton	561.21 ft^3 Bioplastic per hour[1]	CMN202 10001	October 26, 28, 2021
		Methanol EF			Method 308	NA	0.059 lb/ton			
502	Condensers HX-685 & HX-686 in series	Controlled VOC EF at outlet of HX-686.		Within 60 days of achieving max prod. rate, not to exceed 180 days after install of condensers.	Method 25A	NA	7.852* lb/ton	24.9 gpm Water Coolant[2] 9.4 gpm Glycol Coolant[2] 3.12° C Outlet Stack Temp[2]	CMN202 10001	October 26, 28, 2021
		Controlled Methanol EF at outlet of HX-686.			Method 308	NA	2.431* lb/ton			

* The test results yielded emission factors higher than those provided in the respective applications.

1. The throughput from the test report is based on the plant throughput for the entire batch divided by the initial two hours of testing. Please see Section G.5.b in the permit for additional testing requirements.
2. As found on pages 201-209, and 213 of 220 of the Emissions Test Report received by the on December 27, 2021.

Testing Requirements\Results (Continued)

Emission Unit(s)	Control Device	Parameter	Regulatory Basis	Frequency	Test Method	Permit Limit	Test Result	Throughput & Operating Parameter(s) Established During Test	Activity Graybar	Date of last Compliance Testing
502[4]	Condensers HX-685 & HX-686 in series	Controlled VOC EF at outlet of HX-686 and calculated control efficiency.[*4]	401 KAR 52:030, Section 10, to preclude 401 KAR 52:020	Within 60 days of restarting line 1. Repeat every 5 years.	Method 25A	NA	TBD	TBD	TBD	TBD
512 and 522	Condensers HX-695 & HX-696 in series	Controlled VOC EF at outlet of HX-696 and calculated control efficiency.[*5]		Within 60 days of achieving max prod. rate, not to exceed 180 days after startup of emission units 512 and 522. Repeat every 5 years.	Method 25A	NA	5.24 lb/hr (7.42 lb/ton) 94.73% control	0.707 tons Bioplastic per hour 31.8 gpm Water Coolant[3] 10.4 gpm Glycol Coolant[3] 4.47° C Outlet Stack Temp[3]	CMN2022 0001[5]	December 6, 7, 2022
512 and 522	Condensers HX-695 & HX-696 in series	Controlled VOC EF at outlet of HX-696 and calculated control efficiency.[*5]	401 KAR 52:030, Section 10, to preclude 401 KAR 52:020	Within 60 days of achieving max prod. rate, not to exceed 180 days after startup of emission units 512 and 522. Repeat every 5 years.	Method 25A	TBD	TBD	TBD	TBD	TBD

3. As found on pages 59-64 of the Emissions Test Report received by the on January 10, 2023.
4. Unit 502 is idle, testing will be conducted within 60 days of resuming startup.
5. Testing was not conducted for methanol as the carrier solvent had already been switched to isopropanol.

SECTION 4 – SOURCE INFORMATION AND REQUIREMENTS

Table A - Group Requirements:

Emission and Operating Limit	Regulation	Emission Unit
≤ 90 tpy of VOC emissions on a twelve (12) month rolling basis	401 KAR 52:030, Federally-enforceable permits for nonmajor sources to preclude 401 KAR 52:020	Source-wide

Table B - Summary of Applicable Regulations:

Applicable Regulations	Emission Unit
401 KAR 59:010, New process operations.	IA601, IA602, IA603, IA604
401 KAR 59:015, New indirect heat exchangers.	107, 111, 904
401 KAR 63:020, Potentially hazardous matter or toxic substances.	650, 660, 760, 750, 501, 502, 503, 601, 653, 511, 512, 513, 621, 521, 522, 523, 641, 656, IA602
401 KAR 60:005, Section 2(2)(d), 40 C.F.R. 60.40c through 60.48c (Subpart Dc), Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units.	107, 111, 904
401 KAR 60:005, Section 2(2)(eeee), 40 C.F.R. 60.4230 through 60.4248, Tables 1 through 4 (Subpart JJJJ), Standards of Performance for Stationary Spark Ignition Internal Combustion Engines.	903, 905
401 KAR 63:002 Section 2(4)(eeee), 40 C.F.R. 63.6580 through 63.6675, Tables 1a through 8, and Appendix A (Subpart ZZZZ), National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines.	903, 905

Table C - Summary of Precluded Regulations:

None

Table D - Summary of Non Applicable Regulations:

None

SECTION 4 – SOURCE INFORMATION AND REQUIREMENTS (CONTINUED)

Air Toxic Analysis

401 KAR 63:020, Potentially Hazardous Matter or Toxic Substances
The Division for Air Quality (Division) has performed SCREEN View on February 9, 2021 of potentially hazardous matter or toxic substances (Methanol) that may be emitted by the facility based upon the process rates, material formulations, stack heights and other pertinent information provided by the applicant. Based upon this information, the Division has determined that the conditions outlined in this permit will assure compliance with the requirements of 401 KAR 63:020. In the APE20220003 renewal the Division did not rescreen methanol as total potential emissions of methanol have decreased and the units which still emit methanol are unchanged.

401 KAR 63:020, Potentially Hazardous Matter or Toxic Substances
The Division for Air Quality (Division) has performed SCREEN View on May 15, 2025 of potentially hazardous matter or toxic substances (Isopropanol) that may be emitted by the facility based upon the process rates, material formulations, stack heights and other pertinent information provided by the applicant. Based upon this information, the Division has determined that the conditions outlined in this permit will assure compliance with the requirements of 401 KAR 63:020.

Single Source Determination
N/A

SECTION 5 – PERMITTING HISTORY

Permit	Permit Type	Activity#	Complete Date	Issuance Date	Summary of Action	PSD/ Syn Minor
S-18-101	Initial	APE20180002	11/8/2018	11/9/2018	Initial Permit	NA
S-18-101 R1	Admin Amend	APE20190001	2/8/2019	4/13/2019	Administrative Amendment: Name and Ownership Change. Removal of North and South Spray Dryers	NA
F-19-040	Initial	APE20190003	1/9/2020	3/7/2020	Initial Conditional Major Permit	NA
F-19-040 R1	Cond. Mjr. Significant Revision	APE20210001	2/26/2021	4/16/2021	Removed prod. limit on bioplastic prod., adjusted PTE of several emission units, & added condensers HX-515 and HX-516 for control of emission unit 502	NA
	Cond. Mjr./Synthetic Minor Significant Revision	APE20210002	2/26/2021	4/16/2021	Added 56.2 mmBtu /hr boiler, 204 hp emergency engine, and two new tanks; added two new lines to bioplastic production with new condensers HX-615 and HX-616 & RTO R-600. Added 2.25 million lb/month operating limit on bioplastic production	Syn Minor
F-19-040 R2	Significant Revision	APE20210004	11/10/2021	1/3/2022	Updated emission factors for Mixer, Filter #2 and Filter #2 room Ventilation at line 1, the facility also requested the permit removal of the 2,250,000 lbs bioplastic production per month limitation and thermal oxidizer	NA

SECTION 6 – PERMIT APPLICATION HISTORY

None

APPENDIX A – ABBREVIATIONS AND ACRONYMS

Btu – British thermal unit
CO – Carbon Monoxide
Division – Kentucky Division for Air Quality
EF – Emission Factor
GHG – Greenhouse Gas
HAP – Hazardous Air Pollutant
NESHAP – National Emissions Standards for Hazardous Air Pollutants
NO_x – Nitrogen Oxides
PM – Particulate Matter
PM_{10} – Particulate Matter equal to or smaller than 10 micrometers
$PM_{2.5}$ – Particulate Matter equal to or smaller than 2.5 micrometers
PSD – Prevention of Significant Deterioration
PTE – Potential to Emit
SO_2 – Sulfur Dioxide
VOC – Volatile Organic Compounds

APPENDIX B – INDIRECT HEAT EXCHANGER EMISSIONS LIMITATIONS

Summary of All Affected Facilities Used to Determine 401 KAR 59:015 Emission Limits								
EU	Fuel(s)	Capacity (mmBtu/hr)	Constructed	Basis for PM Limit	Total Heat Input Capacity for PM Limit (mmBtu/hr)	Basis for SO_2 Limit	Total Heat Input Capacity for SO_2 Limit (mmBtu/hr)	Notes
101	Natural Gas	8.37	1983	401 KAR 59:015, Section 4(1)(c)	16.74	401 KAR 59:015, Section 5(1)(c)(2)	16.74	Removed from facility in 2011
102	Natural Gas	8.37	1983					
107	Natural Gas	33.6	2002		50.34		50.34	
111	Natural Gas	42	2004		92.34		92.34	
001	Natural Gas	2.929	2014		78.529		78.529	Removed from facility in 2019
904	Natural Gas	48.98	2021		124.58		124.58	