



west virginia department of environmental protection

Division of Air Quality
601 57th Street SE
Charleston, WV 25304
Phone (304) 926-0475 • FAX: (304) 926-0479

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-0882K
Plant ID No.: 039-00663
Applicant: Optima Belle LLC
Facility Name: Belle
Location: Belle, Kanawha County
NAICS Code: 325199
Application Type: Class II Administrative Update
Received Date: March 30, 2016
Engineer Assigned: Mike Egnor
Fee Amount: \$1,000.00
Date Received: May 12, 2016
Complete Date: May 27, 2016
Due Date: July 26, 2016
Applicant Ad Date: May 17, 2016
Newspaper: *The Charleston Gazette*
UTM's: Easting: 451.90 km Northing: 4,232.60 km Zone: 17
Description: Two alternative operating scenarios for production of L-alanine methyl ester (LAME) are being added to this Permit. Emissions from scenario one (dried LAME) of this process includes 0.45 lbs/hr and 0.02 TPY of PM, 19.13 lbs/hr and 0.10 TPY of SO₂, 0.01 lbs/hr and 0.03 TPY of VOC process, 0.01 lbs/hr and 0.01 TPY of Acetonitrile, 0.11 lbs/hr and 0.01 TPY of Hydrogen Chloride, 0.01 lbs/hr and 0.01 TPY of Methanol, 0.01 lbs/hr and 0.01 TPY of Methyl Tert-Butyl Ether, from the process, 1.21 lbs/hr and 0.01 TPY of Methanol from filter changeout, and 1.21 lbs/hr and 0.01 TPY of VOC's from filter changeout. Emissions for scenario two (undried LAME) of this process includes 0.18 lbs/hr and 0.01 TPY of PM, 1.91 lbs/hr and 0.01 TPY of SO₂, 1.25 lbs/hr and 0.03 TPY of VOC process, 0.01 lbs/hr and 0.01 TPY of Acetonitrile, 0.01 lbs/hr and 0.01 TPY of Hydrogen Chloride, 0.01 lbs/hr and 0.01 TPY of Methanol, 1.23 lbs/hr and 0.01 TPY of Methyl Tert-Butyl Ether, from the process, and 1.21 lbs/hr and 0.01 TPY of Methanol from filter changeout and 1.21 lbs/hr and 0.01 TPY of VOC's from filter changeout.

INTRODUCTION

On May 11, 2016 Optima Belle LLC submitted a Class II Administrative Update for the proposed revisions to operating scenario one (dried LAME) and on June 13, 2016 for operating scenario two (undried LAME) for process equipment located at the Belle

Plant, currently covered under permit R13-0882J.

On May 25, 2016, Optima submitted an affidavit of publication indicating that the required legal notice was run in the Charleston Gazette on May 17, 2016, initiating the 30-day public notice period. Optima also submitted the application fee of \$1,000 May 12, 2016 to meet the requirements associated with the Application for Modification Permit.

DESCRIPTION OF PROCESS

L-alanine methyl ester (LAME) Overview:

L-alanine methyl ester (LAME), a crystalline solid, is produced from reactions of mixtures which include: thionyl chloride, methanol, L-alanine, sodium methoxide, acetonitrile, and methyl t-butyl ether "MTBE".

LAME is typically used to generate pharmaceutical intermediators and electrolytes in the food industry.

Process Summary 1 (dried LAME):

Varying amounts of the listed components are charged to reactors, then agitated for mixing. These mixtures are then combined and react to form the final product. Through decanting, stripping, and drying, the final product is isolated and purified from the reaction mixtures and solvents. Waste materials are loaded to totes and tanker trucks for off-site disposal. 10 batches will be made per calendar year.

The proposed production of LAME will be conducted within the existing permitted operating unit, currently permitted under R13-0882J except for a new Tanker Truck (229) and a filter (fugitive).. As a result, the changes associated with permit application R13-0882J will result in two new emission points.

Process Summary 2 (Undried LAME):

Varying amounts of the listed components are charged to reactors, then agitated for mixing. These mixtures are then combined and react to form the final product. Through decanting and stripping the final undried product is isolated and purified from the reaction mixtures and solvents. Waste materials are loaded to totes and tanker trucks for off-site disposal. 10 batches will be made per calendar year.

The proposed production of LAME will be conducted within the existing permitted operating unit, currently permitted under R13-0882J except for a new Tanker Truck (229) and a filter (fugitive). As a result, the changes associated with permit application R13-0882J will result in two new emission points.

SITE INSPECTION

No site inspection was performed by the permitting engineer for this modification as the facility is well known to the DAQ and is frequently inspected by members of the DAQ Enforcement Section.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Operating Scenario 1 (dried LAME)

Emission Point 104.014, which is the exit of the main scrubber (003), incinerator (009) and scrubber (010) is stated as 99.9% efficient. The facility is not claiming any reduction in emissions for the dust collector for Emission Point 107.022 and 104.003B. There will also be fugitive emissions from the drop of solid materials into process vessels. Total emissions from below are estimated to be 1.22 lbs/hr and 80 lbs/yr of VOC's, 19.13 lbs/hr and 200 lbs/yr of SO2, 0.01 lbs/hr and 20 lbs/yr of Acetonitrile, 0.11 lbs/hr and 20 lbs/yr of hydrogen chloride, 1.22 lbs/hr and 40 lbs/yr of methanol, 0.01 lbs/hr and 20 lbs/yr of Methyl Tert-Butyl Ether, and 0.45 lbs/hr and 40 lbs/yr of PM.

Emissions Summary

The proposed changes addressed in permit application R13-0882K shall result in the affected emission points undergoing emissions as shown in the following Table 1 - Emissions Summary.

Table 1 - Emissions Summary Operating Scenario 1 (dried LAME)

Emission Point ID	Device Type	Pollutant	Air Pollution Control Device ID	Maximum Potential Uncontrolled Emissions		Maximum Potential Controlled Emissions	
				lbs/hr	tons/yr	lbs/hr	lbs/yr
104.014	Main Scrubber*, Incinerator Scrubber	VOC	003	74.72	3.35	0.01	60
		SO2	009	1,913.47	9.57	19.13	200
		Acetonitrile	010	1.58	0.04	0.01	20
		Hydrogen Chloride		1,088.96	5.44	0.11	20
		Methanol		25.38	0.53	0.01	20
		Methyl Tert-Butyl Ether		47.76	2.78	0.01	20
107.022	Dust Collector	PM	023	0.27	0.01	0.27	20
104.003B	Dust Collector	PM	115A	0.18	0.01	0.18	20
Fugitives	Polish Filter	VOC's	None	1.21	0.01	1.21	20
		Methanol	None	1.21	0.01	1.21	20

	Cleaning/ Cleanout						
--	-----------------------	--	--	--	--	--	--

* - Only Source 208 (Reactor 6) feeds to the Main Scrubber, and only during its reactions step.

Operating Scenario 2 (undried LAME)

Emission Point 104.014, which is the exit of the main scrubber (003), incinerator (009) and scrubber (010) is stated as 99.9% efficient. This scenario also uses Reactor 5 (219) as a scrubber. The facility is not claiming any reduction in emissions for the dust collector for Emission Point 104.003B. There will also be fugitive emissions from the drop of solid materials into process vessels. Total emissions from below are estimated to be 2.46 lbs/hr and 80 lbs/yr of VOC's, 1.91 lbs/hr and 20 lbs/yr of SO2, 0.01 lbs/hr and 20 lbs/yr of Acetonitrile, 0.01 lbs/hr and 20 lbs/yr of hydrogen chloride, 1.22 lbs/hr and 40 lbs/yr of methanol, 1.23 lbs/hr and 20 lbs/yr of Methyl Tert-Butyl Ether, and 0.18 lbs/hr and 20 lbs/yr of PM.

Emissions Summary

The proposed changes addressed in permit application R13-0882K shall result in the affected emission points undergoing emissions as shown in the following Table 2 - Emissions Summary.

Table 2 - Emissions Summary Operating Scenario 2 (undried LAME)

Emission Point ID	Device Type	Pollutant	Air Pollution Control Device ID	Maximum Potential Uncontrolled Emissions		Maximum Potential Controlled Emissions	
				lbs/hr	tons/yr	lbs/hr	lbs/yr
104.014	Reactor 5* Main Scrubber, Incinerator Scrubber	VOC	219	45.63	1.90	1.25	60
		SO2	003	1,913.47	9.57	1.91	20
		Acetonitrile	009	1.58	0.03	0.01	20
		Hydrogen Chloride	010	1,088.96	5.44	0.01	20
		Methanol		25.38	0.52	0.01	20
		Methyl Tert-Butyl Ether		18.67	1.35	1.23	20
104.003B	Dust Collector	PM	115A	0.18	0.01	0.18	20
Fugitives	Polish Filter Cleaning/ Cleanout	VOC's	None	1.21	0.01	1.21	20
		Methanol	None	1.21	0.01	1.21	20

* - Only Sources 208, 208C, and 202 feed to Reactor 5 (scrubber 219), and only during their reaction/neutralization step.

REGULATORY APPLICABILITY

The following State and Federal regulations were considered for applicability to the subject facility:

The following regulations apply to this production unit: West Virginia Regulations 7, 13, 21, 30 and US EPA MACT Standards for the Miscellaneous Organic NESHAP.

RULE 7 - PARTICULATE MATTER FROM MANUFACTURING SOURCES

Scenario 1 - dried LAME

The dumping of L-Alanine and L-Alanine Methyl Ether into Reactor #6 (115) is a "Type a" Source Operation under Rule 7. The mass limits contained in 45CSR§7-4.1 would be 14 lbs/hr for the dust collector (115A) (based on 13,205 lbs over 1 hour). Dust Collector 023 is a "Type d" Source Operation under Rule 7. The mass limits contained in 45CSR§7-4.1 would be 0.42 lbs/hr for dust collector 023 (7,879 lbs over 1 hour). The above limits are below these Rule 7 mass limits. The opacity requirements for these sources are already permitted under their Title V Permit.

Scenario 2 - undried LAME

The dumping of L-Alanine into Reactor #6 (115) is a "Type a" Source Operation under Rule 7. The mass limits contained in 45CSR§7-4.1 would be 5.3 lbs/hr for the dust collector (115A) (based on 5,326 lbs over 1 hour). The above limit is below these Rule 7 mass limits. The opacity requirements for these sources are already permitted under their Title V Permit.

RACT

45CSR21-40.3.c requires RACT analysis on a case by case basis for those VOC emissions greater than 6 pph which are constructed, modified, or begin operation after the date 45CSR 21 becomes effective. The proposed changes to R13-0882K do not include an increase of VOC's greater than 6 pph.

This class II permit amendment application is being filed under 45CSR13 since a change in batch production is being requested. Overall, VOC emissions will be 0.04 tons/year, HAP emissions will be 0.05 tons/year, SO₂ emissions will be 0.10 TPY and PM emissions associated with the sources identified in this application will be 0.02 tons/year.

TOXICITY OF CRITERIA REGULATED POLLUTANTS

Acetonitrile has the following exposure limits:

ACGIH TLV

Skin 20 ppm TWA

NIOSH REL

20 ppm (10 hours) TWA

34 mg/m³ (10 hours) TWA

OSHA PEL

40 ppm (8 hours) TWA
70 mg/m³ (8 hours) TWA

L-Alanine has the following exposure limits:

ACGIH TLV

None Listed

NIOSH REL

None Listed

OSHA PEL

None Listed

Methyl tertiary butyl ether has the following exposure limits:

ACGIH TLV

50 ppm TWA

SG OEL

40 ppm
144 mg/m³ TWA

OSHA PEL

None Listed

L-Alanine Methyl Ether hydrochloride has the following exposure limits:

ACGIH TLV

None Listed

NIOSH REL

None Listed

OSHA PEL

None Listed

Methanol has the following exposure limits:

ACGIH TLV

200 ppm TWA
STEL 250 ppm

NIOSH REL

200 ppm TWA
260 mg/m³ TWA
6,000 ppm IDLH

OSHA PEL
200 ppm TWA
260 mg/m³ TWA

Hydrogen Chloride has the following exposure limits:

ACGIH TLV
2 ppm
3 mg/m³

NIOSH REL
5 ppm
7 mg/m³

OSHA PEL
5 ppm
7 mg/m³

MONITORING OF OPERATIONS

The Title V Permit provides monitoring requirements due to opacity readings. The facility is already required to monitor visible emissions (Condition 4.2.2), monitor their production (Condition 4.2.1), monitor the temperature of the incinerator (Condition 4.2.3), and monitor the pH and flow rate of the scrubbers (Condition 4.2.4).

Changes to R13-0882K include:

1. Updated the Permit Number to R13-0882K.
2. Added a tanker truck (229) and filter (fugitive) to the equipment table.
3. Added Condition 4.1.2.9.1 to require that the dust collector (115) be used when solids are charged to the reactor.
4. Added Condition 4.1.2.9.2 to require that the incinerator (009) and scrubber (010) be used at emission point 114.014 during all periods of dried L-alanine methyl ester (LAME) production. Scrubber (003) shall be in operation and employed for only Reactor 6 (208) during the reaction step.
5. Added Condition 4.1.2.9.3 to require that Dust Collector (023) be used by emission point 107.022 when packaging solids to drums.
6. Added Condition 4.1.2.9.4 to require specific emissions limits for particulate matter, VOC's, SO₂, and HAPs for dried LAME production.

7. Added Condition 4.1.2.10.1 to require that the dust collector (115) be used when solids are charged to the reactor.
8. Added Condition 4.1.2.10.2 to require that the incinerator (009) and scrubbers (003) and (010) be used at emission point 114.014 during all periods of undried L-alanine methyl ester (LAME) production. Reactor 5 (219) shall be used as a scrubber in operation and employed by Sources 208, 208C, and 202 only during their reaction/neutralization step.
9. Added Condition 4.1.2.10.3 to require specific emissions limits for particulate matter, VOC's, SO₂, and HAPs for undried LAME production.
10. Updated the page numbers in the Table of Contents.
11. Added "R13-0882K" to Condition 2.5.1.

RECOMMENDATION TO DIRECTOR

Permit application, R13-0882K, submitted by Optima Belle, LLC, for the administrative permit update of the production facility located at the Belle Plant in Belle, Kanawha County, WV, has been reviewed and determined to meet all applicable requirements, and is therefore, recommended for approval.

Mike Egnor

Mike Egnor
Engineer

7/8/16

Date