



west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-2157E
Plant ID No.:	055-00089
Applicant:	Minova USA Inc.
Facility Name:	Bluefield
Location:	Bluefield
SIC Code:	325991
Application Type:	Modification
Received Date:	August 29, 2013
Engineer Assigned:	Edward S. Andrews, P.E.
Fee Amount:	\$1000.00
Date Received:	September 3, 2013
Completeness Date:	September 29, 2013
Due Date:	December 28, 2013
Newspaper:	<i>Bluefield Daily Telegraph</i>
Applicant Ad Date:	September 4, 2013
UTMs:	Easting: 491.2 km Northing: 4,127.2 km Zone: 17
Description:	Minova has sought to address the issue with the permitted styrene limit as a result of a compliance test.

DESCRIPTION OF PROCESS

Minova USA's Bluefield, WV facility produces a two part mastic/paste used in the underground mining and tunneling industries for roof support and anchoring. This anchoring composite is packaged in a single use cartridge with a film separating the two components, paste, and mastic, until the cartridge is used. When consumed, a roof bolt or anchor is drilled through the cartridge and breaks the film, which mixes the two components to form the plastic composite.

Promoting a healthy environment.

Non-confidential

The Bluefield facility consists of three main areas, which are raw material storage, mastic/paste processing (mixing), and packing. The raw material storage area consists of five storage tanks, and two silos. Two of these tanks can each hold up to 6,500 gallons of polyester resin (7S & 8S). The other three tanks can hold up to 2,000 gallons of diethylene glycol. The paste is mixed in one dedicated mixer (6S). The mastic, the other component of the adhesive, is mixed in one of five separate mixers. There are two different size mixers, which are 12 cubic foot (2S, 3S, & 5S) and 120 cubic foot mixers (1S & 4S). From the mixers, the mastic and paste are transferred to one of the packaging machines. In the packaging machine, the components are then measured and injected into a thin plastic membrane container.

SITE INSPECTION

The writer has visited the facility on two separate occasions (July 28, 2010 & January 30, 2013). The facility is located within an industrial park in Mercer County, WV, which is acceptable for this type of manufacturing operation. The most recent inspection was conducted on June 13, 2013, which Mr. Dan Bauerle, an inspector assigned to the Compliance and Enforcement Section, found the facility to be operating within compliance of all applicable rules and regulations.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

On January 30, 2013, Minova conducted performance testing to confirm compliance with the styrene limit in Permit R13-2157D. The result of this testing required Minova to reevaluate the emission data from the mixing operation and develop a new styrene emission factor for the mastic mixers. The testing yielded a styrene emission factor of 0.71 pounds of styrene per ton of mastic produced.

In addition, Minova evaluated the theoretic production capacity of the Bluefield Plant. In theory, the three (3) small mixers can produce 2.5 batches of mastic each per hour at 1,500 pounds per batch and the two (2) larger mixers can produce one batch each per hour at 9,500

pounds per batch. This results in a theoretical production of 30,250 pounds of mastic or 15.12 tons of mastic per hour. The theoretical maximum styrene emission could be 10.7 pounds per hour.

The three small mixers and two large mixers produce mastic for use in the production machine (packaging) on the main production floor. The capacity of the downstream process equipment (packaging operation) is limited to 8.45 tons of mastic per hour. Since there is a bottleneck in the process that will, in all cases, limit the total continuous production of mastic in the mixers, Minova has calculated the limited Maximum Hourly Emission rate of styrene at 6.0 pounds per hour. This emission rate was calculated as follows

$$\frac{8.45 \text{ tons of mastic}}{\text{hour}} * \frac{0.71 \text{ pounds of styrene}}{\text{ton of mastic}} = \frac{6.0 \text{ pounds of styrene}}{\text{hour}}$$

Minova has elected to limit the annual styrene emission rate at 8.0 tons per year, which is based on limiting annual production of mastic to 22,535 tons per year. Based on this maximum annual production rate, Minova estimated the breathing and working losses from the two polyester resin storage tanks at 87 pounds per year.

To account for fugitive emissions of styrene from the facility, the writer estimated these styrene emissions using the data from static background monitors during the January 30, 2013 testing and the volumetric flow rate of the exhaust fans in the pump room and mixers floor. This rate was determined to be 0.10 lb of styrene per ton of mastic produced. At the proposed mastic production rate of 8.45 tons per hour and 22,535 tons, the fugitive styrene emissions would be 0.845 pounds per hour and 1.13 tons per year respectively.

Styrene is classified as a volatile organic compound (VOC) and a hazardous air pollutant (HAP). Minova assumes that the VOCs emissions from the process is mainly styrene and thus estimated the potential VOCs emissions from the process stack at 6 pounds per hour and 8 tons per year. The actual increase of styrene emission limits between Permit R13-2157D and this action is 1.13 tons per year.

REGULATORY APPLICABILITY

Minova has proposed to take an additional operational restriction to maintain the Bluefield Facility's status as an area (minor) stationary source of HAPs. Because Minova has elected to install the knife valves and take operational limits that restricts the Bluefield Facility's potential to emit of styrene (HAP) below 10 tons per year, the facility is not subject to 40 CFR 63, Subpart HHHHH – Miscellaneous Coating Manufacturing MACT. Therefore, the facility is only subject to the permitting requirement of 45CSR13, operating fees of 45CSR22 and particulate matter limitations of 45CSR7.

Therefore, this action strictly addresses making the proposed mastic production limits enforceable and does not affect the facility's status or ability to comply with the other rules and regulations. The Bluefield facility is classified as a synthetic minor source for HAPs. Rule 13 requires Minova to perform Notice Level C as outlined in 45CSR§13-8.5. §13-8.5 requires Minova to post a sign near the entrance to the facility and publish a commercial ad in conjunction with the agency's legal ad.

To satisfy the Rule 13 modification permitting requirements, Minova submitted a complete application, paid the filing fee, and published a class one legal advertisement. This facility will remain a "9M" source and be required to obtain a "certificate to operate" under 45CSR 22 on an annual basis.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

Styrene

Effects of styrene on human health and the environment depend on how much styrene is present and the length and frequency of exposure. Effects also depend on the health of a person or the condition of the environment when exposure occurs.

Styrene vapor irritates the eyes, the nose, and the throat. Styrene vapor can also adversely affect the human nervous system, causing adverse eye effects. These effects are not likely to occur at levels of styrene that are normally found in the environment.

Human health effects associated with breathing small amounts of styrene over long periods in the workplace include alterations in vision, hearing loss and increased reaction times. Other human health effects associated with exposure to small amounts of styrene over long periods of time are not known. EPA is currently reviewing the potential for styrene to cause cancer in humans. Laboratory studies show that repeated oral exposure to large amounts of styrene cause cancer and adversely affects the blood and the liver of animals. Laboratory studies also show that repeated exposure to large amounts of styrene in air can damage the respiratory system of animals.

Styrene has moderate toxicity to aquatic life. Styrene by itself is not likely to cause environmental harm at levels normally found in the environment. Styrene can contribute to smog formation when it reacts with other volatile substances in air.

AIR QUALITY IMPACTS ANALYSIS

The writer deemed air dispersion modeling was not necessary, because the proposed modification does not change the status of the Bluefield facility as a minor source as defined in 45CSR14. Minova will remain a minor source for all pollutants (criteria and hazardous).

MONITORING OF OPERATIONS

Minova specifically requested an annual styrene emission limit based on a function of annual production. Thus, the monitoring in the permit needs to be re-addressed to tracking mastic production. The current permit tracked batches by mixer capacity and equivalent batches. This will no longer be necessary.

CHANGES TO PERMIT R13-2157D

This action requested that the styrene emission limits be linked with total mastic production instead of equivalent batches, which affects Conditions 4.1.1 and 4.2.1. The changes in these two conditions coincide with the proposed limits on mastic production and the monitoring that supports such limits.

Other changes include omitting the background concentrations limits. The current limits were developed using data/measurements collected from out of date testing. Second, the fugitive emission rate that was determined by the writer was based on the proposed mastic production rate. Therefore, no additional limits or requirements are necessary other than the current work practices to minimize fugitive styrene emissions.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates that Minova USA, Inc. proposed modification of a polyester resin cartridge manufacturing facility meets all the requirements of the applicable rules when operated according to the permit application. Therefore, the writer recommends granting Minova USA, Inc. a Rule 13 modification permit for their Bluefield facility

Edward S. Andrews, P.E.
Engineer

Date: November 27, 2013