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ENGINEERING EVALUATION/FACT SHEET

B ACKGROUND INFORMATION

Application No.:	R13-2006D
Plant ID No.:	003-00026
Applicant:	MAAX US Corp
Facility Name:	Martinsburg
Location:	Martinsburg
NAICS Code:	326191
Application Type:	Modification
Received Date:	September 29, 2011
Engineer Assigned:	Edward S. Andrews, P.E.
Fee Amount:	$1000.00
Date Received:	October 3, 2011
Complete Date:	September 17, 2013
Due Date:	December 16, 2013
Applicant Ad Date:	October 10, 2011
Newspaper:	*The Journal*
UTM's:	Easting: 441.6 km Northing: 4,345.3 km Zone: 17
Description:	The application is for specific changes to the conditions in Permit R13-2006D and to increase manufacturing flexibility.

DESCRIPTION OF PROCESS

MAAX US Corp (MAAX) owns and operates the Martinsburg manufacturing facility. The facility produces tub and shower units for the construction industry. These products are made of fiberglass reinforced plastic composite. The facility is configured with two continuous gel coat production lines and one acrylic production line.

The two continuous productions are nearly identical. Molds are placed on an overhead rail system that moves to mold to each of application stations. Gel coat is applied to the mold. The gel coat adds the color of the final product. Then, a layer of polyester resin is applied. Fiberglass mat is rolled or reinforcement legs/support parts are pressed into the resin or another layer of resin is applied with chopped fiberglass fibers. The actual process steps are dictated by

the end use of the product (i.e. tub, shower stall, etc.). Then another layer of resin is added. Then the product is removed from the production line and sent to the grinder and trim area, where the edges are trimmed/grinded off and desired end holes are cut out for drains or fixtures.

Acrylic products (Pearl Line) line starts with a flat sheet of acrylic that is placed on top of the desired mold then the acrylic thermo-former is clamped on top making a complete seal between the thermo-former and mold. An electric induction heater is used to make the sheet plastic. Once the acrylic is in a plastic state, a vacuum is pulled from the mold which draws the acrylic sheet to form the shape of the mold. The vacuum is released and the formed acrylic shape is removed from the mold and sent to a staging/preparation area. In this step, the acrylic shape is placed upside down on a fixture that allows a spacer to be position in the correct locations for controls knobs, jets, or intakes when the resin/fiberglass is being applied. The application of the resin/fiberglass is nearly the same as on the continuous lines except that only one chop gun is used in the acrylic process.

After this step, the acrylic tub is then sent to an assembly area where the tub is removed from the fixture, the desired controls/lights, jets, intakes, and pumps are installed with associated piping and wiring. Once assembly is complete, each unit is tested before it is packaged for shipment to the customer.

SITE INSPECTION

On August 15, 2012, the writer conducted an announced visit of the facility. The writer was escorted by the production manager on duty during this visit. This visit mainly focused on the composite manufacturing areas and RTO. The manufacturing lines were configured as described in the past applications except for the robotics application station and resin/fiberglass layup booth for the Pearl line (acrylic process). The second continuous line was permitted with two resin layup booths. One was for the robotic spray and the other was a back-up booth. The robotic spray system never really operated as anticipated. The facility removed the robotic system and in 2011 began to use the booth as an area to conduct the resin layup for the Pearl line.

ESTIMATE OF EMISSION BY REVIEWING ENGINEER

This proposed application does not call for any significant changes that affect the facility potential to emit or any permitted limits. In the past and currently used, the facility potential and actual emissions from the composite manufacturing process were determined using the appropriate methods outlined in ANSI/ACMA Unified Emission Factors.

The applicant provide an excel file in the application that is used by the facility to determine and track VOC/HAP emissions. The writer reviewed this file and found embedded equations were consistent with the corresponding method as outlined in ANSI/ACMA Unified

Emission Factors. These calculations take into account the control efficiency of the Durr control device that is monitoring monthly according to the permit

REGULATORY APPLICABLILITY

The proposed changes made by MAAX do not affect the facility's applicability status with any rules or regulations. The changes mainly seek relief of specific conditions that restrict the facility's ability to use certain materials accidently, changes in materials used by the facility, or redundancy. The facility will remain subject to 45 CSR 6, 45 CSR 7, 45 CSR 30, 45 CSR 34, and Subpart WWWW of 40 CFR 63.

Most of the proposed changes call for the omission of the usage and/or material restrictions, which is viewed as a relaxation of specific conditions. Thus, the source is required to obtain a modification permit pursuant to 45 CSR 13.

The facility's potential to emit VOC emissions will not change as a result of this modification application. Thus, the facility's status as a synthetic minor source under the PSD program (45 CSR 14) will be maintained. MAAX's operation is classified as an existing major source of HAPs under 40 CFR 63, Subpart WWWW – National Emission Standard for Hazardous Air Pollutants (4W NESHAP): Reinforced Plastic Composites Production. The proposed changes do not affect the facility's ability to comply with this regulation but just corrects the actual codified applicable provisions that are in Section 6 of the permit.

As a result of these changes, the source is require to submit a significant modification application for their Title V Permit, which was included with this modification.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The proposed changes will not emit any pollutants that aren't already being emitted at the facility. Therefore, no information about the toxicity of the hazardous air pollutants (HAPs) is presented in this evaluation. Further, the facility is currently and will remain a major source for HAPs and these emissions are regulated under 4W NESHAP.

AIR QUALITY IMPACT ANALYSIS

The writer deemed that an air dispersion modeling study or analysis was not necessary, because the proposed modification does not change the facility to a major source as defined in 45CSR14.

MONITORING OF OPERATIONS

The current monitoring and record keeping will remain in place. MAAX is required to use monitored and production data in determine actual emissions on a monthly basis, which they currently perform for Title V Reporting purposes (Emissions Inventory and Certified Emission Statements).

CHANGES TO PERMIT R13-2006C

The main focus of this modification are changes to specific conditions within R13-2006C. The application proposed making changes to Permit R13-2006C, the corresponding Title V Operating Permit and to address the Pearl line in the permit.

After reviewing these proposed changes/suggestions, these requested changes mainly focused on a few points which are:

- Building Enclosure Requirement
- Raw material VOC/HAP content & usage limits
- Pollutant-specific emission limits
- Combustion emission limits
- Unisolve Cleaner
- Durr Control Device
- Resin Storage Tanks

The permanent total enclosure (PTE) requirements of Conditions 4.1.3. and 4.3.2. were revised. The applicant claimed that the requirements were unnecessary at the 10% negative pressure. The Air Pollution Control Technology Fact Sheet EPA-452/F-03-033 noted once a PTE has been confirmed no additional capture efficiency test is required. Thus, the Method 204 testing requirement was omitted from Condition 4.3.2. Condition 4.1.3. is being revised into Condition 4.1.1.f. which requires the application of gel coat and resin be ventilated to the concentrator/RTO. The facility currently monitors the negative pressure in the ductwork to the concentrator and checks it on a daily basis, which is incorporated into Condition 4.2.7.

During the review of Permits R13-2006B & R13-2006C, the writer had little confidence in the UEF methods to determine emissions from the open molding process. Since then, MAAX has conducted six performance tests with each test including a comparison of test results to predicted styrene emission rates using UEF methods. The difference between actual measured styrene emissions and styrene emissions predicted using the UEF method is on average 1.5%. Before these last six tests, the facility's data indicated that the UEF methods under predicted the styrene emissions by over 20% on average, which led to secondary limits to ensure compliance with the actual VOC/HAP limits.

In light of additional data that proves the accuracy of the UEF method for open molding processes, the writer is inclined to recommend significant changes to the permit with regards to the material limitations. The recommendations are to focus on demonstrating compliance directly with the actual VOC limits (hourly and annual) set forth in Condition 4.1.4.and omit Condition 4.1.5.that establishes the material restrictions. The proposed Excel file used to determine VOC/HAPs emissions would only need operating hours added and maintained to demonstrate compliance with the VOC emission limits and the 4W NESHAP emission limits which has been recommended in Conditions 4.1.1., 4.2.4. (Monitoring Requirement), and 5.1.2.

MAAX pointed out several issues with the specific HAP limits (Styrene and MMA) in Condition 4.1.4. Resin formulations are changing with additional monomers added in the resin besides styrene and MMA. All of these monomers are VOCs but only a few are classified as HAPs. Regardless of these formulation changes, MAAX would be required to comply with VOC limits and the 4W NESHAPs limits. The 4W NESHAP limits not only focus on styrene or MMA but total organic HAPs from the open molding process. Therefore, the writer recommends omitting the specific HAP for styrene and MMA and just let the 4W NESPHAP regulated the HAP emissions from the open molding process as it was intended.

Under 4W NESHAP, the Martinsburg facility could possibly use any one of the compliance options for the applicable emission standard without need to making significant changes. Currently, MAAX uses the "*weighted average emission limit option"* and has been maintaining compliance at less than 93% of the limit without taking credit for the Durr Control Device. The process data need to comply using the *weighted average emission limit option* would be nearly the same needed to determine actual VOC emission rates. Thus, the writer recommends re-configuring the permit from a material restriction approach to direct compliance with the VOC limit using UEF methods and process data. Only Changes to Section 5.0 of the permit (40 CFR – Subpart WWWW Requirements) were correcting errors, omitting non applicable requirements, inserting applicable/possible applicable requirements that were over looked and changing the reporting period to coincide the Title V reporting period (See 40 CFR §63.5910(g)). The application's proposed changes do not the facility's ability to comply with the limits in 4W NESHAP.

MAAX made some claims about combustion emissions and how compliance is determined. One of the issues the applicant raised was the emissions from the building heaters and being emitted at the RTO stack. The writer visited the facility and noticed that the IR heaters mounted near the ceiling of the structure are vented up through the roof. Thus, the writer concludes that these emissions could not be drafted into the concentrator/RTO ductwork. During any emission testing of the RTO outlet, the emissions from the building heater could not be measured with the RTO combustion emissions. However, the writer agrees that it is difficult to quantify the combustion emissions (PM, CO, & NO_x). Compliance with the permitted limits for these pollutants should not be an issue if the RTO is properly maintained. The results of the October 26, 2011 compliance test indicted that the NO_x emissions were less than 30% of the limits while CO was just over 10% of the corresponding limit.

To protect the concentrator, screening filters are used to prevent particles (PM) from damaging the absorb beds. Compliance with these specific emissions is really demonstrated on a collective basis. Applicant believes that actual emissions of products of combustion could be determined in terms of styrene vented to the RTO. The writer believes that the facility could generate such factors with the data on hand and that this permit does not prohibit MAAX from doing so. In addition, the writer would suggest that no further compliance test for CO and NO_x is warranted at this time.

MAAX has requested a zero emission factor for the use of Thermaclean® Unisolve™ EX (Unisolve) cleaner at the facility. This industrial cleaner is a universal cleaner that contains no HAPs that is manufactured by CCP Composites as a MACT compliant cleaner. Unisolve is a mixtures of dibasic esters with glycol ether (DGME). Thus, makes the cleaner easier to recycle using a vacuum distillation column. This cleaner consist of several esters and glycol ether with vapor pressures of each component of less than 0.450 millimeters of mercury. Unisolve has a very low evaporation rate.

MAAX has a contractual agreement with a specific vendor that supplies the Martinsburg plant with Unisolve and cleans the spent cleaner on an as needed basis. The writer recommends omitting the material usage table in Condition 4.1.5. However, this cleaner is a VOC and if it evaporates there would be VOC emissions. Making a determination in the permit, that this cleaner is zero emission material is not possible and it not the role of the permitting authority. The draft permit does not restrict or limit the use of this cleaner. The writer understands the technical issues in determining actual VOC emissions from cleaners and would suggests that MAAX looks at ways to track the amount of cleaner received and sent out as spent material (mass balance approach).

The Durr (concentrator/RTO) control device controls VOC losses that occur within the manufacturing building. Permit R13-2006C established a detailed monitoring/ testing plan with a restoration phase means with alternative VOC emission rate. The real problem is that the media used in the concentrator is not very effective on styrene over a long duration and requires frequent replacement. The compliance staff with MAAX and the writer made several attempts to add flexibility within the permit while ensuring the previous level of control/VOC emission limits. The restoration phase is occurring every 12-18 months. The requirements to conduct annual concentrator performance demonstrations are no longer practicable because the restoration conditions require it before and after the restoration phase. Further, the styrene detector tube monitoring has been fairly reliable in monitoring the efficiency of the concentrator on a monthly basis. Thus, Condition 4.3.1 was omitted.

Since issuance of Permit R13-2006C, MAAX has been required to conduct testing every 14 months on average. The purpose of the restoration testing is determining if the collection efficiency of the concentrator has dropped below acceptable levels and if the repair work restored it. MAAX continuously monitors the combustion temperature of the RTO, which is good indicator of actual destruction efficiency of the unit. The five year test requires the same measurements as the restoration testing but adds the outlet measurement of the RTO. MAAX

has the ability to predict emissions without the additional measurement. The writer's recommendation is to omit this five year test from the permit.

Existing Conditions 4.1.15. and 4.1.16. were revised into draft permit as Condition 4.1.3. Condition 4.1.17. was omitted because it was not practical to have an outage of the two of the four concentrator beds and operator the RTO. MAAX uses a chart recorder to record the combustion chamber temperature, which was specifically noted in item b. of Condition 4.1.3.

MAAX added a four resin storage tank due to the acrylic process. The acrylic process requires a different polyester resin than the one used for the other production lines. In addition, a compliance inspection revealed that the resin storage tanks were not venting according to the permit and application, which was to be vented to the concentrator/RTO. Venting the vessel indoors may not be acceptable means from a process safety or operating standpoint. The VOC/HAP emissions from these vessels are fairly insignificant (less than 400 pounds per year). Thus, Condition 4.1.6. in the draft was developed to replace the reference of these vessels going to the concentrator/RTO as noted in Table 1.0 Emission Units.

The application technology, operating, and training requirements for the spray requirements in Conditions 4.1.1., and 4.1.7. through 4.1.9. were rewritten and incorporated into Condition 4.1.1. The re-written requirements focus on key technology which can reduce emissions and training the operator on the correct spray pattern using such technology.

The writer proposed numerous changes to Permit R13-2006C. However, the actual emission limits remain un-changed with the same means to monitor compliance.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates the proposed modification of the facility will meet all the requirements of the applicable rules and regulations when operated in accordance to the permit application. Therefore, the writer recommends granting MAAX US Corp. a Rule 13 modification permit for the changes to Permit R13-2006C, which covers their Martinsburg Plant located in Martinsburg, WV.

Edward S. Andrews, P.E.
Engineer

October 4, 2013
Date