



west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-2085F
Plant ID No.: 035-00039
Applicant: Star Plastics
Facility Name: Millwood Facility
Location: Jackson County
NAICS Code: 325211, 326121
Application Type: Modification
Received Date: January 29, 2015
Engineer Assigned: Steven R. Pursley, PE
Fee Amount: \$1,000.00
Date Received: February 6, 2015
Complete Date: February 27, 2015
Due Date: May 28, 2015
Applicant Ad Date: January 27, 2015
Newspaper: *Jackson Herald*
UTM's: Easting: 427.4 km Northing: 4,306.7 km Zone: 17
Description: Application to combine permits R13-2085E and R13-3147.

DESCRIPTION OF PROCESS

STAR PLASTICS

STAR Plastics, Inc. (STAR) and Technology Plastics, LLC (TPI) are co-located at the STAR facility in Millwood, WV. They both operate under the same 2 digit SIC code and are under common ownership. Therefore, they should be considered as one source. Previously, they had been permitted as two separate sources. Accordingly, this permit will combine permits R13-3147 and R13-2085E.

STAR produces various plastic resins including acrylonitrile butadiene styrene (ABS), high impact polystyrene (HIPS), polycarbonate (PC), acrylate styrene acrylonitrile (ASA) and polypropylene (PP). Some of these materials are sent to TPI for further processing.

The resin to be processed is received in boxes and stored in the warehouse. The resin is fed into the hopper above the extruders via a vacuum transfer system. A volumetric feeder mixes and feeds the resin from the hoppers to one of the (three currently, two after this modification) extruders. The resin is then electrically heated to approximately 450 F at which a fluid thermoplastic is formed. The vapors from each extruder vent pass through a condenser prior to being emitted to the atmosphere. The extruder uses a screw to force the fluid thermoplastic through a die to form strands. The strands are cooled in a water bath prior to being sheared into pellets and packaged. The emissions from the die vents are exhausted uncontrolled through a stack and directly to the atmosphere.

As part of this modification STAR is decommissioning its 3 ½ inch extruder and reducing the production rate of the 6 inch extruder from 6,000 pounds per hour to 3,000 pounds per hour. The 4 ½ inch extruder will retain the existing hourly process rate of 3,000 pounds per hour.

TECHNOLOGY PLASTICS

TPI takes pellets or chips of polyethylene (PE), polypropylene (PP), high impact polystyrene (HIPS), or HIPS-FR, ABS or ABS-FR (flame retardant) plastic and feeds them into a hopper above an extruder via a vacuum transfer system. A feeder mixes and feeds the resin from the hopper to the extruder. The resin is then electrically heated to form a fluid thermoplastic. The vapors from the extruder vent pass through a chiller prior to being emitted into the atmosphere. The extruder uses a screw to force the fluid thermoplastic through a die.

The extruded plastics are processed through a mold machine. The product is packaged for shipment to customers.

SITE INSPECTION

A full compliance inspection of the facility was performed on September 9, 2014 by James Robertson of DAQs Enforcement Section. The facility was found to be "in compliance". To get to the facility take I-77 north from Charleston to exit 138. Turn left on State Route 62 (old US 33) and go 8.8 miles until the road dead ends at State Route 2. Then, turn right on State Route 2 and go approximately 1.3 miles and turn left on Jack Burlingame road. Go approximately 0.3 miles and the facility is on the right.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions of VOCs, styrene, and acrylonitrile (and subsequently total HAPs) are the pollutants that will have emission rates change due to this modification. All emission estimates are based on stack tests of similar processes and materials at SDR Plastics, Inc. In Ravenswood, WV.

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Current permitted emissions from the two facilities are as follows:

	Acrylonitrile		Styrene		VOCs		Total HAPs	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Star Plastics	0.0008	0.0036	6.63	9.09	19.89	87.12	7.14	11.29
Tech. Plastics	0.0002	0.0008	1.875	8.22	1.875	8.22	1.875	8.22
Total	0.001	0.0044	8.505	17.31	21.77	95.34	9.015	19.51

Emissions in the new permit will be limited to the following:

Acrylonitrile		Styrene		VOCs		Total HAPs	
lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
0.001	0.0036	5.63	9.88	19.89	87.12	6.14	12.08

Therefore, the change in emissions will be as follows:

Acrylonitrile		Styrene		VOCs		Total HAPs	
lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
0.00	-0.0008	-2.88	-7.43	-1.88	-8.22	-2.88	-7.43

Note that this is the change compared to the two existing permits combined. Permitted emissions when comparing R13-2085E to R13-2085F will obviously be different.

Additionally, for some reason R13-3147 did not include PM emissions from the extruder. So for this application a PM emission factor was derived from the permitted emission limits in R13-2085 and applied to the Technology Plastics extruder. This resulted in an emission limit of 0.48 pounds per hour and 1.19 tons per year. Those PM emissions will be added to the combined PM limits in condition 4.1.4 of the permit.

REGULATORY APPLICABILITY

The following rules are applicable to the facility:

- 45CSR7 "To Prevent and Control Particulate Air Pollution from Manufacturing Process Operations"

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The extrusion process is classified as a type "a" manufacturing operation. The 3 extrusion lines constitute duplicate source operations having a total combined process rate of 8,500 lb/hr. Table 45-7A sets the total allowable particulate emission rate at 8.5(lb/hr) and the permit application estimates a total particulate emission rate of 2.42 (lb/hr). According to Table 45-7A and information provided in the permit application this process will meet the particulate emission rate requirements.

45CSR13 "Permits for Construction, Modification, Relocation, and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Temporary Permits, General Permits, and Procedures for Evaluation"

The applicant voluntarily submitted the permit application in order to combine two existing permits. Therefore, the applicant was required to place a class I legal ad per 45CSR§13-11.2.a. The applicant place the ad in the January 27, 2015 issue of the *Jackson Herald* and the affidavit of publication for said ad was received on February 11, 2015.

45CSR22 Air Quality Management Fee Program

This facility is a minor source and not subject to 45CSR30. Star Plastics is required to keep their Certificate to Operate current.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

Section 112(b) of the Clean Air Act (CAA) identifies 188 compounds as pollutants or groups of pollutants that EPA knows or suspects may cause cancer or other serious human health effects. Some ingredients used by the facility contain HAPs. However, the potential HAP emissions from the facility are below the levels that define a major HAP source. Therefore, the facility is considered a minor (or area) HAP source, and no source-specific major source NESHAP or MACT standards apply.

The following Hazardous Air Pollutants will be emitted from the facility in amounts of at least 0.01 pounds per hour (all information comes directly from EPA's Air Toxics Website):

Acrylonitrile:

Exposure to acrylonitrile is primarily occupational: it is used in the manufacture of acrylic acid and modacrylic fibers. Acute (short-term) exposure of workers to acrylonitrile has been observed to cause mucous membrane irritation, headaches, dizziness, and nausea. No information is available on the reproductive or developmental effects of

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acrylonitrile in humans. Based on limited evidence in humans and evidence in rats, EPA has classified acrylonitrile as a probable human carcinogen (Group B1).

Antimony Compounds:

Everyone is exposed to low levels of antimony in the environment. Acute (short-term) exposure to antimony by inhalation in humans results in effects on the skin and eyes. Respiratory effects, such as inflammation of the lungs, chronic bronchitis, and chronic emphysema, are the primary effects noted from chronic (long-term) exposure to antimony in humans via inhalation. Human studies are inconclusive regarding antimony exposure and cancer, while animal studies have reported lung tumors in rats exposed to antimony trioxide via inhalation. EPA has not classified antimony for carcinogenicity. Antimony is alloyed with other metals such as lead to increase its hardness and strength; its primary use is in antimonial lead, which is used in grid metal for lead acid storage batteries.

Styrene:

Styrene is primarily used in the production of polystyrene plastics and resins. Acute (short-term) exposure to styrene in humans results in mucous membrane and eye irritation, and gastrointestinal effects. Chronic (long-term) exposure to styrene in humans results in effects on the central nervous system (CNS), such as headache, fatigue, weakness, and depression, CSN dysfunction, hearing loss, and peripheral neuropathy. Human studies are inconclusive on the reproductive and developmental effects of styrene; several studies did not report an increase in developmental effects in women who worked in the plastics industry, while an increased frequency of spontaneous abortions and decreased frequency of births were reported in another study. Several epidemiologic studies suggest there may be an association between styrene exposure and an increased risk of leukemia and lymphoma. However, the evidence is inconclusive due to confounding factors. EPA has not given a formal carcinogen classification to styrene.

Methylene Chloride:

Methylene chloride is predominantly used as a solvent. The acute (short-term) effects of methylene chloride inhalation in humans consist mainly of nervous system effects including decreased visual, auditory, and motor functions, but these effects are reversible once exposure ceases. The effects of chronic (long-term) exposure to methylene chloride suggest that the central nervous system (CNS) is a potential target in humans and animals. Human data are inconclusive regarding methylene chloride and cancer. Animal studies have shown increases in liver and lung cancer and benign mammary gland tumors following the inhalation of methylene chloride.

AIR QUALITY IMPACT ANALYSIS

Since this is a minor modification to an existing minor source, as defined in 45CSR14, no modeling was required.

MONITORING OF OPERATIONS

Since no new equipment is being added (only removed and changing throughputs), no additional monitoring of operations beyond that which is already required by R13-2085E and R13-3147 is necessary. However, the monitoring required by R13-3147 will, obviously, be incorporated into permit R13-2085F.

CHANGES TO PERMIT R13-2085E

The following changes were made to permit R13-2085E:

- * The permit was put into the most recent boilerplate.
- * The equipment from R13-3147 was put into Table 1.0.
- * Condition 4.1.1 was changed to remove the 3 ½ inch extruder, reduce the rate of the 6 inch extruder and add the extruder from the Technology Plastics facility.
- * Condition 4.1.2 was changed to reflect the new production limits.
- * Emissions in Condition 4.1.4 were updated.
- * Condition 4.2.1 was changed to remove the reference to the 3 ½" extruder and replace it with a reference to the extruder from the Technology Plastics facility.

RECOMMENDATION TO DIRECTOR

Information supplied in the application indicates that compliance with all applicable regulations will be achieved. Therefore it is the recommendation of the writer that permit R13-2085F for the modification of a plastics manufacturing facility in Millwood, Jackson County, be granted to Star Plastics, Inc.

Steven R. Pursley, PE
Engineer

April 16, 2015

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