west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-3414A
Plant ID No.:	037-00110
Applicant:	TeMa North America, LLC
Facility Name:	Jefferson County Operations
Location:	Kearneysville, WV
NAICS Code:	326199
Application Type:	Modification
Received Date:	January 16, 2024
Engineer Assigned:	Brian Carney P.E.
Fee Amount:	$1,000.00
Date Received:	February 9, 2024
Complete Date:	April 3, 2024
Due Date:	July 2, 2024
Applicant Ad Date:	February 21, 2024
Newspaper:	*The Shepherdstown Chronicle*
UTM's:	Easting: 252.63 km Northing: 4,360.28 km Zone: 18
Latitude:	39.32712
Longitude:	-79.48648

DESCRIPTION OF EXISTING PROCESS

TeMa North America LLC has an extrusion process in the Burr Business Park in Jefferson County, West Virginia. The facility utilizes polypropylene (PP) and polyethylene (PE), including high density polyethylene (HDPE). The existing facility has three extrusion lines identified as Line 2000, Line 3000, and Line 4000 for the extrusion of the following types of products:

* Monofilaments spacer, anticorrosion and anticondensation layer on roofing and wall siding products, acoustic products as sound mat under gypsum concrete.

* Uncoupling products such as dimple membrane to be used in ceramic floors.

* Dampproofing and drainage membrane for foundations and wall protection and drainage.

Additions to the PE, PP, and HDPE include flame retardants, fluidizers and colorants.

Material is delivered in bulk sacks (super sacks) via trucks which is unloaded by forklift and placed in storage. The bulk sacks are then handled again by the forklift to move the super sacks to the unloading stations and then the contents conveyed either pneumatically or via screw conveyors to the blending system. After blending, the materials are transferred to the hoppers that feed to the extruder. The three extrusion lines are equipped with electrical resistances heating which can reach the melting temperature of the materials to be extruded (typically in the area of about 250° Centigrade/480° Fahrenheit). The extruders will then extrude the product onto water cooled roller. The material is towed/pulled to the membrane trimmer which contains knife trimming systems to cut the width of the product and square off the edges. The material can then be cut to the required length. Additionally, if the extruded material is to be laminated with a fabric, then the material is not cooled and the laminate is applied to the extruded product prior to the product cooling. This allows the lamination to occur without the use of any adhesives. The final product (laminated or not) is then placed in storage. Additional cutting occurs to meet the final product dimensions and then the products are labeled and packaged.

Pieces of the material that are cut off for proper sizing of the product are sent to the shredder and placed in a super sack or returned to the process. There are two external Shredders that will also feed back to the process via super sacks.

There are four silos that are proposed for possible future installation. These silos will be filled pneumatically from trucks and then the material will be pneumatically transferred to the extrusion lines. The silos will have a dust collector for the filling process. The transfer of the material to the inside of the facility will be controlled by the existing line dust collection system. If the silos are used to store the plastics, then bulk sack deliveries would not be used. Therefore, the only additional emission point created for the use of the silos is silo filling.

There are several building heaters. These are comfort heaters which will burn propane until natural gas is available at the site.

REQUESTED CHANGE (as taken from R13-3414A application):

TeMa North America LLC is proposing to install an XPS Board Extrusion and Lamination System at their existing facility in the Burr Business Park in Jefferson County, West Virginia. This process will utilize polystyrene as the feed plastic instead of the existing operations, which use polypropylene and polyethylene, including high density polyethylene. There is expansion gas used in the process as XPS Boards are foam boards. The expansion gas is HFC 152a which is a non-VOC material. The product also requires the addition of other additives to adjust the properties of the board. The main portions of the proposed addition are the XPS Board Extrusion Process, the Laminator to laminate by heating the XPS Board or by gluing the laminate to the XPS Board, and an XPS Recycle Line that will recycle trimmings from the process. Sample Safety Data Sheets for the materials to be used on the lines are provided in Attachment H. The supplier could change for materials, but the materials themselves will not change.

These lines will be in addition to the existing three extrusion lines identified as Line 2000, Line 3000, and Line 4000.

Material will be delivered in bulk sacks (super sacks) via trucks or tank trucks which will be unloaded by forklift and placed in storage or blown into a silo. Initially bulk sacks will be used. A forklift will be used to move the super sacks to the unloading stations and then the contents conveyed pneumatically to the Doser/Extruder Feed Hopper where additives from the five (5) additive bins are also delivered into the process pneumatically. The material is then fed to the extruder, to cooling rollers, then to the Trimmer and Surface Planer for sizing. These boards are then stacked. The stacked boards will then go to the Dimensional Cutter to be sized to the final size of the board to be laminated. The XPS boards can then be laminated with any type of material that is needed for the outsides of the board. Two forms of lamination will be used. The XPS Board can be heated to allow the surface to become tacky which will allow the laminate to stick to the board or a glue will be used that is heated and delivered to the lamination machine. The glue would then hold the laminate surface to the board. After lamination is complete, then the boards/laminate are trimmed, stacked, and wrapped as the final product.

Trimmings from the board production will be recycled in the XPS Recycle Line. The smaller trimmings and planning scraps will be sent to a dust collector and then recycled back to the system pneumatically. The larger scraps will be sent to the XPS Grinder then pneumatically transferred to a silo. Both lines will be combined in the Doser/Extruder Feed Hopper on the recycle line and then feed to the Extruder, pass through a water bath for cooling, and then to a pellet cutter. The pellets will be fed to a Recycled Silo Storage and then will be fed back into the system at the Doser/Extruder Feed Hopper for the XPS Board Extrusion Line.

SITE INSPECTION

A site inspection of the facility was performed on March 21, 2023 by Chris Scanlon (DAQ Inspector). Performed full compliance inspection at Tema North America LLC. all paperwork and records were in order during inspection.

The facility is located in the Burr Business Park near Ranson. The vast majority of surrounding buildings are commercial/industrial. The nearest non commercial/industrial building to the facility is a day care center located approximately ½ mile from TeMa's site. Additionally, an elementary school is located approximately 1 mile from the site.

To get to the facility from Martinsburg take I-81 South to exit 12. Turn left on State Route 9 and go approximately 9.9 miles before taking the Bardane exit. At the end of the off ramp turn right on Wiltshire Road and go approximately 0.3 miles and turn left on W. Burr Blvd. Then go approximately 0.3 miles and turn right on McGary Blvd. Next, go approximately 0.2 miles and turn right on Steeley Way. Proceed approximately 0.2 miles and the facility is on the left.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions from the facility can be broken down into the following categories:

* Material Handling emissions

* Extruder Emissions

- Lamination Emissions

* Natural gas combustion emissions (building heat only) (not part of this modification)

* Haul Road Emissions

Material Handling Emissions

Transfer point (TP), feed hoppers, dimensional cutter, trimmers, and surface planner emissions were based on an emission factor of 0.80 pounds of PM per ton of material. This factor came from AP-42 Table 6.6.2-1 footnote h. This emission factor has a rating of "C". the emission factor was intended to be applied one time to the entire product throughput. However, TeMa's consultant conservatively applied the factor to each individual transfer point. This results in a significant overestimation of emissions.

Extruder and Lamination Emissions

Emissions from the extruders and laminator were based on emission factors from "Sampling and Analysis of Fumes Evolved During Thermal Processing of Polystyrene Resins", Dow Chemical, et al.

Haul Road Emissions

Haul Road Emissions were based on AP-42 Chapter 13.2.2. New annual emissions were based on 797 additional trips per year (based on total throughput of the plant delivered and removed and multiplied by 1.5 to account for any other miscellaneous trucking.) Hourly emissions were based on an estimated maximum of 10 trucks per hour. This again seems conservative since even if all trucking is confined to an 8 hour workday, the average would be less than 4 trucks per hour.

New criteria emissions from the facility should be as follows:

	PM		PM_{10}		$PM_{2.5}$		NO_x		CO		SO_2		VOCs	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Materials Transfers (Pneumatic)(X1S)	0.10	0.43	0.10	0.43	0.10	0.43	--	--	--	--	--	--	--	--
Virgin Silo(X2S)(X3CE)	0.03	0.11	0.03	0.11	0.03	0.11	--	--	--	--	--	--	--	--
XPS Doser/Extruder Feed Hopper (X3S)(X1E)	0.10	0.43	0.10	0.43	0.10	0.43	--	--	--	--	--	--	--	--
Line XPS Extruder(X4S)	0.06	0.28	0.06	0.28	0.06	0.28	--	--	0.01	0.05	--	--	0.23	1.01
XPS Trimmer (X5S)(X1CE)	0.02	0.11	0.02	0.11	0.02	0.11	--	--	--	--	--	--	--	--
XPS Dimensional Cutting(X6S)(X6E)	0.10	0.43	0.10	0.43	0.10	0.43	--	--	--	--	--	--	--	--
XPS Lamination (X7S)(2E)	0.06	0.28	0.06	0.28	0.06	0.28	--	--	0.01	0.05	--	--	0.23	1.01

XPS Trimmer (X8S)(1E)	0.02	0.11	0.02	0.11	0.02	0.11	--	--	--	--	--	--	--	--
XPS Pneumatic System 3 (X9S)(X2CE)	0.01	0.04	0.01	0.04	0.01	0.04	--	--	--	--	--	--	--	--
XPS Pneumatic System 2 (X10S)(X2CE	0.01	0.04	0.01	0.04	0.01	0.04	--	--	--	--	--	--	--	--
XPS Grinder (X11S)(X11E)	0.18	0.81	0.18	0.81	0.18	0.81	--	--	--	--	--	--	--	--
XPS Outside Silo (X12S)(X2CE)	0.01	0.04	0.01	0.04	0.01	0.04	--	--	--	--	--	--	--	--
XPS Pneumatic System 4 (X13S)(X1CE)	0.01	0.04	0.01	0.04	0.01	0.04	--	--	--	--	--	--	--	--
XPS Doser/Extruder Feed Hopper (X14S)(X1CE)	0.01	0.04	0.01	0.04	0.01	0.04	--	--	--	--	--	--	--	--
XPS Extruder (X15S)(2E)	0.02	0.10	0.02	0.10	0.02	0.10	--	--	0.01	0.02	--	--	0.08	0.37
XPS Pellet Cutter (X16S)(X16E)	0.18	0.81	0.18	0.81	0.18	0.81	--	--	--	--	--	--	--	--
XPS Pneumatic System 5 (X17S)(X1CE)	0.18	0.81	0.18	0.81	0.18	0.81	--	--	--	--	--	--	--	--
XPS Recycled Silo Storage (X18S)(X1CE)	0.18	0.81	0.18	0.81	0.18	0.81	--	--	--	--	--	--	--	--
Building Heaters	0.02	0.07	0.02	0.07	0.02	0.07	0.22	0.95	0.18	0.80	0.01	0.01	0.01	0.05
Haul Roads	27.49	14.49	8.10	4.27	0.80	0.42	--	--	--	--	--	--	--	--
XPS Haul Roads	5.50	1.09	1.62	0.32	0.16	0.03	--	--	--	--	--	--	--	--

New Hazardous Air Pollutant emissions from the facility should be as follows:

	Toluene		Acrolein		Hexane		Acetaldehyde		Formaldehyde		Propionaldehyde		MDI		Total HAPs	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Line XPS Extruder	--	--	0.00003	0.0002	--	--	0.0002	0.0009	0.0003	0.0014	0.00003	0.0001	0.02	0.10	0.02	0.10

Updated PTE

	R13-3414		R13-3414A		Emission Increase	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
PM	31.96	34.04	38.54	39.85	6.58	5.81
PM10	12.57	23.82	15.27	28.86	2.70	5.04
PM2.5	5.27	19.97	6.51	24.72	1.24	4.75
VOCs	1.27	5.54	1.70	7.47	0.43	1.93
NOx	0.22	0.95	0.22	0.95	0.00	0.00
CO	0.18	0.80	0.21	0.93	0.03	0.13
SO2	0.01	0.01	0.01	0.01	0.00	0.00
Total HAPS	1.00	4.36	1.02	4.47	0.02	0.11

REGULATORY APPLICABILITY

The proposed facility is subject to the following state rules (no federal rules apply):

45CSR7 To Prevent and Control Particulate Matter Air Pollution from Manufacturing Processes and Associated Operations.

The extruders are subject to the process weight rate based emission limitations of 45CSR7. The rule 7 emission limitation for Extruders which discharge through emission point 2E (based on a type 'a' source and a maximum process weight rate of 7,275.26 lb/hr) is 7.275 pounds per hour. Actual controlled emissions from Extruder 2E are expected to be 0.50 pounds per hour. Therefore, the requirements of 45CSR7 should be met.

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

Potential (uncontrolled) emissions from the construction of the proposed TeMa North America, LLC facility would exceed 6 pounds per hour and 10 tons per year of PM. Therefore, a permit is required.

As required under §45-13-8.3 ("Notice Level A"), TeMa placed a Class I legal advertisement in a "newspaper of general circulation in the area where the source is . . . located." The ad ran on February 21, 2024 in the Shepherdstown Chronicle and the affidavit of publication for this legal advertisement was submitted on April 3, 2024. Additionally, TeMa paid the appropriate application fee of $1,000.

45CSR22 Air Quality Management Fee Program

The facility is not subject to any NSPS, MACT or NESHAP. Additionally, the facility is defined as a minor source under 45CSR30. Therefore the facility is not subject to 45CSR30 and will pay its annual fees through the Rule 22 program.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The majority of non-criteria regulated pollutants fall under the definition of HAPs which, with some revision since, were 188 compounds identified under Section 112(b) of the Clean Air Act (CAA) as pollutants or groups of pollutants that EPA knows or suspects may cause cancer or other serious human health effects. The Station is classified as an area source of hazardous air pollutants. Listed below is a description of the primary hazardous air pollutants for this facility.

Acetaldehyde
Acetaldehyde is mainly used as an intermediate in the synthesis of other chemicals. It is ubiquitous in the environment and may be formed in the body from the breakdown of ethanol. Acute (short-term) exposure to acetaldehyde results in effects including irritation of the eyes, skin, and respiratory tract. Symptoms of chronic (long-term) intoxication of acetaldehyde resemble those of alcoholism. Acetaldehyde is considered a probable human carcinogen (Group B2) based on inadequate human cancer studies and animal studies that have shown nasal tumors in rats and laryngeal tumors in hamsters.

Acrolein
Acrolein is primarily used as an intermediate in the synthesis of acrylic acid and as a biocide. It may be formed from the breakdown of certain pollutants in outdoor air or from the burning of organic matter including tobacco, or fuels such as gasoline or oil. It is toxic to humans following inhalation, oral or dermal exposures. Acute (short-term) inhalation exposure may result in upper respiratory tract irritation and congestion. No information is available on its reproductive, developmental, or carcinogenic effects in humans, and the existing animal cancer data are considered inadequate to make a determination that acrolein is carcinogenic to humans.

Formaldehyde
Formaldehyde is used mainly to produce resins used in particleboard products and as an intermediate in the synthesis of other chemicals. Exposure to formaldehyde may occur by breathing contaminated indoor air, tobacco smoke, or ambient urban air. Acute (short-term) and chronic (long-term) inhalation exposure to formaldehyde in humans can result in respiratory symptoms, and eye, nose, and throat irritation. Limited human studies have reported an association between formaldehyde exposure and lung and nasopharyngeal cancer. Animal inhalation studies have reported an increased incidence of nasal squamous cell cancer. EPA considers formaldehyde a probable human carcinogen (Group B1).

Hexane
Hexane is used to extract edible oils from seeds and vegetables, as a special-use solvent, and as a cleaning agent. Acute (short-term) inhalation exposure of humans to high levels of hexane causes mild central nervous system (CNS) effects, including dizziness, giddiness, slight nausea, and headache. Chronic (longterm) exposure to hexane in air is associated with polyneuropathy in humans, with numbness in the extremities, muscular weakness, blurred vision, headache, and fatigue observed. Neurotoxic effects have also been exhibited in rats. No information is available on the carcinogenic effects of hexane in humans or animals. EPA has classified hexane as a Group D, not classifiable as to human carcinogenicity.

4,4'-Methylenediphenyl Diisocyanate (MDI)
The commercial form of 4,4'-methylenediphenyl diisocyanate (MDI) is used to produce polyurethane foams. Acute (short-term) inhalation of high concentrations of MDI may cause sensitization and asthma in humans. Acute dermal contact with MDI has induced dermatitis and eczema in workers. MDI has been observed to irritate the skin and eyes of rabbits. Chronic (long-term) inhalation exposure to MDI has

been shown to cause asthma, dyspnea, and other respiratory impairments in workers. Respiratory effects have also been observed in animals. No adequate information is available on the reproductive, developmental, or carcinogenic effects of MDI in humans. EPA has classified MDI as a Group D, not classifiable as to human carcinogenicity.

Propionaldehyde
Propionaldehyde is used in the manufacture of plastics, in the synthesis of rubber chemicals, and as a disinfectant and preservative. Limited information is available on the health effects of propionaldehyde. No information is available on the acute (short-term), chronic (long-term), reproductive, developmental or carcinogenic effects of propionaldehyde in humans. Animal studies have reported that exposure to high levels of propionaldehyde, via inhalation, results in anesthesia and liver damage, and intraperitoneal exposure results in increased blood pressure. EPA has not classified propionaldehyde for carcinogenicity.

Toluene
The acute toxicity of toluene is low. Toluene may cause eye, skin, and respiratory tract irritation. Short-term exposure to high concentrations of toluene (e.g., 600 ppm) may produce fatigue, dizziness, headaches, loss of coordination, nausea, and stupor; 10,000 ppm may cause death from respiratory failure. Ingestion of toluene may cause nausea and vomiting and central nervous system depression. `Contact of liquid toluene with the eyes causes temporary irritation. Toluene is a skin irritant and may cause redness and pain when trapped beneath clothing or shoes; prolonged or repeated contact with toluene may result in dry and cracked skin. Because of its odor and irritant effects, toluene is regarded as having good warning properties. The chronic effects of exposure to toluene are much less severe than those of benzene. No carcinogenic effects were reported in animal studies. Equivocal results were obtained in studies to determine developmental effects in animals. Toluene was not observed to be mutagenic in standard studies.

All HAPs have other non-carcinogenic chronic and acute effects. These adverse health effects may be associated with a wide range of ambient concentrations and exposure times and are influenced by source-specific characteristics such as emission rates and local meteorological conditions. Health impacts are also dependent on multiple factors that affect variability in humans such as genetics, age, health status (e.g., the presence of pre-existing disease) and lifestyle. As stated previously, *there are no federal or state ambient air quality standards for these specific chemicals*. For a complete discussion of the known health effects of each compound refer to the IRIS database located at *www.epa.gov/iris*.

AIR QUALITY IMPACT ANALYSIS

Because the original application addressed the construction of a facility that is not defined as major under 45CSR14, no modeling was performed.

MONITORING OF OPERATIONS

The permit will require the following parameters to be monitored and recorded:

* Throughput of resin (polystyrene, polypropylene, polyethylene and high density polyethylene) to each extruder on a monthly basis.

CHANGES TO R13-3414

Permit R13-3414A will supersede and replace Permit R13-3414 that was issued on October 31, 2018. The following changes were made to R13-3414:

- Updated Title page
- Updated headers
- Updated Description of Change
- Updated Table 1.0, added XPS emission points, changed extrusion emission points to 2E
- Updated Section 2.5 language
- Updated Section 2.12 to "*[Reserved]*"
- Deleted section 3.5.4.2
- Updated Section 4.1.1
- Changed 4.1.2 to include XPS extruder
- Changed 4.1.3 to include polystyrene
- 4.1.5 added language for MDI
- 4.1.6 changed to include XPS laminator and extruder
- 4.1.7 changed to include XPS

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates that TeMa North America, LLC meets all the requirements of applicable regulations. Therefore, impact on the surrounding area should be minimized and it is recommended that the Jefferson County Facility should be granted a 45CSR13 Modification for their facility.

Brian D. Carney, PE

Digitally signed by: Brian D. Carney, PE
DN: CN = Brian D. Carney, PE email = brian.d.carney@wv.gov C = US O = WV Dept. of Environmental Protection OU = Division of Air Quality
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