



west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-1230A
Plant ID No.: 107-00181
Applicant: Kuraray America, Inc. (Kuraray)
Facility Name: Kuraray Washington Works
Location: 8480 DuPont Road, State Route 892, Washington, WV 26181
NAICS Code: 325211 - Plastics Material and Resin Manufacturing
Application Type: Modification
Received Date: June 17, 2015
Engineer Assigned: John Legg
Fee Amount: \$1,000.00
Date Received: June 23, 2015
Complete Date: September 2, 2015
Due Date: December 1, 2015
Applicant Ad Date: June 18, 2015
Newspaper: ***The Parkersburg News and Sentinel***
UTM's: Easting: 442.40 km Northing: 4,346.84 km Zone: 17
Lat/Long Coordinates: North Latitude: 39.235 West Longitude: 81.668
Description: Product drying expansion for the PVB Resin Drying Area/Process: Construction of a second dewatering, drying and truck loading operation/line for polyvinyl butyral (PVB) resin/water slurry.

SUMMARY

This modification application (R13-1230A) is to add a second drying line (Line #2) to the PVB Resin Drying Area/Process. The first drying line (Line #1) was permitted on April 23, 1990 and had particulate matter emission limitations totaling 1.097 lb/hr and 4.59 ton/yr. The revised permit has particulate matter emission limitations for both lines totaling 0.98 lb/hr and 4.24 ton/yr, a net decrease in particulate matter of approximately 0.12 lb/hr and 0.35 ton/yr.

APPLICATION TIMELINE

- 6/01/14 - Kuraray purchases from DuPont, the Glass Laminating Solutions (GLS)-Vinyls business located at Washington, Wood County, WV.
- Kuraray is currently working with the DAQ's Title V Group and is believed to be a deferred, non-major Title V source.
- 6/17/15 - Application Received
- 6/18/15 - Legal Notice runs in ***The Parkersburg News and Sentinel***
- 6/23/15 - Application fee (\$1,000.00) Received
- 6/23/15 - DAQ Engineer Assigned
- 6/25/15 - Affidavit of Publication Received at DAQ
- 7/02/15 - Application Deemed Incomplete:
- Non-confidential information claimed confidential and
 - Air Pollution Control Device Sheet (APCDS) for Baghouse B33C was submitted as To Be Determined (TBD)/incomplete.
- 7/17/15 - Confidential and Non-confidential Information Resubmitted
- 9/02/15 - APCDS for Baghouse re-submitted.
- 9/10/15 - Application deemed complete as of 9/02/15.

MSDS

Kuraray provided two (2) Material Safety Data Sheet (MSDS) in Attachment H to the permit application:

#1 - MSDS - Product - PVB Resin

BUTACITE PVB Flake
Polyvinyl Butyral Resin
CAS Number: 63148-65-2
Chemical Formula: $(C_8H_{14}O_2)_n$
% Volatiles: <1%
Solubility in water: Insoluble
Odor: Odorless
Form: Granular material
Specific Gravity: 1

According to Wiki:

Polyvinyl butyral (or PVB) is a resin mostly used for applications that require strong binding, optical clarity, adhesion to many surfaces, toughness and flexibility. It is prepared from polyvinyl alcohol by reaction with butyraldehyde. The major application is laminated safety glass for automobile windshields. Tradenames for PVB-films include Saflex, GlasNovations, Butacite, WINLITE,

Fact Sheet R13-1230A
Kuraray America, Inc.
Kuraray Washington Works

S-Lec, and Trosifol. Butacite is DuPont's registered trade name for PVB.

Laminated glass, commonly used in the automotive and architectural fields, comprises a protective interlayer, usually polyvinyl butyral, bonded between two panels of glass. The bonding process takes place under heat and pressure. When laminated under these conditions, the PVB interlayer becomes optically clear and binds the two panes of glass together. Once sealed together, the glass "sandwich" (i.e., laminate) behaves as a single unit and looks like normal glass. The polymer interlayer of PVB is tough and ductile, so brittle cracks will not pass from one side of the laminate to the other.

#2 - MSDS - Heat Transfer Fluid used in drying oven.

ThermalStar Heat Transfer Fluid
Propylene Glycol
CAS Number: 57-55-6
Form: Liquid
Odor: Odorless
Boiling Point:

ThermalStar hydronic heat transfer fluid is a fully inhibited propylene glycol based solution designed for applications where incidental contact with humans, food, or beverage products could occur. It is for this reason that ThermalStar is produced using only new, virgin USP grade propylene glycol. The inhibitor package is scientifically formulated of new, food grade ingredients and blended into the propylene glycol under tightly controlled manufacturing procedures.

Applications: ThermalStar is recommended for use in all closed primary and secondary heating, cooling, and refrigeration systems. Other applications include radiant heat, snow melt, and various deicing, defrosting, and dehumidifying systems

According to Wiki:

Propylene glycol, also called propane-1,2-diol, is an organic compound with the chemical formula $C_3H_8O_2$. It is a viscous colorless liquid which is nearly odorless but possesses a faintly sweet taste. Chemically it is classed as a diol and is miscible with a broad range of solvents, including water, acetone, and chloroform.

It is produced on a large scale and is primarily used in the production of polymers but also sees use in food processing as the E-number E1520.

Fact Sheet R13-1230A
Kuraray America, Inc.
Kuraray Washington Works

The compound is sometimes called α -propylene glycol to distinguish it from the isomer propane-1,3-diol (β -propylene glycol).

Propylene glycol is a clear, colorless and hygroscopic liquid. Propylene glycol contains an asymmetrical carbon atom, so it exists in two enantiomers. The commercial product is a racemic mixture. Pure optical isomers can be obtained by hydration of optically pure propylene oxide.

The freezing point of water is depressed when mixed with propylene glycol owing to the effects of dissolution of a solute in a solvent (freezing-point depression); in general, glycols are non-corrosive, have very low volatility and very low toxicity, however, the closely related ethylene glycol (a key ingredient in antifreeze) is moderately toxic to humans and fatally toxic to many animals.

DESCRIPTION OF PROCESS

Polyvinyl butyral (PVB), a solid polymeric material is produced by the upstream resin plant as granular solid particles dispersed in water. This slurry is then dewatered, dried, and loaded into Sealand containers in two drying lines. The two lines function as described below and have the same configuration, except where noted otherwise.

The PVB/water slurry from the resin plant flows into the process feed tank and circulates in the feed tank - head tank recirculation loop. The slurry is pumped from the head tank to a screener where coarse particles are removed. In both Line #1 and Line #2 the oversize particles flow to a waste bin. In Line #2 the option exists to route the oversized particles through a mill for size reduction. If this option is used, the smaller sized fraction rejoins the stream from the screener and the remaining coarse fraction continues to the waste bin.

The slurry from the coarse screener then flows to a centrifuge for dewatering. Final drying is accomplished in a fluidized bed dryer using steam-heated air.

The air stream leaving the dryer passes through a cyclone where most of the entrained fines are removed and returned to the dryer. The air stream then passes through a baghouse which removes most of the remaining fines. The air stream then vents to the atmosphere through a blower.

The rework system allows material to be removed from the process equipment during shutdowns or to be recirculated back through the dryer. Material is vacuumed up with pick-up wands and is collected in a big filter and hopper. The solid material is later packed out as waste material or is returned to the dryer.

In Line #1 the dry solid is transported from the dryer outlet via entrainment in a closed pneumatic loop. The material is removed from the air stream by a bag filter and drops into a storage silo. A second closed pneumatic loop then transfers the material from the storage silo to a Sealand container for shipment.

In Line #2, the dry solid is transported from the dryer outlet via entrainment in a closed pneumatic loop. The material is removed from the air stream by a bag filter. The material then exists into a second closed pneumatic loop with two branches, each to a Sealand container filling station. While a container is being filled at one station, the full container at the other station is readied for shipment and moved out, and the next empty container is spotted and prepared for filling.

In Line #1, the silo has a relief device, specifically a conservation vent that protects against generation of pressure and vacuum from silo filling and emptying. This CV is shown in the application in Attachment L, in the chemical process Emission Unit Data Sheet (EUDS). Due to the way this relief device was treated in the original 1990 application, it was included in permit R13-1230 as an emission point with an emission limit. With this application for a modification to R13-1230, it is requested that this relief device be deleted as an emission point with emission limits.

SITE INSPECTION

No site inspection was conducted for this update by the permit writer. The facility's location is known to DAQ Enforcement whose inspectors conduct periodic inspections.

Directions to the facility as given in the permit application (Section I. General, Item 12A, Page 2 of 5):

Three and one-fourth miles west along DuPont Road [State Route (SR)-892] from the intersection of DuPont Road and SR-68.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

According to their June 18, 2015 legal notice/newspaper advertisement, Kararay estimates the increased potential to emit to be:

4.0 ton/yr	Particulate Matter (PM)
0.39 ton/yr	Volatile Organic Compounds (VOC)/propylene glycol*

* Propylene glycol (CAS 57-55-6) is used as a heat transfer fluid in the process dryers. The 0.39 ton/yr emission rate is a fugitive emission rate estimated based on process equipment leaks.

Fact Sheet R13-1230A
Kuraray America, Inc.
Kuraray Washington Works

	Line No.	Emission Point ID No.	Emission Unit Venting to this Emission Point	Control Device	PM (Polyvinyl Butyral)			
					Uncontrolled		Controlled	
					lb/hr	ton/yr	lb/hr	ton/yr
BEFORE Permit R13-1230	#1	Baghouse (B30C)			--	--	1.0	4.38
		⁽¹⁾ Storage Silo (Conservation Vent)			--	--	0.097	0.21
		Total			--	--	1.10	4.59
AFTER Permit R13-1230A	#1	B30E	Cyclone (B30)	Baghouse (B30C)	2.4	11	0.0024	0.011
		B32AE	Rework Bagfilter (B32A)	N/A	0.40	1.75	0.40	1.75
		Sub-Total			2.80	12.75	0.41	1.77
	#2	B33E	Cyclone (B33)	Baghouse (B33C)	3.4	15	0.0034	0.015
		B34E	Rework Bagfilter (B34)	N/A	0.56	2.45	0.56	2.45
		Sub-Total			3.96	15.45	0.57	2.47
	Total					0.98	4.24	
	Net Emission Change (New - Old)						-0.12	-0.35
<p>(1) In Line #1, the silo has a relief device, specifically a conservation vent that protects against generation of pressure and vacuum from silo filling and emptying. Due to the way this relief device was treated in the original 1990 application, it was included in permit R13-1230 as an emission point with an emission limit. With this application for a modification to R13-1230, it is requested that this relief device be deleted as an emission point with emission limits.</p>								

REGULATORY APPLICABILITY

Kuraray's Washington Works facility is divided into two areas, the PVB resin manufacturing area permitted under R13-2380C and the PVB resin drying area permitted under R13-1230. The permit application under reviewed is R13-1230A for the PVB resin drying area.

State Rules:

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

The purpose of Rule 7 is to prevent and control particulate matter air pollution from manufacturing processes and associated operations.

The new PVB resin drying line is subject to the emissions standards of 45CSR7.

Fact Sheet R13-1230A
Kuraray America, Inc.
Kuraray Washington Works

- 45CSR§7-3.1. - Opacity of emission points must be less than 20%.
This is stated in section 4.1.2 of the permit.
- 45CSR§7-3.2. - The provisions of subsection 3.1 shall not apply to smoke and/or particulate matter emitted from any process source operation which is less than forty (40) percent opacity for any period or periods aggregating no more than five (5) minutes in any sixty (60) minute period.

This is stated in section 4.1.2 of the permit.
- 45CSR§7-4.1. - No person shall cause, suffer, allow or permit particulate matter to be vented into the open air from any type source operation or duplicate source operation, or from all air pollution control equipment installed on any type source operation or duplicate source operation in excess of the quantity specified under the appropriate source operation type in Table 45-7A found at the end of this rule.

The PM limitations in the permit for Line #1 and Line #2 are much lower (by a factor of 10) than the PM limitations allowed by Table 45-7A.

See section 4.1.1 of the permit.
- 45CSR§7-5.1. - Must be equipped with control system(s) to minimize fugitive PM.

Quoted in section 4.1.5 of the permit.
- 45CSR§7-5.2. - The owner or operator of a plant shall maintain particulate matter control of the plant premises, and plant owned, leased or controlled access roads, by paving, application of asphalt, chemical dust suppressants or other suitable dust control measures. Good operating practices shall be implemented and when necessary particulate matter suppressants shall be applied in relation to stockpiling and general material handling to minimize particulate matter generation and atmospheric entrainment.

Quoted in section 4.1.6. of the permit.

45CSR§7-8.1. - Director may required PM stack testing.

Quoted in section 4.3.1 of the permit.

45CSR§7-8.2. - Director or his representative may conduct tests to evaluate emissions.

Quoted in section 4.3.2. of the permit.

45CSR§7-9.1. - Continued operation allowances for unavoidable malfunction of equipment.

Quoted in section 4.1.7. of the permit.

45CSR13 - **Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, Permission to Commence Construction, and Procedures for Evaluation**

The PVB resin drying area already has an existing Rule 13 construction permit (R13-1230, approved in 1990) for product drying Line #1. Kuraray wants to add an additional line which would also be subject to the emissions standards of 45CSR7.

The company ran the required legal advertisement as a modification to an existing permit R13-1230, submitted a complete permit application, and paid the required \$1,000.00 application fee.

45CSR21 - **Regulation to Prevent and Control Air Pollution From the Emission of Volatile Organic Compounds**

It is the intent of the Director that all persons engaged in the manufacture, mixing, storage, use, or application of volatile organic compounds control the emission of volatile organic compounds through the application of reasonably available control technology. This regulation applies to sources located in Putnam County, Kanawha County, Cabell County, Wayne County, and Wood County.

Kuraray's Washington Works facility is located in Wood County, WV, one of the five counties Rule 21 applies to. The following generic LDAR was written in the permit to cover any fugitive VOC emissions that might be emitted from the PVB resin drying area/process:

Fact Sheet R13-1230A
Kuraray America, Inc.
Kuraray Washington Works

- 4.2.2. The permittee shall implement and maintain leak detection and repair (LDAR) programs for the reduction of fugitive VOC emissions in all manufacturing process units subject to 45CSR§21-40 producing a product or products intermediate or final, in excess of 1,000 megagrams (1,100 tons) per year in accordance with the applicable methods and criteria of 45CSR§21-37 or alternate procedures approved by the Director. Procedures approved by the Director, 40CFR60, Subpart VV, 40CFR61, Subpart V, 40CFR63, Subpart H, 40CFR63, Subpart TT, 40CFR63, Subpart UU, 40CFR65, Subpart F, and 40CFR265, Subpart CC. This requirement shall apply to the VOC emitting equipment in the PVB Resin Drying Process irrespective of whether or not such units produce as intermediates or final products, substances on the lists contained with 40CFR60, 40CFR61, or 40CFR63. **[45CSR§21-40.3.a.2]**
- 4.3.3. Manufacturing process units subject to the LDAR requirement in section 4.2.2. of this permit may be exempted upon written request of the permittee to the Director. Exempted units are exempted from the frequency of testing as described in 45CSR§21-37, however, LDAR testing of this unit or certification of emission using approved fugitive emission factors will be required every three years, or upon request by the Director or his duly authorized representative. Waiver or scheduling of LDAR testing every three years may be granted by the Director if written request and justification are submitted by the permittee. Units exempted from testing which may be required under any other applicable State or Federal regulations, orders, or permits. The Director may periodically require verifications by the permittee that maintenance and repair procedures associated with approved exemptions are continued and practiced.
- 4.3.4. In the event a source and associated emission from the VOC emitting equipment in the PVB Resin Drying Process are subject to the MACT standards of 40CFR63, then compliance with the applicable LDAR testing requirements set forth by the MACT and identified in the affected 45CSR13 permit shall demonstrate compliance with the LDAR testing requirements set forth in this permit.

What sparked the above concern about fugitive emissions from the PVB resin drying area/process was the 0.39 ton/yr fugitive VOC emission rate listed in Kararay's legal advertisement and the following passage taken from Attachment O in the permit application:

To demonstrate compliance of the closed loop brine system with 45CSR21 Section 37, field patrols will be conducted twice per day. Any equipment leaks from pumps or valves detected by AVO (audible, visual, olfactory) will be repaired and the repair verified per 45CSR21 Section 37.7.

In an email dated 10/27/15 from Mark Gaston to the writer the following information was provided:

Fact Sheet R13-1230A
Kuraray America, Inc.
Kuraray Washington Works

The existing drying line currently uses and the new drying line will use a brine of 26% to 30% propylene glycol in water. This is the brine referenced in Attachment O. It is / will be used in closed loop cooling systems for both drying lines. Were we to have loss of containment in the existing system, the spilled brine would drain to a trench the flows to a process sewer and from there to the site WWTP. The design of the new system will include similar provisions to keep any spilled brine from reaching the ground or storm water drains.

45CSR30 - Requirements for Operating Permits

After being sold by DuPont, Kuraray's GLS-Vinyls business is thought by Title V personnel to be a non-major, deferred Title V source. This determination, however, is under review by Title V personnel and may change depending on the outcome of the Title V review.

Federal Rules

40 CFR Part 63 MON-MACT

The MON-MACT is applicable to the PVB resin manufacturing area and is not applicable to the PVB resin drying area.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

See the **MSDS** section above.

AIR QUALITY IMPACT ANALYSIS

Kuraray's Washington Works facility is consider to be an non-major source under State Rules 14, 19, and 30. The addition of Line #2 is a non-major modification to a non-major source. For this reason, no impact analysis study was conducted for the source.

MONITORING OF OPERATIONS

- Opacity (20% or less) monitoring:

- 4.2.1. For the purpose of determining compliance with the opacity limits of 45CSR§§7-3.1 and 3.2 (4.1.2) for emission points B30E, B32AE, B33E and B34E, the permittee shall conduct opacity monitoring and record keeping for all emission points and equipment subject to an opacity limit under 45CSR7. Monitoring shall be conducted at least once per month with a maximum of forty-five (45) days

Fact Sheet R13-1230A
Kuraray America, Inc.
Kuraray Washington Works

between consecutive readings. These checks shall be conducted by personnel trained in the practices and limitations of 40 C.F.R. 60, Appendix A, Method 22 during periods of normal operation of emission sources that vent from the referenced emission points for a sufficient time interval to determine if there is a visible emission. If visible emissions are identified during the visible emission check, or at any other time regardless of operations, the permittee shall conduct an opacity reading using the procedures and requirements of 45CSR7A within twenty-four (24) hours of the first signs of visible emissions. A 45CSR7A evaluation shall not be required if the visible emission condition is corrected within twenty-four (24) hours after the visible emission and the sources are operating at normal conditions. If the permittee cannot conduct visible emission observations for an emission point due to weather and/or a limited operating schedule, the permittee shall document in the records required by 4.4.4 the specific reason(s) that visible emission observations could not be conducted for that month.

- **Recordkeeping (Visible Emission Observations, Control Device Maintenance, and Facility Dust Suppressants) requirement:**

4.4.4. Records of the visible emission observations required by 4.2.1 shall be maintained documenting the

date and time of each visible emission check, the name of the responsible observer, the results of the check, and, if necessary, all corrective actions taken. These records shall be maintained on-site for a period of no less than five (5) years and made available to the Director or his duly authorized representative upon request.

4.4.5. The permittee shall maintain maintenance records for emission points B30E, B32AE, B33E and B34E relating to the failure and/or repair of air pollution control devices and fugitive emissions control systems. Such records shall contain, at a minimum, the equipment ID number, a brief description of the equipment, the date of failure and/or repair, the nature of the problem, actions taken, and the name or initials of the person making the record entry. In the event of air pollution control equipment, fugitive emissions control system, or system failure, these records shall document the permittee's effort to maintain proper and effective operation of such equipment and/or systems. Records shall be maintained on site for a period of five (5) years. Certified records, signed by a Responsible Official or an Authorized Representative shall be made available to the Secretary or a duly authorized representative upon request.

4.4.6. The permittee shall maintain records indicating the use of any dust suppressants or any other suitable dust control measures as required by 4.1.6 applied at the facility. These records shall be maintained on site for a period of no less than five (5) years.

CHANGES TO UPDATE R13-1230

Air permit R13-1230, written in 1990, was in the older, one-page format. It had emission limitations for Line #1, for the baghouse (B30E) and storage silo (B31E). There were no monitoring or record keeping requirements.

R13-1230A is in the newer, Title V-like permit format. The permit had emission limitations for Line #1 and Line #2 baghouses (B30E and B33E) and Rework Bagfilters (B32AE and B34E). (See the **ESTIMATE OF EMISSIONS** section, specifically the table which shows emission limits for the old and new permit.)

Fact Sheet R13-1230A
Kuraray America, Inc.
Kuraray Washington Works

The Line #1 storage silo is no longer considered to be an emission point. This is discussed in the last paragraph of the **DESCRIPTION OF PROCESS** section given above.

The new permit has monitoring and record keeping requirements as detailed in the **MONITORING OF OPERATIONS** section above.

RECOMMENDATION TO DIRECTOR

Based on the information contained in permit application R13-1230A, the writer is convinced that Kuraray will operation Line #2 in compliance with all applicable state and federal air pollution control rules and regulations. The writer recommends that the company be issued modification permit R13-1230A.

John Legg
Permit Writer

October 28, 2015