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**west virginia** department of environmental protection

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Jim Justice, Governor  
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## **ENGINEERING EVALUATION / FACT SHEET**

### **BACKGROUND INFORMATION**

Application No.:	R13-2317G
Plant ID No.:	037-00061
Applicant:	DALB, Inc.
Facility Name:	Kearneysville Facility
Location:	Kearneysville, Jefferson County
SIC Code:	2759 - Commercial Printing, Not Elsewhere Classified
Application Type:	Modification
Received Date:	December 14, 2016
Engineer Assigned:	David Keatley
Fee Amount:	\$1,000
Date Received:	December 16, 2016
Complete Date:	December 12, 2017
Due Date:	March 12, 2017
Applicant Ad Date:	December 20, 2016
Newspaper:	<i>The Journal</i>
UTM's:	Easting: 252.2 km      Northing: 4,359.8 km      Zone: 17
Description:	Addition of a printing line, addition of a UV printer, modification of permit limits, removal of a propane dryer, update operations in the permit. This is an after-the-fact Modification Permit where the Installation of the proposed equipment was installed in 2016 and previous.

### **DESCRIPTION OF PROCESS**

DALB, Inc. (DALB) operates printing lines, which produce high quality signs and decal graphics for the beverage vending machine industry, flavor card process, and specialty event tickets & passes. DALB utilizes various ultraviolet (UV) inks and solvent based inks. Each printing line is equipped with a drying system, which consists of either a propane oven, UV oven, both propane and UV oven, or electric oven. In addition to the printing inks, other solvents are used throughout the facility for cleanup and maintenance.

Signs and flavor cards are polycarbonate sheets that have been screen printed with UV screen inks. Finished flavor cards are placed in the soft drink selection section on the front of the beverage vending machine and backlit for increased product visibility. Decals are screen printed onto vinyl sheets with UV screen inks. Finished decals are placed on

the sides of the machines and do not require backlighting. The numbering of emission units have been changed in accordance with Attachment I of the application.

Signs are to be produced on four (4) independent primary screen printing lines; Sign Line 1, Sign Line 2, Sign Line 3, and Sign Inline. In addition to the full time sign lines, there is one (1) secondary line, Decal Line 2. Sign Lines 1, 2, and 4 are equipped with both an UV drying oven and propane fired drying ovens that enable the lines to use solvent ink as well as UV ink. Sign Line 3 and proposed Sign Line 5 will be equipped with an electric drying oven and can only use UV inks. Sign Lines 1 through 5, in addition to Decal Line 2, are single station screen-printing lines, which require up to five (5) separate passes through the system until a fully inked sign is produced. In Line 1 is a multiple station line consisting of five (5) screen-printing stations connected by a series of conveyors. In Line 1 can complete a fully inked sign in a single pass. The UV or solvent-based inks, which are used to create signs, are manually applied to the screen printing stations. After drying, the signs are cooled prior to additional passes through the printing stations for the next color application or, if complete, sent to warehouse storage prior to shipping.

Decals are produced on two (2) independent primary screen printing lines; Decal Line 1 and Decal Inline. Decal Lines 1 is a single station screen printing lines which require up to five (5) separate passes through the system until a fully inked decal is produced. The UV inks, which are used to create decals, are manually applied to the screen printing stations. Decal Line 1 is equipped with a UV dryer that is used to dry the UV ink onto the vinyl sheets. Due to the lower temperature required to dry the UV inks, process cooling is not necessary prior to additional handling. At the end of a pass through the station, the decals are either sent back through the station for the next color application or, if complete, sent to warehouse storage prior to shipping. Decal Inline has five (5) screen printing stations, which can fully ink a decal in a single pass. Decal Inline has a UV dryer after each press.

The Small Format Digital Printing Line is used to produce Flavor Cards. The sheets are first pre-coated to accept the printing ink. The sheets are cut into smaller sheets and are digitally printed using UV ink. The sheets are then placed on a clear coat press and are over coated with UV clear coat ink. The clear coat press is equipped with an UV dryer. The small format digital printing line has added a Presstek UV digital printer and a UV finishing press.

DALB has added a Thermoforming and Trimming Line. This line allows DALB to create three-dimensional formed products from thermoplastic sheets of any thickness. This line will have four (4) thermoformers and three (3) trimmers.

DALB has also added a large format digital printing line which consists of three (3) UV Vutek Digital Presses. The Vutek printers will be limited to 0.54 gallons/hr and 4,730 gallons/year of UV ink.

Solvents are used throughout the facility for cleaning inks from screens, printing stations, tools, etc. These solvent materials consist of washer solvent, butyl cellosolve, and EASISOLV 101, S.P.I.F 11, and other miscellaneous solvents.

## SITE INSPECTION

On April 30, 2015, Joseph Kreger conducted a full onsite compliance inspection of the facility. The facility was in compliance at the time of the inspection.

## ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

### Air Emissions from Solvent Ink Usage in Printing Lines:

For calculation purposes the maximum annual amount of solvent ink was divided by the total number of units that can use solvent ink. Sign Line 1 utilize solvent ink. The usage distribution may vary depending on which units are operated, but solvent ink usage will not exceed 150 gallons per year. The maximum VOC content of the solvent inks is 5.96 lb VOC/gallon. For calculation purposes the MSDS highest combo of Glycol ethers was used to differentiate between Non-HAP VOCs and HAPs. The highest HAP portion makes up 91% of the VOC content. The ink with the highest HAP portion was Halftone Cyan (MSDS provided in application, R13-2317F). The remaining 9% is non-hazardous VOCs. Table 4 shows the maximum hourly and yearly VOC and HAP emission rates.

Table 1: Maximum Hourly and Yearly Emissions from Solvent Inks New/Modified

Source	Approximate Usage Rate (gal/hr)	Approximate Usage Rate (gal/yr)	VOC Content (lb VOC/gal)	Emissions					
				VOC (lb/hr)	Total HAPs (lb/hr)	Glycol Ethers (lb/hr)	VOC (TPY)	Total HAPs (TPY)	Glycol Ethers (TPY)
Sign Line 1	0.40	50	5.96	2.38	2.17	2.17	0.15	0.14	0.14

### Air Emissions from UV Ink Usage in Printing Lines:

For calculation purpose the maximum annual amount of UV ink was divided by the total number of units that can use UV ink, except for the Inca printer. The usage distribution may vary depending on which units are operated, but UV ink usage will not exceed 16,000 gallons per year. The higher value of 0.13 lb/gallon was used as a worst case surrogate. The MSDS sheet for the Inca printer shows VOC content as negligible, therefore 0.13 lb/gal was used as a worst case. Per the MSDS, the component glycol ether acrylate is classified as a glycol ether. However, it is considered a reactive chemical in ultraviolet curable inks. Once initiated by a high dose of ultraviolet light, this glycol ether acrylate rapidly polymerizes (i.e. hardens) and becomes part of the ink film. Consequently, there are no emissions of this compound. Table 5 shows the maximum hourly and yearly VOC and HAP emission rates.

Table 2: Maximum Hourly and Yearly Emissions from UV Inks New/Modified

Source	Approximate Usage Rate (gal/hr)	Approximate Usage Rate (gal/yr)	VOC Content (lb VOC/gal)	Emissions					
				VOC (lb/hr)	Total HAPs (lb/hr)	Glycol Ethers (lb/hr)	VOC (TPY)	Total HAPs (TPY)	Glycol Ethers (TPY)
Vutek Digital Presses	0.54	4,730	0.036	0.06	--	--	0.27	--	--
Small Format Digital Printing Presstek UV Printer	0.28	2,453	0.584	0.6	--	--	0.72	--	--
Small Format Digital Printing UV Finishing Press	0.5	4,380	0.1	0.50	--	--	2.19	--	--
Decal Inline Press #1 through Press #5 (Previously Decal Line 3)	5.00	1,600	0.13	0.65	--	--	0.10	--	--

## Fugitive Source VOC Emissions from Ink Usage on Flavor Card Line:

Emissions of VOCs from the Flavor Card Line were estimated by the maximum usage and assuming the majority of the material used will evaporate to VOCs. Table 3 shows the material used, maximum usage rate, specific gravity, hourly VOC emissions, and yearly VOC emissions.

Table 3: VOC Emissions from Ink Usage on Flavor Card Line (Fugitive) New/Modified

Material	Max. Usage (gal/hr)	Max. Usage (gal/yr)	Specific Gravity	Max Usage (lbs/hr)	VOC Content		VOC Emissions	
					%	lb/gal	lb/hr	TPY
Special Primer	0.33	1,157	0.819	0.67	100	6.70	0.67	1.67
Imaging Agent	0.01	15	0.797	0.07	89	5.93	0.06	0.04
HP Imaging Oil	0.01	87.6	0.77	0.06	99	6.34	0.06	0.28
HP Electrolink 3.1	0.063	552	0.856	0.45	74	5.26	0.33	1.45
HP Imaging Agent 4.2	0.01	15	0.819	0.07	80	5.47	0.05	0.04
Imaging Oil 4.0	0.01	87.6	0.77	0.06	99	6.38	0.06	0.28
HP Electrolink 4.0 Magenta	0.071	622	0.818	0.48	79	5.39	0.38	1.68

Special UV White	0.33	1,735	1.32	3.63	0.02	1.00	0.33	0.87
Special UV Low Viscosity NSC Clear	0.33	1,735	1.09	3.00	1.1	0.1	0.01	0.04
Total	2.22	1,850	--	--	--	--	13.62	3.65

Table 4: Total Facility Wide and Increase in Regulated Air Pollutants:

Tons/Year						
	NOx	PM	VOC	Glycol Ethers	Ethylbenzene	Total HAPs
Total	0.01	1.11	60.22	8.06	0.14	13.52
Increase	-0.02	1.11	6.74	-0.28	0.14	-0.14

## REGULATORY APPLICABILITY

### 45CSR7 - To Prevent and Control Particulate Matter Air Pollution From Manufacturing Processes and Associated Operations

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

The only sources of particulate emissions proposed at this facility are from the combustion of propane in the solvent dryers for Sign Line 1. The facility is exempt from the emission limits of Section 4.1 of 45CSR7 since the proposed particulate emission rates are less than 1 lb/hr and 1,000 lb/yr. This facility is subject to the 20% opacity limit of 45CSR7 and due to the low particulate emissions from propane combustion in the dryers, they should be capable of meeting this limit. Due to the location and nature of this facility, there should be no sources of fugitive particulate emissions.

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

The purpose of this rule is to set forth the procedures for stationary source reporting, and the criteria for obtaining a permit to construct and operate a new stationary source which is not a major stationary source, to modify a non-major stationary source, to make modifications which are not major modifications to an existing major stationary source and to relocate non-major stationary sources within the state of West Virginia. Such construction, modification, or relocation without a required permit is a violation of this rule. This rule also establishes the requirements for obtaining an administrative update to an existing permit, a temporary

permit or a general permit, and for filing notifications and maintaining records of changes not otherwise subject to the permit requirements of this rule. This rule does not apply to nonroad engines, nonroad vehicles, motor vehicles, or other emission sources regulated under Subchapter II of the federal Clean Air Act; provided, however that the Secretary may regulate such sources pursuant to another rule promulgated for that purpose.

Under 45CSR13 this facility is required to get a permit because this source exceeds the regulatory emission threshold for criteria pollutants of 6 lb/hr and 10 ton/year for VOCs.

45CSR19 - Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution Which Cause or Contribute to Nonattainment

It is the intent of the Secretary that all applications filed by any person to construct major new or modified stationary air pollution sources, intending to locate in areas with air quality worse than the levels set to protect the public health and welfare, or that might impact those areas, must adequately meet the pre-construction review procedures and conditions of the Clean Air Act as amended and this rule.

This facility is not defined as a major stationary source of any regulated air pollutant and therefore this facility is not subject to this rule.

45CSR22 - Air Quality Management Fee

This rule establishes a program to collect fees for certificates to operate and for permits to construct, modify or relocate sources of air pollution. Funds collected from these fees will be used to supplement the Director's budget for the purpose of maintaining an effective air quality management program.

As can be seen in Table 2 this facility is not a major source. The applicant is a 9E source and is responsible for paying the \$200 annual fee. DALB is required to keep their Certificate to Operate current.

## TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The following information was obtained from EPA's Air Toxic website.

### Glycol Ethers:

Glycol ethers have many uses; these include use as solvents and as an ingredient in cleaning compounds, liquid soaps, and cosmetics. Acute (short-term) exposure to high levels of the glycol ethers in humans results in narcosis, pulmonary edema, and severe liver and kidney damage. Chronic (long-term) exposure to the glycol ethers in humans may result in neurological and blood effects, including fatigue, nausea, tremor, and anemia. No information is available on the reproductive, developmental, or carcinogenic effects of the glycol ethers in humans. Animal studies have reported reproductive and

developmental effects from inhalation and oral exposure to the glycol ethers. EPA has not classified the glycol ethers for carcinogenicity.

## AIR QUALITY IMPACT ANALYSIS

The increase in emissions from the proposed modification does not meet the definition of a major modification in accordance to 45CSR14 or 45CSR19, and therefore, an air quality impact analysis was not required.

## MONITORING OF OPERATIONS

For each line, DALB, Inc. shall record the following information on a daily and monthly basis: 1) the ink's name, manufacturer, and ID no., 2) the total amount of each ink used, 3) the VOC content of each ink, 4) the HAP (glycol ethers) content of each ink, 5) the hours of operation for the printing stations, 6) the total daily VOC and HAP emissions, and 7) the maximum average hourly VOC and HAP emissions.

Daily and maximum average hourly VOC and HAP emissions shall be calculated as follows:

$E_{VOC} = \sum_{i=1}^n A_i B_i$	$E_{VOC}$ is the daily VOC emission rate (lb/day), A is the amount of ink used (gals/day), and B is the VOC content of the ink (lbs VOC/gal).
$E_{HAP} = \sum_{i=1}^n A_i B_i C_i$	$E_{HAP}$ is the daily HAP (glycol ethers) emission rate (lb/day), A is the amount of ink used (gals/day), B is the VOC content of the ink (lbs VOC/gal), and C is the maximum percentage of glycol ether present in the ink.
$H_{VOC} = \frac{\sum_{i=1}^n A_i B_i}{h}$	$H_{VOC}$ is the maximum average hourly VOC emission rate (lb/hr), A is the amount of ink used (gals/day), B is the VOC content of the ink (lbs VOC/gal), and h is the hours of operation for the printing station.
$H_{HAP} = \frac{\sum_{i=1}^n A_i B_i C_i}{h}$	$H_{HAP}$ is the maximum average hourly HAP (glycol ethers) emission rate (lb/hr), A is the amount of ink used (gals/day), B is the VOC content of the ink (lbs VOC/gal), C is the maximum percentage of glycol ether present in the ink, and h is the hours of operation for the printing station.

At the end of each day, the facility shall record the following on a monthly record: 1) the total amount of each material used on the sign and decal lines, on the flavor card line, Inca UV Printer, and for clean up, 2) the material's name, manufacturer, and ID no., 3) the VOC and HAP (glycol ether) contents of each material, 4) the total daily VOC and HAP emissions. At the end of each month, the facility shall calculate a total VOC and HAP emissions for the month and shall use the monthly emissions to calculate a twelve month rolling total.

In addition to these records, the facility shall also maintain a monthly record of total propane usage. All records shall be maintained onsite for a period of five (5) years. Certified records shall be made available upon request.

### CHANGES TO PERMIT R13-2317F

Removal of old Sign Line 2 with associated 0.5-mmBtu/hr propane dryer. Removal of old Sign Line 4 with associated 0.25-mmBtu/hr propane dryer. Removal of Decal Line 2. Modification of emissions from Decal Inline and Small Format Digital Printing Line. Installation and operation of Large Format Digital Printing Line and Thermoforming & Trimming Line.

### RECOMMENDATION TO DIRECTOR

Permit Application No. R13-2317F to DALB, Inc. for the modification of the screen printing facility near Kearneysville, Jefferson County, WV meets all applicable requirements and should therefore be approved.

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David Keatley  
Permit Engineer - NSR Permitting

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December 19, 2017  
Date