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ENGINEERING EVALUATION / FACT SHEET

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BACKGROUND INFORMATION

Application No.:	R13-2315F
Plant ID No.:	083-00104
Applicant:	Greenfield Cabinetry, LLC
Facility Name:	Elkins
Location:	Randolph County
NAICS Code:	337110
Application Type:	Modification
Received Date:	May 18, 2015
Engineer Assigned:	Joe Kessler
Fee Amount:	$1,000
Date Received:	May 20, 2015
Complete Date:	June 17, 2015
Due Date:	September 15, 2015
Applicant Ad Date:	May 20, 2015
Newspaper:	*The Inter-Mountain*
UTM's:	Easting: 598.90 km Northing: 4,308.50km Zone: 17
Latitude/Longitude:	38.91984/-79.85916
Description:	Addition of a manual spray booth.

On May 18, 2015, Greenfield Cabinetry, LLC (Greenfield) submitted a permit application to modify the Elkins Cabinet Manufacturing Facility located in Elkins, Randolph County, WV. The facility was originally permitted under Permit Number R13-2315 on October 28, 1999. Since the issuance of R13-2315, the facility has been the subject of several other new source review (NSR) permitting actions:

- On July 9, 2001, Greenfield was issued a Class I Administrative Update (A/U) as Permit Number R13-2315A for the removal of references to Hazardous Air Pollutants (HAPs) they were no longer using;

- On May 17, 2002, Greenfield was issued a Class I A/U as Permit Number R13-2315B to revise various coating usage limits;

- On September 11, 2002, Greenfield was issued a Class I A/U as Permit Number R13-2315C to revise various coating usage limits;

- On February 13, 2003, Greenfield was issued a Class I A/U as Permit Number R13-2315D to change the permit from using material usage based limits to using actual emissions recording for potential-to-emit (PTE) compliance; and

- On February 10, 2014, Greenfield was issued a Class I A/U as Permit Number R13-2315E to modify the requirements related to use of materials containing HAPs.

DESCRIPTION OF PROCESS

Existing Facility

The Elkins Cabinet Manufacturing Facility produces as a final product assembled wood floor and wall cabinets. To accomplish this, the facility includes woodworking and coating operations. All woodworking operations are controlled by cyclones and bag filters and vented inside the building. As such, any particulate matter emissions exiting the building through the general exhaust fans is expected to be minimal. Coating operations are performed in one of three (3) existing spray booths (SB-01 through SB-03). In each spray booth, all coatings (with the exception of hand wipe varnishes) are applied using High Volume Low Pressure (HVLP) spray guns which limit the amount of particulate matter overspray generated (assumed to have a minimum transfer efficiency of 72.5%). Additionally, each spray booth is controlled by a fiberglass mat filter (with a minimum particulate matter control efficiency of 82.5%).

Other equipment includes two electric curing ovens and a natural gas-fired 0.50 mmBtu/hr boiler for use to provide heat for drying.

Proposed Modifications

Greenfield is now proposing the addition of one (1) spray booth (SB-04) for additional coating applications. This spray-booth will be similar to the existing booths filters with the exception that SB-04 will be equipped with a "Paint Arrestors 3400 Series" fiberglass mat filter (OF-4) that will achieve a minimum 99% particulate matter control efficiency. The addition of the spray-booth will allow for an expansion in production at the facility and will result in an increase in VOC emissions.

Additionally, Greenfield has updated the worst-case estimates for facility-wide individual speciated HAPs (including HAPs not previously quantified) from surface coating. All HAPs have counted toward the facility-wide total HAPS limit, but not all HAPs were previously speciated with permitted limits.

SITE INSPECTION

Due to the nature of the source and the proposed changes, the writer deemed a site inspection as not necessary. The facility was last inspected by DAQ Compliance/ Enforcement (C/E) Inspector Dan Bauerle on December 13, 2012. As of January 16, 2015, with the submission of required documentation, the facility has been determined to be "Status 30 - In Compliance."

AIR EMISSIONS AND CALCULATION METHODOLOGIES

Greenfield provided in Attachment N of the permit application an emission estimate for both particulate matter and VOCs from the addition of the new spray booth.

VOC Emissions From Coating Operations

VOC and HAP emissions from all coating operations are based on the VOC/HAP constituent percentages listed in the MSDS or certified product data sheets. It is assumed that all VOCs/HAPs within the coatings volatilize and are emitted (no VOC control devices are used). Although coating operations will take place in four (4) different spray-booths and components are cured in a separate electric infrared station, it is impossible to quantify the VOCs/HAPs to be emitted from each emission point. Furthermore, each spray booth is used for a variety of coating applications and not limited to one type of coating. Therefore, VOC/HAP emission rates are given as an aggregate total emitted from all potential emission points (and any fugitive emissions). This facility-wide emission rate was updated to account for the increase in production associated with the installation of the proposed new spray-booth.

Emission estimates for the application of surface coatings are based on the coating usages for the designated period of time. Maximum annual coating usages are based on the estimated maximum amount of coatings to be used in a twelve-month rolling basis as provided by the applicant. Maximum monthly coating usages are calculated by dividing the annual usages by 12 and providing a 50% safety factor to account for high production months. Maximum hourly coating usages were determined by using the full capacity of the spray guns and the highest VOC/HAP contents of the various coatings used.

Particulate Matter Emissions From Coating Operations

Particulate matter may be emitted from the coating operations from the overspray generated in the spray booth. The amount of particulate matter in the coatings are based on the solids content of the individual coatings (lb/gal) as given in the MSDS or certified product data sheets. Overspray will be limited through the use of HVLP spray guns with a transfer efficiency of 72.5% (the 72.5% was calculated using vendor information in Permit R13-2315). The remaining overspray is evacuated from the spray-booths and, after passing through a fiberglass particulate filter, is vented up through the stack. The existing particulate filters are given a collection efficiency of 82.5% while the new "Paint Arrestors 3400 Series" filters used on SB-04 will have a collection efficiency of 99% as based on information provided by the vendor and included in the permit application. To be conservative, for the purposes of this calculation, all particulate matter emissions are assumed to be $PM_{2.5}$.

Emissions Summary

The change in the facility-wide PTE as a result of the proposed addition of the spray booth is given in the following table:

Table 1: Change In Facility-Wide Annual PTE

Pollutant	R13-2315E[1]		R13-2315F		Change	
	lbs/hour	tons/year	lbs/hour	tons/year	lbs/hour	tons/year
CO	0.04	0.18	0.04	0.18	0.00	0.00
NO_X	0.05	0.22	0.05	0.22	0.00	0.00
PM[2]	0.94	1.00	1.06	2.98	0.12	1.98
SO_2	<0.01	<0.01	<0.01	<0.01	0.00	0.00
VOCs	38.73	40.29	83.22	87.63	44.49	47.34
Total HAPs	6.54	6.82	37.45	6.94	30.91	0.12
Xylene	*3.66*	*3.81*	*16.87*	*3.07*	*13.21*	*-0.74*
Toluene	*2.13*	*2.21*	*7.69*	*1.02*	*5.56*	*-1.19*
Ethyl benzene	*0.64*	*0.67*	*2.80*	*0.49*	*2.16*	*-0.18*
Methyl Isobutyl Ketone[3]	*n/a*	*n/a*	*3.22*	*0.60*	*3.22*	*0.60*
Glycol Ether[3]	*n/a*	*n/a*	*4.44*	*0.67*	*4.44*	*0.67*
Methanol[3]	*n/a*	*n/a*	*1.82*	*1.01*	*1.82*	*1.01*
Cobalt 2 Ethylhexanoate[3]	*n/a*	*n/a*	*0.43*	*<0.01*	*0.43*	*0.01*
Chromium II[3]	*n/a*	*n/a*	*0.01*	*<0.01*	*0.01*	*0.01*
Formaldehyde[3]	*n/a*	*n/a*	*0.06*	*0.08*	*0.06*	*0.08*

(1) PTE calculated from permit R13-2315E.
(2) All particulate matter emissions are assumed to be less than 2.5 microns. Includes condensables.
(3) These calculated changes reflect paper increases only as these HAPs may have been emitted previously in some quantity but were not limited in the permit.

REGULATORY APPLICABILITY

The following will discuss only the regulatory applicability of general rules and specific rules to the emission units that have been proposed to be modified or added as part of this permitting action.

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

45CSR7 has two substantive requirements applicable to the particulate matter emissions from the proposed spray booth - defined as a "manufacturing process" pursuant to §45-7-2.20. These are the opacity requirements under Section 3 and the mass emission standards under Section 4. Each of these sections will be discussed below.

45CSR7 Opacity Standards - Section 3

Section 3.1 sets an opacity limit of 20% on all applicable "source operations" as defined under §45-7-2.38. As noted above, Greenfield has proposed the use of HVLP spray guns and highly efficient filters to control particulate matter emissions from the new spray booth. Proper operation and maintenance of this equipment should maintain any opacity from the proposed spray booth to well below 20%.

45CSR7 Weight Emission Standards - Section 4

Section 4.1 of 45CSR7 requires that each manufacturing process source operation or duplicate source operation meet a particulate matter limit based on the weight of material processed through the source operation. The weight of cabinet components that will be coated in the proposed new spray booth is not known. However, the facility-wide particulate matter emission rate from all coating operations can be used to back-calculate the minimum process weight rate that would be needed for compliance. Based on a controlled facility-wide particulate matter emission rate from coating operations of 1.06 lbs/hour, a total process weight rate for type 'a' sources from all four spray booths of 883 lbs/hour would be needed for 45CSR7 compliance. It is clear that if all four spray booths were operating at maximum capacity, the throughput of cabinet components would exceed this process weight rate. Additionally, as all potential particulate matter emissions from surface coating is well controlled (see above), the individual and duplicate source operations are expected to easily meet 45CSR7.

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 proposed changes to the Elkins Cabinet Manufacturing Facility have the potential to increase the PTE of the facility in excess of six (6) lbs/hour and ten (10) TPY (see Table 1 above) and, therefore, pursuant to §45-13-2.17, the changes are defined as a "modification" under 45CSR13. Pursuant to §45-13-5.1, "[n]o person shall cause, suffer, allow or permit the construction, modification, relocation and operation of any stationary source to be commenced without . . . obtaining a permit to construct." Therefore, Greenfield is required to obtain a permit under 45CSR13 for the modification of the facility.

As required under §45-13-8.3 ("Notice Level A"), Greenfield placed a Class I legal advertisement in a "newspaper of *general circulation* in the area where the source is . . . located." The ad ran on May 20, 2015 in *The Inter-Mountain* and the affidavit of publication for this legal advertisement was submitted on June 4, 2015.

45CSR14: Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration (non-applicability)

The Elkins Cabinet Manufacturing Facility is defined (see Table 1 above) as an existing "minor stationary source" under 45CSR14 - i.e., PTE of each regulated pollutant is less than 250 TPY. The post-modification facility-wide PTE of each pollutant shall remain below 250 TPY and, therefore, the proposed changes are not defined as a major modification under 45CSR14 and the provisions do not apply.

45CSR30: Requirements for Operating Permits (non-applicability)

45CSR30 provides for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. The modified Elkins Cabinet Manufacturing Facility does not meet the definition of a "major source under § 112 of the Clean Air Act" as outlined under §45-30-2.26 and clarified (fugitive policy) under 45CSR30b (see Table 1 above) as no regulated pollutant has an emission rate in excess of 100 TPY, no single HAP has an emission rate in excess of 10 TPY, and the facility-wide emission rate of HAPs does not exceed 25 TPY.

40 CFR 63, Subpart JJ: National Emission Standards for Wood Furniture Manufacturing Operations

As a minor source (or "area source") of HAPs (no single HAP has an emission rate in excess of 10 TPY and the facility-wide emission rate of HAPs does not exceed 25 TPY), the Elkins Cabinet Manufacturing Facility is not subject to Subpart JJ.

TOXICITY ANALYSIS OF NON-CRITERIA REGULATED POLLUTANTS

This section provides an analysis for those regulated pollutants that may be emitted from the proposed modification and that are not classified as "criteria pollutants." Criteria pollutants are defined as Carbon Monoxide (CO), Lead (Pb), Oxides of Nitrogen (NO_x), Ozone, Particulate Matter (PM, PM_{10}, and $PM_{2.5}$), and Sulfur Dioxide (SO_2). These pollutants have National Ambient Air Quality Standards (NAAQS) set for each that are designed to protect the public health and welfare. Other pollutants of concern, although designated as non-criteria and without national concentration standards, are regulated through various federal and programs designed to limit their emissions and public exposure. These programs include federal source-specific HAP limits promulgated under 40 CFR 61 (NESHAPS) and 40 CFR 63 (MACT). Any potential applicability to these programs were discussed under REGULATORY APPLICABILITY above.

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. Greenfield has identified the following HAPs as potentially being emitted at the Elkins Cabinet Manufacturing Facility. The following table lists each HAP's carcinogenic risk (as based on analysis provided in the Integrated Risk Information System (IRIS)):

Table 2: Potential HAPs - Carcinogenic Risk

HAPs	Type	Known/Suspected Carcinogen	Classification
Xylene	VOC	No	Inadequate Data
Toluene	VOC	No	Inadequate Data
Ethyl benzene	VOC	No	D- Not Classifiable
Methyl Isobutyl Ketone	VOC	No	Inadequate Data

HAPs	Type	Known/Suspected Carcinogen	Classification
Glycol Ether	VOC	No	No Assessment Available
Methanol	VOC	No	No Assessment Available
Cobalt 2 Ethylhexanoate	PM	No	No Assessment Available
Chromium II	PM	No	No Assessment Available
Formaldehyde	VOC	Yes	B1 - Probable Human Carcinogen

All HAPs have other non-carcinogenic chronic and acute effects. These adverse health affects 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

The estimated maximum emissions from the modified Elkins Cabinet Manufacturing Facility are less than applicability thresholds that would define the proposed facility as a "major stationary source" under 45CSR14 and, therefore, no air quality impacts modeling analysis was required. Additionally, based on the nature of the proposed modification, modeling was not required under 45CSR13, Section 7.

MONITORING, COMPLIANCE DEMONSTRATIONS, REPORTING, AND RECORDING OF OPERATIONS

No substantive changes to the existing monitoring, compliance demonstrations, reporting or record-keeping requirements were made as part of this permitting process. Compliance with the revised emission limits will continue to be based on monthly actual emissions monitoring, recording, and reporting as given under 4.2.1. of the draft permit.

PERFORMANCE TESTING OF OPERATIONS

No substantive changes to the existing performance testing requirements were made.

CHANGES TO PERMIT R13-2315D

The substantive changes to Permit Number R13-2315D are the following:

- The new spray booth was added to Table 1.0 Emission Units;
- The spray booth emission limits given under 4.1.2 were updated;
- The higher minimum control efficiency of filter OF-4 was put into requirement 4.1.4(c); and
- The requirement to only hand wipe stains and glazes under 4.1.4(d) has been removed.

RECOMMENDATION TO DIRECTOR

The information provided in permit application R13-2315F indicates that compliance with all applicable federal and state air quality regulations will be achieved. Therefore, I recommend to the Director the issuance of Permit Number R13-2315F to Greenfield Cabinetry, LLC for the modification and operation of the Elkins Cabinet Manufacturing Facility located in Elkins, Randolph County, WV.

Joe Kessler, PE
Engineer

8/12/15
Date