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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-21920
Plant ID No.: 067-00095
Applicant: JELD-WEN, Inc.
Facility Name: Craigsville Facility
Location: Nicholas County
NAICS Code: 321219/325510
Application Type: Modification
Received Date: July 31, 2012
Engineer Assigned: Steven R. Pursley, PE
Fee Amount: \$3,500
Date Received: August 1, 2012
Complete Date: August 30, 2012
Due Date: November 28, 2012
Applicant Ad Date: August 2, 2012
Newspaper: *The Nicholas Chronicle*
UTM's: Easting: 529.8 km Northing: 4,243.8 km Zone: 17
Description: Construction of a control device controlling HAP emissions to fulfill the requirements of 40 CFR 63 Subpart DDDD.

DESCRIPTION OF PROCESS

The facility manufactures door skins in a process similar to the hardboard manufacturing process. The fiber-containing material, or furnish, consists of green poplar chips. The furnish is mechanically separated into fiber by the refiner and is then dried in a tube dryer. Next, the fiber is blended with a no-added formaldehyde resin and a fiber mat is formed. The mat continues into a cold pre-compressor, which is followed by trimming operations. The mat is then consolidated in a steam-heated press. After the press, the door skins are cut to the final dimensions and painted with waterborne primer.

A wood-fired boiler burns wood residuals from the production process, as well as purchased hogged fuel to generate steam for the facility. Additional combustion sources at the facility include a natural gas-fired backup boiler and natural gas-heated ovens associated with the priming operations. The fiber dryer is heated by both steam and natural gas (direct fired).

SITE INSPECTION

No site inspection was performed by the writer since JELD WEN is an existing, well known facility. The facility was inspected by Eric Ray of DAQ's enforcement section on August 18, 2011. The facility was deemed out of compliance. As discussed below under the Regulatory Applicability section of this document, JELD WEN has entered into a consent decree with USEPA and has a negotiated timeline in which to come into compliance. Submittal of this permit application is part of said consent decree.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Under the old permit, the Press Vents, Rotary Valve, and Fiber Dryer each had separate emission points (E11a & E11b for PV, E16 for RV and E7, E8 & E9 for FD). Now each of those sources will be vented to the new biofilter. So the following estimate of emissions compares the previously permitted 6 emission points to the new single emissions points. Emissions from the previous 6 emission points comes directly from permit R13-2192N. Emissions from the new emission point are based on a mixture of AP-42 emission factors and source testing combined with biofilter control efficiencies as follows (based on information provided by MET-PRO, the biofilter manufacturer):

VOC	5% (MET-PRO estimates 10% but applicant used 5% to be conservative)
Methanol	90%
Formaldehyde	90%

The existing HAP emission limits for the sources to be vented to the biofilter are as follows:

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	E11a/b		E16		E7,E8,E9		Total	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Acetaldehyde	0.15	0.60	--	--	0.72	1.36	0.87	1.96
Acrolein	0.15	0.60	--	--	0.39	0.74	0.54	1.34
Benzene	--	--	--	--	0.02	0.03	0.02	0.03
Formaldehyde	0.17	0.67	0.01	0.02	0.62	1.17	0.80	1.86
Methanol	0.53	2.08	0.17	0.73	12.09	22.73	12.79	25.54
Phenol	0.53	2.08	--	--	1.38	2.59	1.91	4.67
Propionaldehyde	0.15	0.60	--	--	0.39	0.74	0.54	1.34
MDI	0.55	2.15	--	--	--	--	0.55	2.15
Total HAPS	2.23	8.78	0.18	0.75	15.6	29.4	18	38.89

The existing criteria emissions limits for the sources to be vented to the biofilter are as follows:

	E11a/b		E16		E7		E8		E9		Total	
	lb/hr	tpy	lb/hr	tpy			lb/hr	tpy			lb/hr	tpy
CO	--	--	--	--	0.54	2.37	0.54	2.37	0.54	2.37	1.62	7.11
NO _x	--	--	--	--	0.64	2.82	0.64	2.82	0.64	2.82	1.92	8.46
PM ₁₀	2.41	7.93	--	--	0.10	0.32	0.10	0.32	0.10	0.32	2.71	8.89
SO ₂	--	--	--	--	--	0.02	--	0.02	--	0.02	--	0.06
VOCs	--	--	--	--	12.1	43.3	12.1	43.3	12.1	43.3	36.3	129.9

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HAP emissions from the new biofilter will be as follows:

	E18	
	lb/hr	tpy
Acetaldehyde	0.88	1.96
Acrolein	0.68	1.59
Benzene	0.02	0.03
Formaldehyde	0.08	0.19
Methanol	1.30	2.55
Phenol	1.91	4.68
Propionaldehyde	0.55	1.35
MDI	0.55	2.15
Total HAPS	5.97	14.5

As can be seen from the above, the installation of the biofilter results in decreases in Formaldehyde (1.67 tpy), Methanol (22.99 tpy) and total HAPs (24.39 tpy). It would appear that Acrolein increases 0.25 tpy. This is due to the fact that Acrolein emissions from the rotary valve were not accounted for in the previous permit.

Criteria emissions from the new biofilter will be as follows:

	E18	
	lb/hr	tpy
CO	1.74	7.11
NO _x	2.04	8.46
PM ₁₀	0.17	0.32
SO ₂	0.01	0.06
VOCs	18.15	39.22

As can be seen from the above, there will be no change in emissions of CO, NO_x, or SO₂. Emissions of PM₁₀ will decrease by 8.57 tpy while emissions of VOCs will decrease by 90.68 tpy.

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REGULATORY APPLICABILITY

Units covered under this permit modification are subject to the following state and federal rules:

STATE RULES

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

The process weight rate for the facility is 23,942 pounds per hour. This would equate to a 45CSR7 limit of 17.58 pounds per hour. Total stack PM emissions from the facility (except for PM emissions from the Boilers which are regulated under 45CSR2) are 8.42 pounds per hour.

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 applied for a permit in order to comply with the terms and conditions of consent decree entered into with USEPA and DOJ (Civil Action No. 11-453 ST).

45CSR30 Requirements for Operating Permits

The facility is subject to 45CSR30 because it has the potential to emit more than 100 tons per year of CO, NO_x and VOCs. The facility has an existing Title V permit that will also need to be modified.

FEDERAL RULES

40 CFR 63 Subpart DDDD Plywood and Composite Wood Products MACT

JELD-WEN is not currently in compliance with the PCWP MACT. However, they have entered into a Consent Decree (Civil Action No. 11-453ST, DOJ No. 90-5-2-1-09567) with USEPA which requires final compliance with all MACT requirements by August 4, 2014. This permit application is part of that compliance plan.

There are three compliance options outlined in 40 CFR §63.2240. These compliance options are 1) Production-based compliance option, 2) Add on control systems, or 3) Emissions averaging. To demonstrate final

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compliance with the Final MACT requirements, JELD-WEN has decided to use the compliance option for add-on control systems for each Affected Process Unit.

When choosing the add-on control system, 40 CFR §63.2240 (b) requires that the control device meet the requirements of Tables 1B and 2 of the subpart. Table 2 lists the approved control devices along with their required respective monitoring. JELD-WEN has selected a biofilter as their approved control device. Table 1B lists the emission reductions the control device must achieve. JELD-WEN has chosen to meet the 90% reduction requirement of methanol (formaldehyde will also be reduced by 90%).

40 CFR 63 Subpart QQQQ Surface Coating of Wood Building Products MACT

The facility has previously chosen to comply with the MACT by using the compliant materials option as specified in 40 CFR 63.4691(a). 40 CFR 63.4690 (when combined with the compliant materials option) requires that the primer contain no more than 0.06 pounds of HAP per gallon of solids. The facility must maintain records as required by 40 CFR 63.4730 to demonstrate compliance with this limit. The initial compliance status notification requirements have been met. The facility shall submit semi-annual reports and maintain records as applicable in §§63.4730 and 63.4731 as required within this subpart.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The emission rates of the following HAPs are effected by this modification.

The following information comes directly from EPA's Air Toxics Website:

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.

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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).

Methanol:

Methanol is released to the environment during industrial uses and naturally from volcanic gases, vegetation, and microbes. Exposure may occur from ambient air and during the use of solvents. Acute (short-term) or chronic (long-term) exposure of humans to methanol by inhalation or ingestion may result in blurred vision, headache, dizziness, and nausea. No information is available on the reproductive, developmental, or carcinogenic effects of methanol in humans. Birth defects have been observed in the offspring of rats and mice exposed to methanol by inhalation. EPA has not classified methanol with respect to carcinogenicity.

Methylene 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.

Phenol:

Exposure to phenol may occur from the use of some medicinal products (including throat lozenges and ointments). Phenol is highly irritating to the skin, eyes, and mucous membranes in humans after acute (short-term) inhalation or dermal exposures. Phenol is considered to be quite toxic to humans via oral exposure. Anorexia, progressive weight loss, diarrhea, vertigo, salivation, a dark coloration of the urine, and blood and liver effects have been reported in chronically (long-term) exposed humans. Animal studies have reported reduced fetal body weights, growth retardation, and abnormal development in the offspring of animals exposed to phenol by the oral route. EPA has classified phenol 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.

AIR QUALITY IMPACT ANALYSIS

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

MONITORING OF OPERATIONS

In addition to the existing monitoring requirements of R13-2192N, the permittee will be required to install a continuous parameter monitoring system (CPMS) for measuring the biofilters operating parameters. Specifically, either the biofilter bed temperature OR the THC concentration in the exhaust. Said CPMS shall be installed, operated and maintained in accordance with 40 CFR 63.2269.

CHANGES TO PERMIT R13-2192N

The following changes were made to permit R13-2192N

- * Table 1.0 was updated to reflect the changes made. Specifically, it was changed to reflect the fact that the Press Vents, Dryer and Rotary Valve all now vent to a common control device and associated emission point.
- * Condition 4.1.6 was changed to reflect the new (generally lower) emissions. Additionally, a limit for MDI was added.
- * Condition 4.1.7 was changed to reflect the new emission point arrangement and new lower emission limits.
- * Old Condition 4.1.8 was deleted since the press vent emissions are now included in the limits in conditions 4.1.6 and 4.1.7.
- * Old Condition 4.1.10 was changed to reflect the new emission point arrangement and slightly different emission limits.
- * Old Condition 4.1.11 was changed to reflect the new emission point arrangement and slightly different emission limits.
- * Condition 4.2.1 was changed to reflect Subpart DDDD requirements.
- * New Condition 4.3.12 was added.

RECOMMENDATION TO DIRECTOR

Information supplied in the application indicates that compliance with all applicable regulations (except as noted under regulatory applicability) will be achieved. Therefore it is the recommendation of the writer that permit R13-2192O for the modification of an door skin manufacturing facility be granted to JELD-WEN, Inc

Steven R. Pursley, PE
Engineer

November 13, 2012

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